



**Livelihoods and forest management in
transition – knowledge and strategies
of local people in the walnut-fruit forests
in Kyrgyzstan**

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**The University of Reading
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**Livelihoods and forest management in transition –
knowledge and strategies of local people in the walnut-fruit forests
in Kyrgyzstan**

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for the
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Abstract

Since the breakdown of the Soviet Union in 1991, the Central Asian country of Kyrgyzstan has been undergoing a difficult process of economic, political and social transition. This applies as much to the country and its society and national economy as a whole as to the forest sector.

The transition process from central planning and a one-party system towards a market economy and a more pluralistic political system raises fundamental questions concerning the future roles of the State, private stakeholders, civil society and the market, and effective modes of governance. These questions also concern natural resource management in general and the forest sector in particular. Accordingly, the Kyrgyz forest policies are being adapted to the new social, political and economic contexts and new institutional arrangements for the conservation and management of the Kyrgyz forests are currently being explored. The first part of this study provides a theoretical introduction into the transition process and key concepts from the international debate in the fields of development (e.g. participation, decentralisation, devolution) and of forestry (e.g. sustainable forest management, collaborative forest management) that influence the ongoing reforms in Kyrgyzstan.

This research focuses on the man-forest interface and institutional aspects in the State-owned walnut-fruit forests of Southern Kyrgyzstan in times of social, political and economic transition. These valuable forest resources have come under increased human pressure since the breakdown of the Soviet Union. The economic difficulties of the transition process have prompted the question, how these forests can be sustainably managed in a partnership involving the State Forest Service, local people and other relevant stakeholders. In this context, this study explores ways in which local people can contribute to the sustainable management of the walnut-fruit forests.

The study analyses and documents key changes in terms of the institutional framework, forest policies and local livelihoods in the walnut-fruit forest belt. It identifies opportunities and constraints for the involvement of local people in forest management and assesses the potential of local people who have leased a forest plot to contribute to forest management with their skills, knowledge and experience. Forest use practices undertaken by these leaseholders are described and analysed. Hereby, forest use is analysed in the context of the overall livelihood systems of the respondents. This allows developing a good understanding of the significance of forest resources for the livelihoods of forest leaseholders.

The research was conducted on four research sites in the walnut-fruit forest belt which differ in terms of general conditions for forest management, using a combination of qualitative and quantitative research methods. In terms of knowledge, the research found that, generally, local people have solid forestry skills, relevant technical and marketing knowledge and are, under certain circumstances, increasingly innovative. Applied ecological knowledge, however, is less widespread. Forest use is not as multifunctional as one would expect given the wide range of non-timber forest products and agricultural products available in these forests. The results clearly show that the walnut-fruit forests are a key resource for subsistence and a welcome, but rather unreliable source of cash income. The reasons for the observed forest use patterns are identified and discussed.

The discussion concerning future governance revolves around different options for appropriate institutional arrangements and the issue of devolution of property rights for the management of these forests. The complementarity of the knowledge and the roles of local people and foresters in forest management is stressed, and recommendations for mobilising and extending the knowledge available with local people and increasing the capacity of the State Forest Service to address social questions are derived. New roles for local people, State bodies and civil society are envisaged as these stakeholders jointly move towards a more participatory management system for the unique ecosystem of the walnut-fruit forests.



The forest – the future of the people
(Forest subrange No 4, area 1938 ha)

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Glossary of terms

<i>Ail-Okmot</i>	Municipality or rural commune typically comprising several settlements; municipal administration; sometimes also used to refer to the locally elected head of the municipal administration.
<i>Aksakal</i>	Village elder, literally “white beard” (Kyrgyz)
<i>Akim</i>	Head of the district administration (Russian: <i>Rayon</i>), appointed by the President with approval of the district assembly.
<i>Akimiat</i>	District administration.
<i>Ashar</i>	A form of voluntary group labour and pooling of funds.
Forest Institute	Short English name of the “Institute of Forest and Walnut Management of the National Academy of Science of the Kyrgyz Republic”
Forest range	Territorial sub-unit of a State forest farm (Russian: <i>leshoz</i> , see below)
<i>Goslesagentsvo</i>	State Agency for Forests and Wildlife, name of today’s State Forest Service until 2000
<i>Goslesfund</i>	State Forest Fund comprising forests and non-forested areas, the latter also destined for forestry use in the long-term, under control by SFS.
<i>Goszemregister</i>	State administration for land management and registration of real estate rights.
<i>Jailoo</i>	Summer pastures
<i>Khan</i>	Title for the ruler of a State or empire in Central Asia, originally commander or leader in Mongolian and Turkish.
<i>Khanate</i>	State or empire in Central Asia controlled by a <i>khan</i> .
Kirghiz SSR	Kirghiz Soviet Socialist Republic
Kirghizia	Short name of the Kirghiz Soviet Socialist Republic (Kirghiz SSR), i.e. the name of today’s Kyrgyzstan during most of its time as part of the Soviet Union.
<i>Kenesh</i>	Self-government assemblies, members elected by the citizens of the respective territorial entity
<i>Kolhoz</i>	Cooperative (collective) agricultural farm during the Soviet period.
Kyrgyz Republic	Official name of independent Kyrgyzstan since 1991.
Kyrgyzstan	Commonly used name for the independent Kyrgyz Republic.
<i>Leshoz</i>	State forest farm; a form of decentralised forest administration managing an area of forest. Collective State forest farm during Soviet period - a territory with a resident population.
<i>Oblast</i>	Province/Provincial administrative body, sometimes also translated as Region
<i>Oblesupravlenie</i>	Regional Forest Administration, i.e. forest administration at the regional, provincial level (<i>Oblast</i>)
<i>Orech-Les</i>	Applied silvicultural research project in the walnut-fruit forests jointly undertaken by the Swiss Federal Institute of Technology Zurich (ETHZ) and the Kyrgyz Forest Institute, literally “walnut-forest” (Russian)
<i>Plov</i>	traditional Uzbek and southern Kyrgyz rice dish
<i>Rayon</i>	Administrative district, a constituent part of the <i>Oblast</i> .
<i>Sherine</i>	a traditional rotating system of responsibility for hospitality
<i>Som</i>	Kyrgyz currency; exchange rate 2001: 1 USD \approx 47 Som; 2004: 1 USD \approx 42 Som
<i>Sovhoz</i>	State agricultural farm during the Soviet period.

<i>Zapovednik</i>	State nature reserve, nature protection as the primary objective; human activities within “ <i>zapovedniki</i> ” are strictly controlled and economic activities are prohibited ¹ .
<i>Zakaznik</i>	State specialised reserve, conservation of certain species or habitats as the primary objective; limited economic activities within “ <i>zakazniki</i> ” are permitted as long as the regulations of the “ <i>zakazniki</i> ” are obeyed. There are five different sub-categories of “ <i>zakazniki</i> ”: complex, zoological, botanical, forest and hydrogeological ² .

¹ Cf. Chapter II of the “Law on Specially Protected Natural Territories” of the Kyrgyz Republic (1994) and Oldfield (2005)

² Cf. Chapter IV of the “Law on Specially Protected Natural Territories” of the Kyrgyz Republic (1994)

Abbreviations and acronyms

ACM	Adaptive Collaborative Management of Forests
AD	<i>Anno Domini</i> (Latin), years according to the Christian calendar
ANOVA	Analysis of variance
CFM	Collaborative Forest Management
CIFOR	Center for International Forestry Research
CIS	Commonwealth of Independent States
DFD	Department of Forest Development, previous name of today's State Forest Service in the year 2001, under the then new Ministry of Ecology and Emergency Situations.
DFID	Department for International Development of the British Government
ETH Zurich	Abbreviation of "Eidgenössische Technische Hochschule Zürich" which translates to "Swiss Federal Institute of Technology Zurich", Switzerland
FSC	Forest Stewardship Council
GLM	General Linear Model
GPS	Global Positioning System
Intercooperation	Swiss Foundation for Development and International Cooperation
IRDD	International and Rural Development Department, School of Agriculture, Policy and Development (SAPD), University of Reading, UK
ITTO	International Tropical Timber Organization
IUCN	The World Conservation Union
KIRFOR	Kyrgyz-Swiss Forestry Support Programme
m a.s.l.	Metres above sea level
n	Number of observations
n.a.	Not applicable
NR	Natural resources
NTFP	Non-Timber Forest Product, including firewood
ODI	Overseas Development Institute, London
OECD	Organisation for Economic Co-operation and Development
PRA	Participatory Rural Appraisal
PTD	Participatory Technology Development
RRA	Rapid Rural Appraisal
SAPD	School of Agriculture, Policy and Development, University of Reading, UK
SD	Standard Deviation
SDC	Swiss Agency for Development and Cooperation
SFS	State Forest Service (of the Kyrgyz Republic)
SFM	Sustainable Forest Management
SL	Sustainable livelihood
<i>s.l.</i>	Lat. " <i>sensu lato</i> " for "in the broad sense"
SPSS	Statistical Package for the Social Sciences
<i>s.s.</i>	Lat. " <i>sensu strictu</i> " for "in the strict, narrow sense"
Std. Error	Standard error (statistics)
USD	United States Dollar
WFF-belt	Walnut-fruit forest belt
WFFs	Walnut-fruit forests

Note on transliteration and spelling of Russian, Kyrgyz and Uzbek words

- In general, Russian words are transliterated according to the standard BS 2979 (1958) of the British Standards Institution & Chemical Abstracts Service³. However, in a few cases (e.g. *leshoz* instead of *leskhoz*) the author uses the spelling which got established in the wider environment in which this research was conducted (e.g. in translations of legal documents or in documents published by project partners such as the State Forest Service (SFS) or the Forest Institute).
- Plurals of Russian words are usually given in their anglicised version ending on a terminal “s” and not on a Russian “i” or “y” respectively (e.g. *leshozes* instead of *leshozy* (лесхозы)).
- Kyrgyz words are usually written in their anglicised version thus leaving out the typical umlauts to ease the reading (e.g. *Ail-Okmot* instead of *Ail-Ökmöt*).
- For places, the most widespread spelling at the time of fieldwork is used. In a few cases, the spelling used in this thesis does thus not reflect recent changes in the spelling of geographical names (e.g. the spelling of the name of the city of Jalal-Abad, as used in this thesis, was recently changed to Jalalabat).

Note on the use of scientific and common plant names

- The common and the scientific name of a plant is given the first time the particular plant species or genus is mentioned in the text. Subsequently only the common name is used, with exception of Section 4.3.1 describing the walnut-fruit forests and of tables. The authority is stated the first time the scientific name is used.
- The database “the International Plant Names Index (IPNI)” (a collaboration between the Royal Botanic Gardens, Kew, the Harvard University Herbaria and the Australian National Herbarium) was used to check the scientific names of plants and the authorities (www.ipni.org, accessed 10 May 2007).

³ Source: <http://tastatur.da.ru/en/transliteration.html> (Accessed 30/09/2004)

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1. Background, relevance, aim and objectives of the research

This thesis is a study about man and forest resources during times of social, political and economic transition. It explores ways in which local people living in the area of the walnut-fruit forests (WFFs) in Southern Kyrgyzstan can contribute to sustainable forest management. More specifically, it addresses the questions as to what potential roles local people can play in forest management, what constraints have to be overcome in order to use this potential and how different stakeholders, in particular the State, Kyrgyz civil society and citizens, can collaborate to achieve sustainable forest management.

Throughout the world, thinking about natural resource management and development, about the roles of the State, civil society actors, the private sector and local people/communities in natural resource management under the conditions of globalisation, decreasing State budgets, and an increasing marketisation is constantly evolving. The need for changes on all levels is particularly accentuated in countries in transition such as Kyrgyzstan. The ongoing transition process fundamentally affects natural resources such as forests, people living in forested areas and the relationship between people and forest resources. This is reflected in changing local livelihood systems and changes in forest management, as people try to cope with the challenges of socio-economic transition and local people, the State and other stakeholders struggle to find new institutional arrangements for the management of forests and other natural resources.

Using the example of the WFFs of Southern Kyrgyzstan, this thesis analyses and contributes to a better understanding of the ongoing changes at the man-forest interface in the context of the broader transition process of Kyrgyzstan. The study takes the situation under the late Soviet rule as a starting point and describes and analyses the changes in terms of the institutional framework for forest governance, local people's livelihoods and forest management involving local people with their knowledge and skills. Hereby, it applies a conceptual framework that was developed on the basis of recent thinking on institutional dimensions of forest management, on the transition process, and on concepts of devolved and sustainable forest management and sustainable livelihoods.

Environmental degradation in general and the disappearance of natural forests worldwide, and particularly in developing countries, have been important international concerns for decades. Forest degradation negatively affects the livelihoods of people dependent on forest products and services. Much effort has been invested to identify the causes of such damaging processes and to develop concepts and approaches to halt environmental deterioration and, especially, to make social development and forest conservation convergent rather than divergent goals. Much analysis has been dedicated to questions concerning effective institutional arrangements for the governance and sustainable management of common-pool resources such as forests. All these efforts, conducted both on a theoretical as well as on a practical level in the field, have resulted in a variety of participatory, devolved approaches to forest management. The concept of "sustainable development", as promoted during and after the United Nations Conference on Environment and Development (UNCED) held 1992 in Rio de Janeiro, reflects, in a broader sense, this search for a development pathway that ensures the balance between social well-being, economic development and preservation of the natural resource base for sustained human development (UN 1992). However, the operationalisation and implementation of sustainable development in general, and sustainable and participatory forest management in particular prove to be very difficult.

The difficulties in sustaining both development and forest management apply also to the situation in many countries with economies in transition, which emerged from the breakdown of the socialist regimes in Eastern Europe and the Soviet Union. The sudden collapse of these States has, in many instances, accentuated and worsened pre-existing ecological problems; this has been the case in Central Asia and Kyrgyzstan (de Cordier 1996). Also, it is feared that existing tensions over natural resources, in particular over water, could spark off major conflicts in particularly sensitive regions in Central Asia (Klötzli 1994, 1997). The economic, political and social changes of the transition period have often led to increased pressure on natural resources and forests by a variety of stakeholders including local people. At the same time, the process of transition resulted generally in a weakening of the States, which before were the guarantors of forest conservation. This situation in transition countries prompts questions as to the new roles of the State, the private sector, civil society and individual citizens in natural resource and forest management. Past and existing institutional arrangements and policies not relevant to current conditions have to be adapted to the new realities and new policies and ways to govern forest and natural resource use have to be developed. In this process, it is possible that international experience with participatory approaches to forest management can provide some guidance. But any such approach would have to be tailored specifically to the local conditions prevailing in the country or region concerned. This thesis aims to contribute to the development of new forest policies and new approaches to sustainable forest management in the post-Soviet transition era through work carried out in areas of the Kyrgyz WFFs.

1.1 Kyrgyzstan - a country and a forest sector in transition

The WFFs of Southern Kyrgyzstan are unique in that they comprise the world's largest remaining area of a range of forest ecosystems dominated by walnut (*Juglans regia* L.) and other fruit bearing tree and shrub species (Gan 1970; Musuraliev 1998). These forests are regarded as biodiversity hotspots of international importance and are generally believed to play a great role for the livelihoods of local people as a source of subsistence products and of revenue (Blaser *et al.* 1998, p. xxiii *et seqq.*). Today, the WFFs, as well as all other forests of the country, are owned by the State and managed by the State Forest Service (SFS). At the local level, State forest farms (Russian: *leshoz*), being part of the SFS, are responsible for the protection and management of specific tracts of forests.

The collapse of the Soviet Union and the on-going economic, social and political transition and the associated period of hardship led, on the one hand, to a breakdown of an effective, State-run forest management system and, on the other hand, to increasing pressure on easily accessible forest resources by a variety of stakeholders. Increasing demands for forest products in a time of economic and social hardship have also resulted in conflicts with the established conservation-oriented forest policy that newly independent Kyrgyzstan inherited from Soviet times. Thus, the conservation and sustainable management of these unique forest ecosystems in the long run, is currently uncertain. Therefore, new visions and approaches to management of the WFFs are urgently needed. The SFS is, with the support of international partners, currently developing a new forest policy and new approaches to the management of the country's forest resources. In the case of the WFFs, it seems that a multipurpose management approach with the active participation of local communities in forest management may provide a new *modus operandi* with which to manage sustainably this unique resource.

Since the mid-eighties and early nineties local people have become increasingly involved in the use and management of the WFFs, both in informal as well as in formal ways. Some of the State forest farms have adopted a system of paid leases (in cash or in-kind) according to which some user rights for forest plots are transferred to local farmers. The Kyrgyz-Swiss Forestry Support Programme (KIRFOR)⁴ and its local partners have developed another lease system, in the framework of their project aiming at the promotion of collaborative forest management (CFM) in Kyrgyzstan (for details see Section 6.3.6). This particular lease system, usually referred to as “CFM lease”, is intended to guide future policy decisions and forest management practices. The analysis of different aspects of a range of lease schemes that are currently in place in the WFFs forms the basis of this thesis. These lease schemes vary considerably in terms of duration of the leases and other contract conditions, such as the range of user rights being granted and/or the form of the lease payment (see Section 6.4 for further details). In this thesis, all these lease schemes as well as any other model in which local people take part in forest management are subsumed under the umbrella term “participatory approaches to forest management”.

1.2 Relevance of the study

With the collapse of the Soviet Union and of the socialist block in Eastern Europe, and the ongoing reorientation of other, formerly socialist countries with their centrally planned economies, the forest sector in many of these countries face problems and need to ensure that there is appropriate conservation and sustainable management of forest resources at the time when pressure on forests is growing. Common development thinking suggests that, in such a situation, a practical option may be to engage all stakeholders, particularly the local population, actively in decision-making over forest management, and thus transfer some responsibility for forest management to local communities and to other stakeholders. This idea forms the foundation for the development of collaborative forest management (CFM) approaches in many countries including Kyrgyzstan.

The social, economic, historical and political conditions in Kyrgyzstan – as in other countries with economies in transition – are however very different to conditions in countries in which forms of collaborative or community forest management have already been introduced as for example Nepal or India. It is therefore important to tailor the promising approach of CFM to the particular conditions prevailing in Kyrgyzstan and to pilot it on a few sites before applying any new, emerging Kyrgyz approach more broadly.

With the opening up of the former communist block, some CIS and Eastern European countries claim to have adopted more participatory approaches to forest management. The extent to which this has actually taken place is debateable. There were/are also some internationally assisted projects aiming at introducing collaborative elements into forest management in some of these countries (e.g. projects of WWF International in the Russian Republic Komi and in Bulgaria (Pimbert 1996/97), World Bank Forestry Project in Georgia (World Bank 2004a)). But documented experiences from collaborative natural resource management in former Soviet republics are few (c.f. Section 2.3.1). The fact that relatively little empirical work to draw on is available, underlines the need for studies like the one in hand. Thus, this study is expected to contribute to the debate on the prospects and challenges

⁴ KIRFOR aims at supporting its Kyrgyz partner organisations during the on-going transition process. The programme KIRFOR was started in 1995 and is implemented by Intercooperation on behalf of the Swiss Agency for Development and Cooperation (SDC) and other donors (see www.intercooperation.ch/projects/p43 or www.intercooperation.kg (accessed 10/03/2007) for more information).

of developing participatory approaches to natural resource and forest management to countries in transition in general and to Kyrgyzstan in particular.

1.3 Aim, objectives of the research and research questions

Participatory approaches to forest management are new to Kyrgyzstan and to countries with economies in transition in general. Thus, a number of questions arises from the idea of multipurpose forest management approaches which include the degree to which they should permit the participation of local peoples. Such questions concern: the knowledge and capabilities of local people to conduct forestry activities, and the role of local people and of State forest farms in future forest management.

The research aim stated below and the research objectives arise from the following assumption which has guided the thinking for this research:

Local people can contribute to the sustainable forest management of the walnut-fruit forests with their knowledge and capabilities, provided that sound and fair agreements between the State forest farms and local people exist.

Hereby, “knowledge” refers to the knowledge and technical skills that are relevant for the use and management of trees and forests and are held by members of local communities (c.f. Section 2.6). “Capabilities” stands here as a general term for the faculty of local people to do something, to get involved in forestry and conduct forestry work. The attribute “sound” refers to an agreement of which the consequences are foreseeable for both parties and to which both sides can adhere to. “Fair” stands for an agreement that allows both parties to gain a reasonable, balanced benefit from the contract.

The aim of this research is to:

Analyse the potential and constraints for participatory approaches to sustainable forest management of the walnut fruit forests in the post-Soviet context of Kyrgyzstan.

The research objectives that were determined on the basis of the aim of this study and the research questions derived from the objectives are to:

1. Document, describe and analyse key changes in terms of the institutional framework and policies for sustainable forest management in the WFFs and local livelihoods in the WFF-belt during the transition process from a Soviet style system towards a more pluralistic political system and a market economy.

- How have the institutional set-up and forest policies for the sustainable management of the WFFs changed over the transition period?
- How have local livelihood systems changed over the transition period?
- What are key challenges for the sustainable forest management of the WFFs under the current conditions of social, political and economic change?

2. **Identify important opportunities and constraints at the governance level for the enhancement of sustainable forest management involving local people.**
 - What are the opportunities and constraints for the involvement of local people in forest management from the point of view of their relevant knowledge and their capabilities?
 - What other opportunities and constraints for the involvement of local people in forest management exist?
 - How do the informants view the role of local people in forest management?
 - How do the informants see the role of representatives of the SFS in forest management?
3. **Determine the knowledge available with local people in the fields of silviculture and agroforestry, describe the local knowledge system regarding forests, and identify factors influencing innovation in silviculture and agroforestry.**
 - What are the sources of forest related knowledge?
 - What are the ideas and intentions of local farmers for forest use and management in the future?
 - Under what circumstances and why does innovation in forest management by local people occur?
 - Why may innovation be discouraged?
4. **Describe and analyse the current forest use practices of forest leaseholders⁵ and the significance of forest resources for their livelihoods, and identify factors influencing forest use practices.**
 - What are the benefits from forest use for local people?
 - How do local farmers use their leased forest plots?
 - Which factors influence forest use patterns?
 - Why do the leaseholders use their forest plots in the described ways?
 - What are the roles of leased forest plots and the general forest in comparison to other resources and sources of revenue available to a household within its livelihood system?
5. **Explore ways to implement sustainable multipurpose forest management involving local people and develop conclusions for future forest governance and adequate institutional arrangements in the walnut-fruit forests.**
 - What are key elements for future forest governance to create an enabling institutional framework for sustainable forest management?
 - Under what circumstances can local people with their knowledge and capabilities best contribute to the sustainable management of the WFFs?
 - How can the identified constraints (from objective 2 above) be addressed?

Thus, the present study focuses on forest use by local people and their forest-related knowledge taking in account the social, political and economic context of a post-Soviet country in transition.

⁵ In this thesis, the words “leaseholder” and “tenant” are used as synonyms for a person holding a lease for a forest plot. Leaseholders/tenants that participated in the study are sometimes also referred to as “informants” or “respondents”.

This research will contribute to the:

1. **Debate regarding forest governance and the sustainable management of forest resources in Kyrgyzstan and in other countries in transition with similar conditions;**
2. **Development and further improvement of participatory approaches to sustainable forest management in the walnut-fruit forests in Kyrgyzstan, such as the CFM lease system and other existing schemes;**
3. **Development of future policy and forest management in the walnut-fruits forests, in other forests in Kyrgyzstan and also in similar forest types beyond Kyrgyzstan;**
4. **Long-term sustainability of the walnut-fruit forests in Kyrgyzstan at a time of fundamental economic, political and social change.**

Thus, the results of the study are expected to guide future policy and forest management in the WFFs, in other forests in Kyrgyzstan and also in similar forest types beyond Kyrgyzstan. More specifically, the results will allow adapting and refining existing institutional arrangements and forest management approaches in order to make sure that they become effective means for the sustainable management and for the conservation of the valuable and unique WFFs.

1.4 Outlook on the thesis

The general assumption that local people can contribute to sustainable forest management in the WFFs of Southern Kyrgyzstan with their knowledge and capabilities serves as a starting point for this thesis. On this basis, the argument of this study is developed using the following building blocks:

- A description and analysis of key changes in the institutional framework and policies for forest management during the transition process, building on key concepts introduced in the theoretical Chapter;
- The identification of potentials and constraints for sustainable forest management involving local people, in particular on the governance level;
- An analysis of the locally available knowledge that is relevant for forest management;
- A description and analysis of the ongoing forest use practices of forest leaseholders and of the role that forest resources play in the their overall livelihood systems.

In this thesis, local knowledge is understood as a potentially significant element for the development of participatory approaches to forest management in the walnut-fruit forest area in Southern Kyrgyzstan. How this potential is used, what hampers its use and how it translates into natural resource use practices, does however depend on a wide range of other factors, such as policies, the interplay between different stakeholders and the market.

Chapter 2 of this thesis explores, largely building on literature, the understanding of the changing roles of the State, the market and local people in forest management against the background of the transition process. It introduces key concepts of the current development debate that have influenced the development of new approaches to forest management in Kyrgyzstan. These theoretical considerations are incorporated in the conceptual framework presented at the end of this chapter.

Chapter 3 describes the research process, the design of the study and the methods used both for fieldwork as well as for data analysis. It concludes with some considerations on the

validity, reliability and the potential to draw generalisations from the findings. The subsequent Chapter 4 provides the reader with more information on Kyrgyzstan and on the transition process of the country. It also provides a description of the walnut-fruit forests and introduces the research sites.

The following Chapter 5 focuses on livelihoods and issues of forest governance in the walnut-fruit forest area during the Soviet period. Chapter 6 explains the institutional set up of forest management in the walnut-fruit forests of the post-Soviet era and current forest policies, and explores the meaning of sustainable forest management under the conditions of transition. Forest stakeholders and current forest tenure arrangements are equally introduced in Chapter 6.

The Chapters 7 to 9 present the main results of fieldwork conducted for this study. Each chapter contains, in its last subsection, a discussion of the findings. Chapter 7 focuses on findings on governance issues, especially regarding the devolution of property rights and the roles of key stakeholders in the management of the walnut-fruit forests. Chapter 8 explores and discusses different aspects of local knowledge and skills of local people that are involved in forest management. The presentation of the results is concluded with Chapter 9 that provides an analysis of forest use practices of local people and explores the significance of forest resources for people on the research sites.

The concluding Chapter 10 revisits key issues of forest governance and of the search for appropriate institutional arrangements for the management of the walnut-fruit forests. It discusses the roles of key stakeholders in the emerging new system and the meaning of the concept of sustainable forest management for a country in transition.

2. Development of new approaches to forest management: changing roles of the State and local people

This chapter provides a general introduction into the transition process and an analysis of the changing roles of the State, private actors including local people and the market in the management of forest resources in countries in transition. Relevant concepts for the thesis, such as property rights, forest tenure, devolved/collaborative forest management (CFM), sustainability and local knowledge, are presented. The key question is how different stakeholders can, with their strengths and experience, engage in a partnership for the management of forests. Institutionally speaking, this is the question for the most appropriate arrangements for the management of forests as a common-pool resource. Building on these concepts the conceptual framework included at the end of this chapter was developed.

2.1 The transition process

The purpose of this general introduction into the transition process is to describe the wider development context of the study. This is particularly relevant in view of the questions regarding the new roles of the State, private actors and civil society in natural resource management in a post-Soviet system that this study addresses. The main features of the transition process in Kyrgyzstan are described in Sections 4.2.

2.1.1 Definition of transition and the transition process

Generally, the term transition describes “a passing or passage from one condition, action, or (rarely) place, to another; change” (Oxford English Dictionary 1989). In the context of this thesis, “transition”⁶ stands for the ongoing shift of the economic, social and political systems of formerly socialist countries from a command economy and a politically authoritarian one-party system towards a free market economy and a democratic and pluralistic social and political system. This fundamental change is often also being referred to as “transition process”, thus highlighting the procedural nature of the changes.

Altvater (1998) warns that there is no such thing as a simple and straightforward “transition from ‘there’ to ‘here’”, as neoclassical thinking and modernisation theory would suggest. Instead, he describes the transition process as “a complex and articulated transformation of social, political and economic forms” that can follow many different pathways and includes changes of individual habits, social culture and of the social relation to nature.

2.1.2 Key elements of the reform agendas for countries in transition

With the breakdown of the socialist systems of Eastern Europe at the end of the 80es and of the Soviet Union in 1991 a long period of intense competition between the systems of a free market and of a command economy came to a close. For many observers, the collapse of the planned economies was proof enough of the superiority of an efficient free market approach over inefficient socialist systems (Gillis *et al.* 1996, p. 104), and there was, at the time, little room to consider a third way. Therefore, it is little surprising that the image of the most advanced capitalist countries, of the “OECD-world” heavily influenced the thinking about the objective of the transition process (Altvater 1998).

⁶ While the term “transition” predominates in English, some authors prefer, for conceptual reasons, to use the term “transformation” (e.g. Altvater (1998), Swain & Hardy (1998)).

The breakdown of most, but not all socialist States and with it the decline of socialism as a political and economic system came at a time when the role of the State as the prime agent of development was increasingly questioned in development thinking (Agrawal & Ostrom 2001b; Mansuri & Rao 2004a, p. 7). These two trends might even have mutually influenced and amplified one another. For most of the time between the end of the Second World War and the 1970s, the central State was, in accordance with modernisation theory, accorded a pivotal role in the development process, in planning and industrialisation (Agrawal & Ostrom 2001b). The late 1970s and the 1980s then saw a gradual “retreat of the State” (Ellis & Biggs 2001) and the emergence of markets, civil society, often in the form of NGOs, and communities taking over important functions from the central State in a more “participatory” development process. These transfers typically take the form of decentralisation or devolution of decision-making authority (Agrawal & Ostrom 2001b).

Economic liberalisation combined with democratisation is now the preferred remedy to tackle the challenges that developing countries face (Harriss *et al.* 2004, p. 6). This also applies to countries in transition. In fact, neoliberal thinking has, as the dominant development discourse of the outgoing 20th century, largely guided the development of strategies and policies for the reform process in countries in transition (Swain & Hardy 1998). The World Bank and the International Monetary Fund strongly advocated to apply the instruments agreed upon in the so-called “Washington Consensus”, such as structural adjustment and macro-economic stabilisation. This decision was taken based on the observation that many features of the communist system, such as a dominant State, distorted prices or low international trade, resembled the situation in developing countries for which this consensus had originally been designed (Rufer 2000, p. 17).

According to the neoliberal reform agenda, the State should primarily act as a guarantor of suitable conditions for a privately run economy to prosper. Gamble (2006) argues that, while the market has primacy, a strong State is required to create the necessary framework that allows a market to function. Others hold the view that the required maximal scope for the market is associated with a “small State” (Dryzek & Holmes 2002, p. 10). Particular functions of the State and its policies include, for example, guaranteeing legal security and property rights and allowing an, ideally, undistorted competition. A privatisation campaign of formerly State-owned enterprises and State guarantees for private property should create private ownership and with it incentives to increase productivity and efficiency of production. In parallel, a programme aiming at liberalising domestic prices and foreign trade would reduce price distortions and create the necessary conditions for price mechanisms to regulate the market (Rufer 2000, p. 17). In this way, in a neoliberal “market State” (Robison 2006) private actors would replace the State as the main economic agents of the system and, ideally, prices on a free market would guarantee the efficiency of the system. In terms of the role of the State, political economists have suggested the idea of a “stable State” as a precondition for success of the reform process. In this view, political stability and long-term credibility of policy measures are decisive factors that create favourable conditions for the development of markets (Wagener 1993b).

So far, neoliberal reforms and particularly early “shock-therapies”, conducted for example in the early 1990s in Russia, have yielded mixed results (Altwater 1998; Dryzek & Holmes 2002, p. 95; Oversloot 2006), a fact that is also acknowledged by the World Bank (World Bank 2002c). Neoliberal reform concepts and strategies are often criticised as being too deterministic and relying too much on an overly optimistic believe in the force of market mechanisms whilst largely neglecting the political side of the transition process (Altwater 1998; Rufur 2000, p. 19).

Proponents of an alternative, political-economic view of the transition process such as Wagener (1993a) have already early in the process stressed the need for political and institutional reform and the fact that not only the economic systems of the countries in transition, but their whole societal organisation was in a process of fundamental change (Wagener 1993a, p. v). Most of the countries of the former socialist “Eastern Bloc” indeed simultaneously faced marketisation and democratisation or at least the change to a new, pluralistic political system (Offe 1993; Góralczyk 2000). This political reform process includes, in most cases, the establishment of a multi-party system and a parliamentary or presidential democracy, of political accountability of the governments and the rule of law, participation of citizens in political decision-making, and the gradual replacement of the former State control over society by a slowly emerging civil society (Góralczyk 2000). However, as Dryzek and Holmes (2002, p. 4) point out, democratisation goes far beyond the introduction of institutions such as parliament, elections, a party and a legal system. As decisive as this “institutional hardware” is what people make of these institutions, how people engage in politics and bring such institutions to work, i.e. the “institutional software” in a society.

On an individual level, the most fundamental challenges of the socio-political change process were, and still are, the changes from “passive absorption of directions from above” (Góralczyk 2000) to individual decision-making based on one’s own knowledge and experience and taking up of responsibility and risks that come with the new economic system. These societal changes, that Góralczyk (2000) refers to as a “mentality revolution”, are critical for the success of the entire transition process.

More than fifteen years after the fall of the Berlin Wall and the breakdown of the Soviet Union, one notes that a range of post-communist capitalist systems has emerged over many different transition-pathways (Gill 2002, p. 11) from a variety of centrally planned systems (Swain & Hardy 1998). In political terms, the transition process has resulted in a wide spectrum of political systems, ranging from parliamentary and presidential democracies to authoritarian systems. While in most post-communist countries a decision had been taken in favour of a market economy and a democratic or at least a more pluralistic political system than the former one-party regime, the concrete results of the reform processes depend to a great extent on national conditions at the outset, such as history, culture, the institutional structure of the former system and the integration with western economies (Swain & Hardy 1998), and on the outcome of a political negotiation process between different interest groups at the national level (Wagener 1993b).

2.2 Changing roles of the State and private actors in the management of forest resources

Over the last few decades, institutional questions have generally been recognised as a critical dimension of sustainable natural resource management. This is reflected in a rapidly growing body of literature on institutional aspects of natural resource management in general and forest management in particular. The debate has been markedly influenced by exponents of the “new institutional economics” which include the evolution of institutions and property rights amongst their main concerns (Wang & Van Kooten 2001, p. 19). The publication of Hardin’s much-debated essay entitled “The Tragedy of the Commons” (Hardin 1968) and the emerging theory of collective action (Olson 1965) can be seen as early steps of this debate. A substantial body of theories about institutional aspects of natural resource management, especially about governance of common-pool resources - a category in which

forests often fall - has emerged since the late 1980s, in parallel to the increased emphasis on decentralisation and devolution in natural resource governance.

Since colonial times through most of the 21st century, forests worldwide have predominately been owned and centrally controlled by the State (White & Martin 2002, p. 2; Edmunds *et al.* 2003b). On a global scale, this still holds true today. However, over the last three to two decades, there has been a fundamental shift in natural resource and forest governance away from centralised State-driven control towards approaches in which lower levels of government and local people play a more active part. Even ownership over forests has increasingly shifted from central governments to local communities and private households since about the late 1980s (White & Martin 2002, p. 2). These changes are demonstrated by a multitude of decentralised, devolved and participatory forest management initiatives that have emerged throughout the world. These are underpinned by the broad principle of subsidiarity, i.e. the principle that decision-making should be devolved to the lowest appropriate level (Meinzen-Dick & Knox 2001). The transfer of more decision-making power to the local level is seen as a means to increase the stake of local actors in the benefits gained from the resources concerned and thus also their interest in the conservation of these resources.

These shifts and the thinking behind questions existing power arrangements between central government, other levels of government, local people, civil society organisations and the private sector, and hereby raises fundamental questions concerning the responsibilities and roles of these actors in the conservation and management of forests and other natural resources. Ultimately, this leads back to the question that is at the heart of this thesis about how local people in the walnut-fruit forests in Southern Kyrgyzstan can contribute to the sustainable management of these forests.

In the following Section, a few key terms are defined before the discussion on institutional aspects of forest management is extended in the subsequent sections.

2.2.1 Forests as common-pool resources providing a range of services and products

2.2.1.1 Definition of common-pool resources, institutions, property rights and tenure

The two criteria which political economists apply to classify goods are i) the ease or difficulty with which potential users can be excluded from access to the good (the *excludability* of the good), and ii) whether the use of an unit of the good decreases the remaining stock, i.e. whether a resource can be depleted by consumption or not (the *subtractability* or *rivalness* of a good) (Gibson *et al.* 2000). **Common-pool goods** or **resources** are natural resources and other goods from which potential beneficiaries cannot or only with great difficulty and at high costs be excluded and that are depletable by consumption (Wade 1987; Ostrom 1990, p. 30; McKean 2000). Generally, forests are seen as a typical common-pool resource. Under certain circumstances, it might however also be appropriate to think of forests as a bundle of products with characteristics of common-pool and public goods (Gibson *et al.* 2000). Other types of goods are private (rivalrous in consumption, exclusion easy), club (non-rivalrous in consumption, exclusion easy) and public goods (non-rivalrous in consumption, exclusion difficult or costly).

Institutions can be defined as “a set of formal and informal rules, which are administered by organizations” (North 1990, p. 5). In this definition, organisations are themselves not seen as institutions, but as “players, or groups of individuals bound together by some common purpose to achieve objectives” (North 1990, p. 5). In practice, however, the use of term

“institution” in the literature mostly also includes organisations. The following elements are key for the analysis of natural resource and forest management regimes from an institutional perspective:

- Actors or stakeholders and their interactions including: State (central government and its regional or local bureaucratic arms, regional government, local government), households, civil society and the private sector;
- Formal and informal rules, i.e. institutions *s.s.*, regarding natural resources. These rules shape the interactions between the actors and also the distribution of power and authority in decision-making;
- Policies and practices which typically reflect the existing set of rules;
- Values underpinning these rules and interactions between the actors.

Rights in general can be described as the product of rules (Schlager & Ostrom 1992). Property rights over natural resources play an essential role in resource management, as they convey authority to the actor(s) concerned and thus shape the incentives for the management of these resources (Meinzen-Dick & Knox 2001). **Property rights** can be defined as “the capacity to call upon the collective to stand behind one’s claim to a benefit stream” (Bromley 1991), or as “an enforceable authority to undertake particular actions in a specific domain” (Commons 1968). In this way, property rights establish “a relationship between the right holder, others and an institution to back up the claim” (Meinzen-Dick & Knox 2001).

A right can be classified as public or private, depending on its exclusivity, clarity and security. A **private right** is exclusively tied to the holder of the right, provides a clear entitlement to do or leave something and protects the holder from claims by nonholders. A **public property right**, on the other hand, is non-exclusive, i.e. it is a right of access or use that does not include the right to exclude others from such use. A well-defined group of people sharing property rights towards a resource in common is called a **common-property regime** or, short, **common property**. McKean (2000) classifies such a property rights arrangement as a shared private property. A complete absence of any property rights for common-pool resources is referred to as **open** or **free access** (Grafton 2000). On the level of the right holder, it is also useful to distinguish between public and private bodies on the basis of their representational claims. A public body claims to represent the general population, while a private body just represents itself. This distinction between the nature of rights and the nature of the holders of property rights makes it clear that both public and private entities can, and in fact do hold public and private rights (McKean 2000).

A useful categorisation is suggested by Schlager & Ostrom (1992) who disaggregate the bundles of property rights into:

- **Use rights**⁷, including **access** (to enter the resource domain, e.g. the right to go into a forest) and **withdrawal** (to remove something, e.g. to harvest a product or take fodder); and
- **Control rights**, including **management** (to modify or transform the resource, e.g. by planting trees or shrubs, or restricting what can be harvested), **exclusion** (to determine who else may use the resource), and **alienation** (to transfer management or exclusion rights to others).

⁷ Schlager & Ostrom (1992) use the terms “operational-level” and “collective-choice” property rights to refer to the categories “use rights” and “control rights” respectively.

To link these different property rights to widely used concepts such as resource use and ownership, Schlager & Ostrom (1992) distinguish, as shown in Table 1, between the following four types of property-rights holders: owner, proprietor, claimant and authorised user. This categorisation provides a useful framework for the analysis of the extent of transfers of decision-making power on forests to different bodies.

Table 1: Property rights associated with different rights holders (Schlager & Ostrom 1992).

		Owner	Proprietor	Claimant	Authorised user
Use rights	Access and withdrawal	x	x	x	x
Control rights	Management	x	x	x	
	Exclusion	x	x		
	Alienation	x			

The term “**forest tenure**” describes the bundle of legally or customarily defined rights and responsibilities of ownership and forest uses that adhere to a given area of forests (Schmithüsen 1997, p. 1). In other words, forest tenure arrangements determine *inter alia* who owns and who can use what forest resource, for how long, and under what conditions (FAO 2007a).

2.2.1.2 Services and products provided by forests and interests in forests by the main stakeholders

Forests are complex ecosystems that provide multiple environmental services and products for the benefit of individuals, communities, enterprises and society at large. Examples of such services and products are shown in Table 2. Some of these goods are public goods, whereas others show characteristics of common-pool goods. At first sight, it would appear that some products, such as a tree providing timber, could also be thought of as a private good. However, given the size of forests exclusion from access to trees is usually difficult and costly, which is an attribute of common-pool goods. Thus, forests can be seen as a complex of common-pool and public goods (Gibson *et al.* 2000).

The third column in Table 2 showing various beneficiaries and their interests in forest services and products highlights that forests satisfy both private and public interests. In practice, a clear distinction between private and public interests is often difficult. Also, there might be cases, as indicated in Table 2, of claims of public interests behind which there are in fact “hidden” private interests of a particular group.

Table 2: Services and products provided by forests and interests of different stakeholders in these products and services.

	Services and products	Interests by stakeholders
Forest resources providing ...	<p>... environmental services, such as:</p> <ul style="list-style-type: none"> • Soil protection; • Protection against natural disasters; • Watershed functions; • Biodiversity conservation; • Scenic beauty; • Carbon sequestration. <p>... harvestable products for subsistence use and/or income generation such as:</p> <ul style="list-style-type: none"> • Timber; • Non-timber forest products (NTFPs) <i>s.l.</i> 	<ul style="list-style-type: none"> • Public interest in sustaining these services (subnational, national, regional, international); • Private interest of communities, groups (= common interest of all group members) directly benefiting from such services (e.g. hamlet at a foothill protected by forests against rockfall). <hr/> <ul style="list-style-type: none"> • Private economic interest of people/households/enterprises involved in harvesting, consumption and/or marketing of forest products; • Public interest in the contribution to national economic development from the use of forest products: <ul style="list-style-type: none"> ○ Direct use/sale of products by the State; ○ Taxes on use of forest products. • Interest of representatives of State bodies in benefits for their particular administrative entities = “hidden” private interests behind declared public interest.

Management decisions of a forest owner potentially affect interests of many other groups, given the various services provided by forests for the benefit of the society at large. This explains why “forest ownership is subject to public regulation which goes beyond restrictions on other property” in most other fields (Schmithüsen 1997, p. 3).

The institutional key question is which property rights regime, which institutional arrangement can best accommodate and integrate the various legitimate interests in forests and thus guarantee the conservation and sustainable management of forests and, with it, the continuation of the flow of services and products provided by forests. The determination of a reasonable and politically acceptable balance between the rights of local owners to use forest resources according to their needs and necessary restrictions of some forest uses in the wider public interest is indeed a key point in the process of shaping forest tenure.

2.2.2 Governance of forests and institutional options for ownership and management of forest resources

2.2.2.1 Local governance and forests

Internationally, there is an increasing interest in the issue of natural resource and forest governance. This discussion is strongly influenced by thinking on the broader issues of governance and good governance. The World Bank defines governance “as the traditions and institutions by which authority in a country is exercised for the common good” (World Bank 2005a). The term good governance emphasises the importance of the benefit for the society at large as the ultimate goal of the process of governing. Good governance concerns the positive interrelations between the State and its citizens, civil society and the private sector. It should be based on a series of key principles, also described as a “set of normative

ideals for societies and government” (Batterbury & Fernando 2006). These principles include (adapted from RECOFTC (2002)):

- Rule of law and compliance with rules and decisions;
- Transparency and accountability;
- Decentralisation and devolution of power and authority;
- Defined roles and responsibilities;
- Participatory decision-making;
- Gender sensitivity, equity, representation and power balance (empowerment);
- Bidirectional flow of information horizontally and vertically.

The observance of these principles can be interpreted as indicators of good governance. Other definitions of good governance include additional principles, such as government effectiveness. This principle was for example much underlined in the World Development Report 1997 (World Bank 1997) that presented good, effective governance as a vital necessity for development.

As far as forests are concerned, the conceptualisation and application of the principles of good governance in forest management (see for example ODI (2002), and Ojha (2003)) have become important issues in the international debate surrounding forests and development. Participation of local communities in forest management has, in addition to other aspects, to do with the principles of decentralisation and devolution and, of course, of participatory decision-making (see Section 2.2.2.3 for definitions and Section 2.2.3 for a brief historic review). Measures to decentralise State administrations and promote the devolution of responsibilities often go together and bring participation to a higher step on the participation ladder (see Table 3). These initiatives are therefore often implemented in the context of attempts to promote good governance (c.f. Arnold (1998a), Shackleton *et al.* (2002) and, in particular, Edmunds & Wollenberg (2003a)).

2.2.2.2 Ownership and management options for forests

For the sake of clarity, it is important to make a distinction between ownership of forests and other use and control rights over forests. In the logical of property rights explained in Section 2.2.1.1, ownership means that the right holder disposes of a complete set of property rights, i.e. use and control rights including the right of alienation of the forest. The formal forest owner can transfer all or parts of these property rights to other entities, which, in practice, very often happens.

In terms of ownership, one can broadly distinguish between three main categories:

- Public forests owned by central, regional or local governments;
- Private forests in the ownership of corporations, cooperatives or collectives;
- Private forests owned by individuals or firms.

From the perspective of property rights, the second category can be described as a group of individuals being a private owner of shared property rights and thus create a regime of common property rights for a given forest (McKean 2000, p. 32). The concept of privatisation describes the change from publicly to privately owned forests (for a short discussion on the overlap between privatisation and devolution see Section 2.2.2.3). Nationalisation, on the other hand, describes the change the other way around.

By transferring property rights for forests from the owner to other public and/or private entities a multitude of institutional arrangements for the management of forests is created.

These range from “decentralised” management of forests by lower level authorities, over “devolved” forest management involving non-State stakeholders, to forest management by private forest owners. The terms usually used to describe such transfers are defined in the following.

2.2.2.3 Privatisation, devolution, decentralisation, participatory and collaborative forest management

As we have seen, different terms are used to describe transfers of decision-making power regarding forests, or, in other words, transfers of property rights (use and control rights) between public and private entities. In this section, only the most important concepts for this thesis are defined. Some of them do overlap.

The definitions of privatisation, devolution and decentralisation used in this thesis are based on the actors concerned (i.e. to whom is decision-making power, are property rights transferred to) and their representational claims (whole population *versus* only members of a private group) and accountability (upwards to the central government and/or downwards to their constituents, e.g. the local population).

Privatisation denotes the transfer of rights and responsibilities from a public body to any private entity, be it a private group, corporation or individuals. Within the concept of privatisation, there are transfers of rights to individuals or to private groups resulting in either a property-rights regime of individual or of common property rights. The fundamental difference between the two concerns the distribution or non-distribution of rights to goods and of the goods themselves. In the case of individual privatisation, the property rights and the goods, for example forest services and products, are split into individual pieces. In contrast to this, in the case of the shared private property of a common-property regime only the rights to forest products and services are privatised. The forest, the resource base is kept intact and not parcelled (McKean 2000, p. 37).

For this thesis, **devolution** is defined as the transfer of decision-making power, i.e. of at least some categories of property rights from the central government and its agencies to local civil society actors not created or controlled by government. Forest users and forest user groups are examples of such actors (Edmunds *et al.* 2003b). In this context, it is relevant to remember that, as Ribot (2001) points out, forest user groups at the local level may well be private bodies. This holds true in cases in which such groups are only accountable to their members, and do not represent others in the local community, nor society at large. Also, this definition of devolution includes transfers to individual, private actors, such as households. Thus, in such cases, devolution and privatisation, as defined above, are largely the same. In fact, some authors (e.g. (Ribot 2002, p. 4; Ribot *et al.* 2006)) strictly term such instances privatisation⁸.

Decentralisation is defined as the transfer of decision-making power from a central government to lower levels of government in a political-administrative and territorial hierarchy (Ribot *et al.* 2006).

Deconcentration (sometimes also called **administrative decentralisation**) refers to the transfer of decision-making power from the central government to lower-level branches of

⁸ The transfer of power and responsibilities to special authorities outside the regular bureaucracy or to public corporations is usually termed “delegation” (Ostrom *et al.* 1993; Ribot *et al.* 2006).

the central government or to other public authorities who are upwardly accountable to the central government (Larson 2005; Ribot *et al.* 2006). Their main responsibility is towards their superiors, although they may have some downward accountability as well. However, the predominance of the upward accountability makes deconcentration a “weak” form of decentralisation (Ribot 2002, p. 4).

Political or democratic decentralisation refers to the transfer of decision-making power to authorities that are representative of and downwardly accountable to the local populations. In this way, these authorities are empowered to make decisions that are significant to the lives of their constituents. Because of the representativeness and downward accountability of the authorities this is considered the “strong” form of decentralisation which can be seen as an “institutionalised form of community participation” or local democracy respectively (Ribot 2002, p. 4). Successful democratic decentralisation requires that the local authorities have discretionary powers, i.e. a domain of local autonomy, as well as the necessary resources for the implementation of their decisions (Ribot *et al.* 2006).

Edmunds & Wollenberg (2003a) and Colfer & Capistrano (2005) provide accounts of decentralisation and devolution policies in forestry in countries worldwide and their impacts on forest conservation, livelihoods of local communities and on their involvement in forest management.

The concepts of devolution and democratic decentralisation are closely linked to participatory approaches to forest management. In the context of forestry, **participation** usually refers to the involvement of local people who have no professional background in forestry and are, therefore, not part of the formal forestry sector. In this thesis, the various existing types of devolved forest management or participatory approaches to forest management (see Section 2.2.3.2) are subsumed under the umbrella term “**collaborative forest management**” (CFM) suggested by Fisher (1995). The basic concept of all the approaches referred to as CFM “is having forest authorities and local people reach agreement about forest management” (Fisher 1995, p. 2). In a broader sense, CFM may also be defined as “a working partnership between the key stakeholders in the management of a given forest” (Carter & Gronow 2005, p. 2). Following these definitions, it appears that such a collaboration has two dimensions in terms of stakeholders concerned: i) between State and non-State actors (c.f. definition of devolution) and ii) between specialised forest authorities and non-foresters (c.f. definitions of participation in forestry and democratic decentralisation). The aim of CFM is twofold, addressing social and economic issues including the promotion of sustainable local livelihoods and, ultimately, social justice, and ensuring sound forest management (Carter & Gronow 2005, p. 18).

To achieve clarity in the application of the concepts defined above, it is very important to specify what property rights and responsibilities are being transferred in a concrete case. In the following Sections, the application of different institutional arrangements for forest management and the experience gained from it will be presented and discussed.

2.2.3 Review of changes in institutional arrangement in the field of forestry over time

Over time, institutional arrangements in the field of forestry and the organisation of the forestry sector has changed considerably. In this section, the main steps in forest history regarding governance of forest resources since colonial times are briefly presented, with a focus on the rational and reasons for important changes. This allows putting the ongoing changes in the forestry sectors of countries in transition in the context of the major discourses at the international level. The latter have strongly influenced the formulation of new forest policies in countries in transition.

2.2.3.1 From traditional local forest use to the nationalisation of forests and centralised forest management

It is believed that common-property regimes used by local communities to manage forests were once a widespread arrangement all over the world. With the time, most of these regimes seem however “to have been legislated out of existence” (McKean 2000). One of the main factors for this change certainly was widespread nationalisation of forests. In some other cases, un-codified common-property regimes may, as McKean (2000) suggests, simply have been left out when a formal forestry sector was established and property rights to forests were formalised for the first time.

The tradition of government ownership of forests and centralised forest management has one of its main roots in medieval Europe, where, in many places, nobility and influential urban centres dominating their hinterlands laid claim to forests for their own benefit and thus deprived rural communities of their rights to forest resources (for examples from the Venetian Republic and medieval England see Perlin 1989, p. 150 + p. 191 *et seqq.*). Subsequently, first governmental services for the control and management of forests were founded. During the colonial era, this model of government ownership and centralised forest management was adopted at a large scale in most of the colonies (White & Martin 2002, p. 2). The main reason for State ownership of forests in communist countries lies in the nationalisation and/or collectivisation of land and forests by the communist governments.

In the process of establishing a forestry sector, the new governments took rights from local communities and indigenous peoples and handed over the authority over most if not all of the natural forests to public forest agencies (Lynch & Alcorn 1994; White & Martin 2002, p. 2). This inevitably led to the erosion of responsibilities held by local communities and to increased exclusion of local people (Müller & Sorg 2001). Such increased State custody usually resulted in:

- Progressive concentration of timber production for the primary benefit of the State;
- Declaration of many local forest uses as illegal or the imposition of strict rules governing such uses without or after only limited consultation with local communities and other non-State stakeholders.

Amongst the main justifications advanced for the nationalisation of forests and centralisation of forest management was the argument that public ownership would provide greater protection of the forests in the long run (McKean 2000) and also allow scientifically-based efficient resource use (Shackleton *et al.* 2002). Given the multitude of products and services provided by forests and the wide range of partly conflicting interests in forest resources by multiple stakeholders, the coordination of forest use and control over the stakeholders was often seen as a typical role for the State. In this way, the idea of multi-functional forest

management (see Section 2.5.2) has, in past forest history, often been used to justify State custody in forestry (Wiersum 1999, p. 32).

In terms of forest conservation, it has however become apparent with the time that the nationalisation of forests and the centralisation of forest management were generally ineffective and costly strategies (McKean 2000; Meinzen-Dick & Knox 2001). In many cases central government and national agencies governing forests and other common-pool resources prove to be unable to manage these resources sustainably. Due to a lack in resources to enforce rules, such *de jure* State-owned resources turn *de facto* into a situation of open-access (Agrawal & Ostrom 2001a). The transfer of property rights away from communities living within or in vicinity of forests has in many cases eliminated economic incentives for these communities to use the natural resource base sustainably. Even worse, this “de-responsibilisation” of local people often creates converse incentives for these communities to enter into a competitive race with new owners and claimants “to extract as much short-term benefit from the resource as possible” to the detriment of forests (McKean 2000). Thus, resource degradation and financial crises have driven governments and other stakeholders to search for alternative models for the sustainable management of forests.

2.2.3.2 Recent shifts towards collaborative forest management

In the framework of the search for new, more effective arrangements to ensure the conservation and sustainable management of forests, a wide range of approaches to link people, living within or in vicinity of forests, with forest management have been developed all over the globe since the late 1970s. Initially, the term “social forestry” was most commonly used to refer to such approaches. Later, other approaches emerged under new names, such as “joint forest management” or “community forestry”⁹ (Fisher 1995, p. 16 *et seqq.*). The models developed under these and similar terms share the aim of making forestry more responsive to local needs. They do however differ in terms of conception, level of participation, geographical application and other characteristics. The umbrella term collaborative forest management (CFM) used in this thesis (definition see Section 2.2.2.3) encompasses all of these participatory/devolved approaches to forest management.

The uptake of participation in forestry is coupled with the general move in development towards people-centred, participatory development, “development from below” and “bottom-up” processes. It is the result of major reorientations and paradigm changes in forestry over the last 30 years. This has moved forestry, at the outset predominantly considered to be an ecological and technical discipline to one embracing consideration of the people. In terms of the concept of sustainability, this change represents an increased focus on the social angle of sustainable forest management. This shift in thinking is well reflected in the following, often quoted programmatic declaration of Jack Westoby made in 1967 in his contribution to “Problemas Actuais de Economia Florestal”: “Forestry is not about trees, it is about people. And it is about trees only insofar as trees can serve the needs of people” (Leslie 1987, p. ix). The Eighth World Forestry Congress held in Jakarta in 1978 with the theme “Forests for People” and the resulting “Jakarta Declaration” are considered to represent turning points in the general orientation of forestry and in the change towards an increased contribution of forestry to social and economic development in general and to the well being of rural people in particular.

⁹ Wollenberg (1998) identifies 20 widely used terms for various forms of local forest management.

There are several leading to the transfer of some property rights for forests (and other common-pool resources) to local people and to their increased involvement in forest management (compiled on the basis of: Thompson (1995), Agrawal & Ostrom (2001a), Meinzen-Dick & Knox (2001) and Colfer (2005, p. 40)):

- Local people should receive some benefits from their surroundings, including forest resources;
- Existing (informal) rights to resources should be recognised;
- Local people are actors who can participate cooperatively or otherwise serve as stumbling blocks to conservation;
- Local people have stores of useful knowledge and other useful social capital for forest management;
- Financial constraints and general inability (lack of capacities) of State agencies to guarantee sustainable resource use alone;
- Pressure of bilateral and multilateral donors on national governments to improve environmental governance and stressing decentralisation, devolution and participation.

The first two reasons are put forward on ethical grounds and are considered to be a matter of justice (Colfer 2005). In this regard, Fisher (1995, p. 16) points out that the shift towards increasing acknowledgement of user rights of local communities can be seen as returning of at least some of the control which was previously moved away from them when central governments extended their control and established formal forest sectors, as we have seen in Section 2.2.3.1. It would however be naïve to expect that by devolving rights to communities, one could recreate pre-colonial common-property regimes, where they existed. The general contexts of forest management, the forests concerned as well as forest management itself have changed to drastically for this to happen; due to political, demographic and economic changes at large as well as to the interruption of local forest management by years of centralised government control (Edmunds & Wollenberg 2001).

The third above-mentioned reason is the consequence of practical imperatives. Highly centralised State-run forest management and purely conservation-oriented forest policies attempting to keep people out of the forests are usually of repressive nature and have proved to be largely unsuccessful and too costly to implement in many countries. A key reasons certainly are, as mentioned at the end of Section 2.2.3.1, lacking property rights and, consequently, negative economic incentives for local people to sustain forests. Positively speaking, there is growing evidence that local communities are able to manage forest sustainably (Lynch & Alcorn 1994; Colfer *et al.* 1997; Thrupp *et al.* 1997) and sometimes even better than government agencies or forest enterprises (c.f. Colfer & Wadley (2001) for an example from Kalimantan, Indonesia). There are also documented examples of successful forest protection under communal tenure that provide disincentives for forest conversion, for example from Ecuador (Wunder 2000, p. 189). It thus became clear that sustainable forest management, either for productive or conservation purposes, implied sustainable livelihoods and required inclusion rather than exclusion of the people from the forests (Oldfield 1988; Brown 1998).

The fourth of the reasons listed above reflects an increasing realisation among the international scientific community and among decision-makers that, in many instances, local communities – often, but not always, indigenous people – have the experience, technical knowledge and other capabilities which are needed to conduct forest management. It has also been found that some local communities put this experience and knowledge into

practice by managing forest resources, albeit often for different goals than government officials, foresters or conservationists and following their own rationality and logic (Colfer 2005). The increasing involvement of local people in Kyrgyzstan and some other countries in transition in forest management highlights the need to know more about relevant knowledge held by local people in these countries. This explains one of the topical foci of this thesis on local knowledge.

The shift towards the involvement of local people in forest management has also prompted new people-oriented forest-related research. For instance, models of collaboration between key-stakeholders, local livelihood strategies and local knowledge systems, have led to important changes in the general orientation, approaches and methods used in (tropical) forestry research, as documented in Lawrence (2000).

2.2.4 Experience gained with collaborative forest management

The experience gained with collaborative forest management (CFM) so far has been reviewed in many papers (see for example Shepherd (1985), Arnold (1992), Dove (1995), Fisher (1995), Hobley (1996), Fisher (1999b), Nguingiri (1999), Brown *et al.* (2002), Shackleton *et al.* (2002), Carter & Gronow (2005), and Pagdee *et al.* (2006)). This experience is also documented, mostly from the viewpoint of the practitioner, in a range of “Social Forestry Network” and “Rural Development Forestry Network” papers published by ODI.

It is generally acknowledged that changes towards CFM address the linkages between the formal forest sector, forestry officials, rural people and development represent one of the crucial development in forest policy of the 20th century. It seems however that many countries are still at an early stage in the process of tailoring the concept of CFM to their specific situations and developing and introducing appropriate approaches (RECOFTC & FAO 2003).

There is a considerable number of accounts of examples successfully reconciling forest conservation and rural livelihood improvements (e.g. cases documented in Durst *et al.* (2005)). In terms of sustainable livelihoods and social justice, CFM has led to significant progress in local people’s empowerment in many countries ensuring the rights of access to forest resources and benefits from resource use for the communities (Carter & Gronow 2005, p. 19). The economic viability of CFM depends very much on the characteristics of the forests concerned and market opportunities. Generally, CFM faces the same challenge as most other forms of forest management, namely that in most cases virtually all alternative land uses tend to be more profitable. A combination of CFM and supportive policies can nevertheless result in economically viable and also socially and ecologically beneficial common property regimes for forests, as Bray *et al.* (2006) (c.f. also Antinori & Bray 2005) demonstrate for Mexico. In terms of resource protection, there is sufficient evidence to indicate that CFM can have significant positive effects on forest conservation and result in quantitative and qualitative improvements of forests (Carter & Gronow 2005, p. 31). A key element in this certainly is the removal of a *de facto* open-access situation through a clarification of forest tenure and property rights that often takes the form of a common-property regime. In this way, CFM addresses, in many cases, some of the limitations of highly centralised State-run forest management.

Besides these successes, there are however also many cases in which CFM failed to fulfil its promises and even lead to unanticipated conflicts (Leach & Fairhead 2001). In a series of

case studies in India, China and the Philippines, Edmunds & Wollenberg (2003b) found that devolution policies resulted primarily in changes in the way that central governments exercise control over forest management rather than in a genuine shift in decision-making power to the poorest forest users. Similarly, Ribot *et al.* (2006) argue, based on case studies from six countries (Senegal, Uganda, Nepal, Indonesia, Bolivia, Nicaragua) that central governments tend to retain control over forests by undermining democratic decentralisation initiatives, which consequently yield only limited benefits in terms of increased efficiency in resource management and equity at the local level. The typical strategy of central governments identified in their study include limiting the decision-making powers that are transferred to lower level authorities and choosing local institutions that serve central interests.

Several authors (e.g. Arnold (2001b), Leach & Fairhead (2001), Malla (2001), Edmunds *et al.* (2003a), Fisher (2003b, p. 18), Sunderlin (2005), Iversen *et al.* (2006)) list and discuss weaknesses and reasons for failures of CFM in managing forests sustainably, improving the living conditions of the people concerned in an equitable way and increasing local participation. These include:

- Weak and slow-changing institutions; including weak tenure for local people for forests and forest products;
- Vested interests unwilling to devolve decision-making power and tenure rights to new forest management partners;
- Rent capture by local elites;
- Protagonist promoting collaboration for other reasons than those linked to advancing social justice or protecting forests;
- Conflicts over the goals of forest management and its concrete implementation; divergence of the State's and (poor) local forest users' interests in forests;
- Inconsistent laws and regulations;
- Cumbersome bureaucracy.

Reasons for limited success of early integrated conservation and development projects that may also apply to some forestry projects include a tendency to treat the beneficiaries as passive recipients of project activities (Wells & Brandon 1992, p. 47); and a tendency for short-term projects that rely too much on external expatriate expertise (Nsanjama 1993; Wright 1993). Generally, it appears that promoting and achieving participation in forestry as well as in other integrated conservation and development projects remains a key challenge, despite widespread rhetoric in favour of participatory approaches (Pimbert & Pretty 1995, p. 40). Leach & Fairhead (2001) see a key reason for all these problems in an underestimation of the high social, institutional and ecological differentiation and dynamic of the different settings to which CFM and community-based natural resource management is introduced.

Success or failure of participatory models for sustainable forest management depends often, to a considerable extent, on exogenous factors (e.g. societal, political or (macro)economic) that are beyond control of a sectoral project or programme. This has led to a further widening of the forest-related development and research agenda. Consequently, the participation of local people in forest management has, in recent years, been increasingly linked to dominant issues of the contemporary development agenda, such as “poverty alleviation”, “sustainable livelihoods” and “good governance” in general, and to “decentralisation”, “devolution” and “empowerment” in particular. Accordingly, the focus of the international debate on the role of forest resources in development has shifted to questions concerning the link between forest management and poverty alleviation (see for

example Arnold & Bird (1999), Arnold (2001b), Wunder (2001), Dürre (2002), Levang (2003), Sunderlin (2005)).

2.2.5 Institutions for the sustainable management of forests and common-pool resources: optimism of the early literature *versus* realities on the ground

The establishment of common-property regimes holds the promise to address some of the failures of State-run centralised forest management. Attributes of successful management regimes for common-pool resources are presented and discussed in the literature (Ostrom 1990, p. 90; Arnold 1998b; Ostrom 1999; McKean 2000). Such systems should increase the likelihood of users and other stakeholders organising themselves, creating local institutions and thus resolve the problem of open-access.

In reality, CFM is usually being developed in an environment where there are complex pre-existing sets of informal and formal institutions and a variety of stakeholders with partly conflicting interests and hence often divergent political agendas. Therefore, an in-depth analysis of the situation at the outset and careful considerations of different options are needed to develop CFM and with it a suitable institutional framework for concrete cases in the field. This includes a better understanding of the actors in communities, of interests and processes within communities and between communities and other stakeholders (Agrawal & Gibson 1999). Such an in-depth analysis allows tailoring CFM and programme or project to support the development of CFM to the specific socio-political context (Ribot *et al.* 2006). The findings of Edmunds & Wollenberg (2003a) and Ribot *et al.* (2006) (see Section 2.2.3.2) underline the significance of such political factors for the success or failure of attempts to introduce CFM or decentralise forest management respectively.

Campbell *et al.* (2001) observe that much of the early literature on community-based natural-resource management including CFM is optimistic regarding its potential and expected effects. At the same time, they note a discrepancy between this optimism and numerous case studies from Zimbabwe showing a breakdown of local institutions. The experience gained from implementing CFM and decentralised and/or devolved natural resource management and presented in Section 2.2.3.2 tempers some of the initial enthusiasm and optimism about CFM, co-management of natural resources and the establishment of sustainable common property regimes. In fact, over recent years, an increasing amount of critical literature on the institutional side of CFM, decentralised or devolved natural resource management has been published (c.f. for example Campbell *et al.* (2001), Leach & Fairhead (2001), Edmunds & Wollenberg (2003a), Walker & Hurley (2004) and Ribot *et al.* (2006)).

Noting that many early voices in the literature on common property regimes are optimistic does not mean that the proponents of such systems do not mention potential problems. In fact, McKean (2000) draws attention to the fact that such regimes contain internal collective-action problems and that certain preconditions must be given for them to be successful. As examples for the latter, she lists the availability of sufficient social capital in the group, so that cheating on jointly established rules and shirking do not become problems; and cultural values that support cooperation as a conflict-solving mechanism.

2.3 Key issues in forest policy and governance in countries in transition

Governance measures including decentralisation and/or devolution are very often part of neoliberal reform packages (Batterbury & Fernando 2006), although, as Ribot *et al.* (2006) argue, there is no automatic link between the adoption of liberalisation or democracy and the

decentralisation or devolution of administrative powers. The national governments of 63 out of 75 developing countries analysed have committed themselves to decentralisation initiatives across many different sectors (OECD 1997, p. 47). The fact that the Kyrgyz Government has developed a “National Strategy for Further Decentralization and Development of Local Self Government in the Kyrgyz Republic (2002-2010)” (Government of the Kyrgyz Republic 2002, p. 8) indicates that decentralisation and devolution are also important issues in Kyrgyzstan.

2.3.1 Current trends in forest policy in countries in transition

The collapse of the socialist economies has led to a phase of institutional reform (Ribot *et al.* 2006) extending also to the domain of natural and forest resources. Thus, the forest sectors of most former communist countries currently undergo fundamental changes that are part of the overall transition process introduced in Section 2.1.1. Since the breakdown of the former socialist bloc, most if not all transition countries in Eastern Europe and the former Soviet Union have developed new legal frameworks for forest conservation and management (Csóka 1998; Frederiksson 2002; FAO 2007b, p. 22). However, the extent to which reforms in the forest sector have been conducted and progress of the reforms vary widely. This reflects the variation in the overall transition process amongst the countries.

Generally, one observes that, at least in post-Soviet countries, central governments remain key actors in forestry. This is linked to the facts, that, in most of the former Soviet republics, forests are still predominantly owned by the State and forest management is still largely centralised. In most cases, the implementation of forest management plans in the field remains the responsibility of State forest farms (Russian: *leshozes*) that are accountable to central government (Savcor Indufor Oy 2005, p. 17; FAO 2007b, p. 22).

Questions regarding sound institutional arrangements for forest management are particularly acute in countries with economies in transition for at least two reasons. Firstly, because their institutional set-up at the outset was generally and, as mentioned above, is often still dominated by strong central governments and administrations functioning largely in a top down “command and control” mode (FAO 2007b, p. 73). Secondly, because of the huge economic challenges faced by these countries, which, according to the currently prevailing neoliberal development model, require a reduction of public expenditure in the process of transition to a market economy. This considerably reduces the resources available for forest conservation and management and calls for increased collaboration with non-State stakeholders.

Similarly to the transition process at the national level, the forest sectors are engaged in a double transformation that involves simultaneous economic and political changes. The transfer to a market based system and the involvement of the private sector in forestry are key features of economic reforms. The political adaptations typically comprise measures to decentralise and/or devolve forest management. These two aspects of the transition process in the forest sector are briefly reviewed below. The fundamental question for this transition of the forest sector is what will be the responsibilities and roles of the State, the private actors, civil society and the market in a future system that is both economically efficient and ensures the conservation of forest resources.

This multiple transition process coincides with important changes in forestry concepts and forest policy at the international level (Csóka 1998), including, for example, the adaptation of a comprehensive understanding of sustainability, of the concept of multifunctionality (see

Section 2.5) and of participation (see Section 2.2.3.2) in forestry. As a general trend throughout the world, market mechanisms and new market-based policy instruments play an increasing role in forest policy (c.f. for example Cashore *et al.* (2004)), as governments struggle with decreasing budgets and limited professional resources. Payments for environmental services (Wunder 2005) or forest certification (Vogt *et al.* 2000; Nussbaum & Simula 2005) are examples of such new instruments. Governments typically play the role of a catalyst or rule maker in the process of developing such approaches and policies. Their concrete implementation is then largely done by the interplay between markets, the private sector, communities and individuals (Cubbage *et al.* 2007).

2.3.1.1 Economic reforms and involvement of the private sector

The emergence of a market and with it of a demand-and-supply driven system in formerly communist countries leads to a new dynamic in forest policy and management. It also means that the State that previously used to plan demand for and supply of forest products loses a substantial area of influence. Markets considerably influence forest use, as, for example, changes in demand for forest products translate into different extraction rates.

In the emerging capitalist system, private actors, be they private households or enterprises, may take over tasks from the State in forest management, processing and trade of forest products. In accordance with the neoliberal reform agenda, the private sector could take on all productive functions and tasks, i.e. functions that are regulated by the market and do not concern public interests. The State, on the other hand, would limit its activities to normative functions that are needed to guarantee the provision of environmental services and forest products that are in the public interest (Roering 2002, p. 97). Correspondingly, Nijnik (2002, p. 20 *et seqq.*) advocates a far-reaching privatisation of the forest sector of the Ukraine on economic grounds.

Generally, there is still a State dominance in productive activities in many if not most of the countries in transition (Savcor Indufor Oy 2005, p. 17). Although, the State remains a dominant actor in forestry in many Eastern European countries, the private sector gets increasingly involved in forestry and especially in productive forestry activities (Roering 2002, p. 4). In contrast to this, private sector involvement in the post-Soviet countries of Central Asia and the Caucasus has so far been limited (FAO 2007b, p. 74). In the case of Kyrgyzstan, the national concept for the development of the forest sector (c.f. Section 6.3.4) calls for a handing over of a part of productive activities to the private sector (State Forest Service of the Kyrgyz Republic & Intercooperation Kyrgyzstan 2004).

2.3.1.2 Decentralisation and devolution in forest management in countries in transition

In terms of forest tenure, the State remains the dominant forest owner in most of the post-Soviet countries (Bouriaud & Schmithüsen 2005; FAO 2006, p. 203; 2007b, p. 136). In Eastern Europe, where in a few cases such as in Poland and Slovenia private forests existed in the socialist period, there has been a considerably increase in privately owned forests during the transition period (FAO 1997, p. 11 *et seqq.*; 2006). Processes of restituting forests to their formal private owners or their descendants are on the way in several countries of Eastern Europe (e.g. in Bulgaria (Staddon 2000) or Estonia (Puustjärvi *et al.* 1998)) (FAO 1997, p. 11 *et seqq.*; Roering 2002, p. 73 *et seqq.*; Bouriaud & Schmithüsen 2005).

Decentralisation efforts in forestry within the former Soviet Union seem so far to have been rather limited. The large majority of all political and economic decisions, including those that are relevant at the local level, are still made at the national level. A strong hierarchical

relationship between the central, regional and local governments prevails (FAO 2007b, p. 73). Despite some declarations of intention to transfer more rights and responsibilities to local governments, relatively little has changed so far. If responsibilities were in fact transferred, often the authority to take related decisions and the resources to realise these responsibilities were not shifted (FAO 2007b, p. 73) (c.f. Matsuzato (2001) for an account of similar problems in the course of the establishment of local governance (“municipalisation”) in Kyrgyzstan).

With regard to transfer of use and some control rights for forests, several post-Soviet countries, including Armenia, Kyrgyzstan, Tajikistan and Uzbekistan, have created mechanisms to lease forests and often also un-forested land of the State Forest Fund (Russian: *goslesfund*, see glossary) to collective farms, communities, the private sector or private individuals (Savcor Indufor Oy 2005, p. 22; FAO 2007b, p. 13). Georgia is currently considering privatisation of land of its State Forest Fund. To date, the area for which property rights have been transferred to non-State actors remains however very limited (FAO 2007b, p. 13).

Beyond the countries in transition of Eastern Europe and the former Soviet Union, formally still communist countries such as China and Vietnam have engaged in decentralisation and devolution in forestry. Reform in these latter countries is limited to the sphere of economy. Decentralisation and devolution policies in both these countries provide interesting insights concerning an effective division of roles between different levels of government, collectives and local people in the context of a political one-party system. Forests in China are owned by the State or by collective bodies (Wenming *et al.* 2002, p. 30). In Vietnam, there is an increasing level of privately owned forests (FAO 2005, p. 13) with the State still owning 56% of all forests in 2000 (FAO 2006, p. 203)¹⁰.

China initiated a series of policy reforms including decentralisation of decision-making in forestry from central to local governments and devolution measures transferring some rights and responsibilities for forests and trees to individual households in the early 1980s (Liu 2001; Liu & Edmunds 2003). Local people get involved in forest management under a range of different arrangements, including household-based management of forest lands and reforestation of denuded forestland and brush, collective forest management and a variety of shareholding systems (Sun 1992; Song *et al.* 1997; Liu 2001; Edmunds *et al.* 2003a, p. 176; Liu & Edmunds 2003). Devolution introduced by these reforms focused on transfer of use rights for forests from collective to households (Liu 2001), contrary to the community orientation of devolution in many developing countries. Nevertheless, a significant percentage of forests in China remains collectively managed (Weyerhaeuser *et al.* 2006). Despite these decentralisation and devolution measures, the central government still exercises considerable control over all forests in the country (Liu & Edmunds 2003).

In the course of the economic transition process, Vietnam has made efforts to decentralise its forest sector and introduce devolution in forest management (Sam & Trung 2003). Long-term use rights for forests and land to be reforested are allocated to individual households based on a decision taken in 1993 in the framework of the economic transition process (Howard 1998; Sikor 1998; Sunderlin & Thu Ba 2005, p. 17). Additionally, there is, since 2004, a legal basis for the allocation of forested and other land to communities (Sunderlin &

¹⁰ There are divergent ownership statistics for Vietnam in the literature (cf for example data given in FAO (2006, p. 203) and in Nguyen (2006a, p. 362)). This is mainly due to a variety of institutional arrangements that allow for different categorisations of ownership.

Thu Ba 2005, p. 46). In some cases, the complete set of property rights and, with it, official land use titles are granted to forest recipients (Sam & Trung 2003; Nghi 2004), while the State retains some supervisory rights (Nguyen 2006b).

The government of Laos has, during the 1990s, equally introduced measures to decentralise and devolve forest management (Thongphanh 2004). This includes provision for the allocation of forested land and land to be reforested to households and villages (Kitamura 2003) and for community forestry (often being referred to as “village forestry”) (Sunderlin 2006).

To sum up, one can say that efforts to decentralise and devolve forest management are being undertaken in many countries in transition. Attempts to introduce CFM in former Soviet republics have however so far been limited. It seems that especially China and also Vietnam, both countries in which reforms have largely been limited to the domain of economy, have already gathered considerably more and longer experience in terms of devolution than post-Soviet countries. An interesting communality of most of the efforts discussed above is that they focus rather on devolution of rights and responsibilities to individual households than on community-based approaches or that provisions for individual approaches were introduced prior to provisions for a community-based approach. In the case of post-Soviet countries, there are indications that negative perceptions of community-based approaches might be largely the effect of the experience with collective natural resource management during the Soviet era (FAO 2007b, p. 13). This point will be further discussed in Section 7.7.5.

2.3.2 Key elements for forest governance and devolved forest management in countries in transition

From the rationale for decentralisation and devolution presented in the previous Sections, there is a range of reasons in favour of decentralisation and devolution that apply particularly to countries in transition. These include: The principle of subsidiarity and the need for efficient decision-making in forestry; the fact that inclusion of local forest-dependent people in forest management is more effective and socially just than exclusion, particularly in times of economic hardship; and financial constraints of the State that call for collaboration in forest management with non-State stakeholders.

The implementation of CFM understood as a “partnership between key stakeholders in the management of a given forest” (Carter & Gronow 2005, p. 2) is very much a matter of defining clear roles for the stakeholders and finding the right balance between them along multiple dimensions:

- Local *versus* “wider”, private *versus* public interests;
- Rights, responsibilities and adequate power for decision-making;
- Relevant strengths, knowledge and experience.

The goal is to find the most effective division of roles amongst the stakeholders to achieve sustainable forest management.

In terms of interests and roles of the stakeholders, important environmental services provided by forest ecosystems for society at large legitimise a certain role to be played by the State in forest management for “the good of society”. A variety of institutional options is conceivable, ranging from full State ownership and management over the allocation of limited use and control rights, to the assignment of the complete bundle of property rights combined with some restrictions for the resource owner. However, the notion of

conservation of natural resources or the need to achieve national economic development goals have often been overstretched as arguments by representatives of the State in order to safeguard their interests and legitimise their actions (Shackleton *et al.* 2002).

Given the long tradition of centralised, top-down decision-making in forestry in post-Soviet countries and, often, the availability of a considerable bureaucracy at the central level, the above-mentioned principles in favour of decentralised and devolved natural resource management may collide with a more traditional understanding of extended central control and interests of central agencies. The political will within the central administration to provide local organisations and people with the necessary discretionary powers for local decision-making (Edmunds & Wollenberg 2003b; Ribot *et al.* 2006) might be limited because of fears of losing power (Ribot 2004, p. 74 *et seqq.*). Taking the interests of the central administration into consideration, one has good reasons to be very sceptical of any declaration made by State representatives in favour of decentralisation and devolution and their genuineness. Arun Agrawal is quoted (Lele 1998) as wondering: "Why should States, whose central *raison d'être* is the accumulation of authority, material resources, and legitimacy, be interested in decentralizing and devolving real power?". One can indeed wonder under what conditions previously powerful forest authorities in countries in transition are willing to transfer some authority over forests to lower level authorities and local people and be satisfied with the remaining tasks of monitoring resource use and providing technical advice.

The questions raised in the previous paragraph highlight the key issue of role change for government agencies. For them, decentralisation and devolution imply less direct involvement in the management of resources, but an increasing role in providing a suitable regulatory framework, monitoring of resource use and in the provision of support services for the new users and managers of the forest (Prins & Korotkov 1994; Meinzen-Dick & Knox 2001). For the success of decentralisation and devolution it seems important that there are positive incentives for the staff of government agencies to take up new roles. Reduced responsibilities in resource management can lead to reduced opportunities to generate formal and sometimes also informal revenues and to diminished power and status. It may even result in cuts in government funding (Meinzen-Dick & Knox 2001). It is therefore important that the new roles offer adequate salary, status and job security (Vermillion, 1996 #1805 quoted in Meinzen-Dick & Knox 2001). If this role change is not facilitated by such means, it is likely to lead primarily to internal power games between different units of the State administration about the allocation of limited or even further decreasing State funds. This risks to render the administration largely dysfunctional.

But also local people face a role change. Under the previous Soviet-style arrangements in the forest sector, some local people have been involved in operational forestry work, but generally less in decision-making, as the data from Kyrgyzstan will show. Other local people now gaining access to forest resources through devolved forest management, have no practical experience in forestry. Thus, forestry work is an entirely new domain for some and decision-making in forest management is new to most of local people becoming involved in forest management. This stresses the need for support from the side of trained forestry staff.

Concerning the strengths, knowledge and experience that different stakeholders bring in, it is important to stress the complementarity of the strengths of State forest agencies and local forest users (Berkes 1997). These include notably the science-based knowledge of professional foresters and the site-specific experience of the local forest users (Carter & Gronow 2005, p. 31). The latter also offers significant potential for local innovations in

forest management practice. Edmunds & Wollenberg (2003a, p. 175) suggest starting “with what forest users know and do” when a new management system should be developed, as “many of the most successful examples of local management are found where forest users themselves initiated a management system”. For Kyrgyzstan, this thesis contributes to this analysis of the knowledge and experience in forestry available amongst local people.

The complementary use of the experience and knowledge of the different stakeholders of course requires them to mutually accept the expertise held by the other partners and its equivalence and relevance for forest management. The balance in the use of this knowledge and in the rights is however often being disturbed by officials using “scientific management” to justify continued strong central control over resources, sometimes even as a pretext to secure the control of profitable income opportunities (Shackleton *et al.* 2002; Ribot 2004, p. 74; Ribot *et al.* 2006).

Linked to knowledge is the question regarding the use of appropriate management tools. Shackleton *et al.* (2002) and Ribot *et al.* (2006) voice concerns that government officials might apply and prescribe the use of unnecessary complicated planning and management procedures and tools as a pretext to justify their own rule and to keep their decision-making power. Such requirements and plans can considerably reduce or even completely outweigh the sphere for discretionary decision-making for local resource users and thus create new modes of government control over resource use (Ribot *et al.* 2006). Carter & Gronow (2005, p. 31) see a risk of overly sophisticated management techniques or prescriptions reducing the scope for decision-making of local people or excluding illiterate members of the community. This would call for management tools that are as simple as possible and only as complex as strictly necessary.

These considerations underline above all that the development of decentralised and/or devolved forest management is to a large extent a political process of negotiation about rights of access and, linked to these, about power and scope for decision-making. Introducing CFM or devolved natural resource management has, in many different contexts throughout the world, not been as easy and straightforward as originally expected. The legacy of the Soviet period in terms of large government bureaucracies, a strong tradition of top-down decision-making combined with severe financial constraints make it a particularly challenging endeavour in a post-communist setting. Devolution and CFM is likely to face strong institutional resistance in many instances and to progress only in relatively small steps and hence to take a considerable amount of time. On the positive side, one can note that the broad concept of CFM allows for local adaptations and a wide range of possible institutional set-ups. The need for context-specific approaches that are highly adaptive and flexible to respond to a changing environment and to accommodate new lessons learned and for sufficiently long time-horizons is in fact stressed by many authors in the literature (Leach & Fairhead 2001; Edmunds *et al.* 2003a; Mansuri & Rao 2004b; Batterbury & Fernando 2006; Ribot *et al.* 2006).

2.4 Sustainable development, sustainable livelihoods and participation

2.4.1 To sustain – the root of a family of contested terms

The terms “sustainable”, “sustainability” and derived composite terms such as “sustainable development” or “sustainable management” go back to the English verb “to sustain”, which has Old French and Anglo-French etymological roots (Oxford English Dictionary 1989). For

the purpose of this study two out of 13 senses given to the verb in the Oxford English Dictionary (1989) are of particular interest, these are:

- “To keep in being; to cause to continue in a certain state; to keep or maintain at the proper level or standard; to preserve the status of”;
- “To keep going, keep up (an action or process, .. *occas.* a material object); to keep up without intermission; ... to carry on (a conflict, contest).”

Early uses of the verb “to sustain” in the first of the above listed senses date back to 1290, of the second to 1330 (Oxford English Dictionary 1989). One of the problems of the verb “to sustain” and its derived terms today are their wealth of different meanings (see also Section 2.4.2). Even more important is the fact that the object being sustained has to be explicitly mentioned in order to make the use of the verb and its related terms meaningful.

The English adjective “sustainable” was already used in the 17th century, albeit rather rarely and in the now obsolete sense of “supportable, bearable”. It gained only prominence more recently, from the 1960s onwards, when it first appeared mainly in specialised economic literature in the sense of “capable of being maintained at a certain rate or level” (Oxford English Dictionary 1989). The noun “sustainability” was also first coined in this context. “Sustainable” and “sustainability” were then increasingly used in an ecological sense (see Section 2.4.2 below) to mean “of, relating to, or designating forms of human economic activity and culture that do not lead to environmental degradation, esp. avoiding the long-term depletion of natural resources” (Oxford English Dictionary 1989).

2.4.2 Sustainable development – career and controversy of a term

There are different indications in the literature as to the first appearance of the term “sustainable development”. Ruitenbeek and Cartier (1998) refer to the report “Only one Earth: The Care and Maintenance of a small Planet” compiled by Ward and Dubois (1972) for the United Nations Conference on the Human Environment of 1972 in Stockholm as first source of the term. Glasby (2002) mentions the book “Building a Sustainable Society” written by Brown (1981) as “one of the most influential early texts to promote this concept”. In the “World Conservation Strategy” published by IUCN in 1980 (IUCN 1980) the term is defined as follows:

" **'Sustainable development'** is used in this strategy to mean: improving the quality of human life while living within the carrying capacity of supporting ecosystems."

The term “sustainable development” became well known through the publication of the report “Our Common Future” by the so-called Brundtland Commission in 1987 (WCED 1987, p. 41), where it is defined as follows:

"**Sustainable development** is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

Both these definitions of sustainable development make clear that the quality of life for mankind and the conservation of its biotic and abiotic resource base in the long run should be central to any modern concept of development. Following the United Nations Conference on Environment and Development (UNCED) held in 1992 in Rio de Janeiro “sustainable development” became a central theme for the future development of mankind and the global environment. Thus, the term “sustainable development” as used from the time of the Rio

conference onwards comprises ecological, social and economic dimensions. This fundamental idea of the concept can be illustrated with a simple, equilateral triangle with society (social environment), ecology and the economy at each corner as shown in Figure 1.

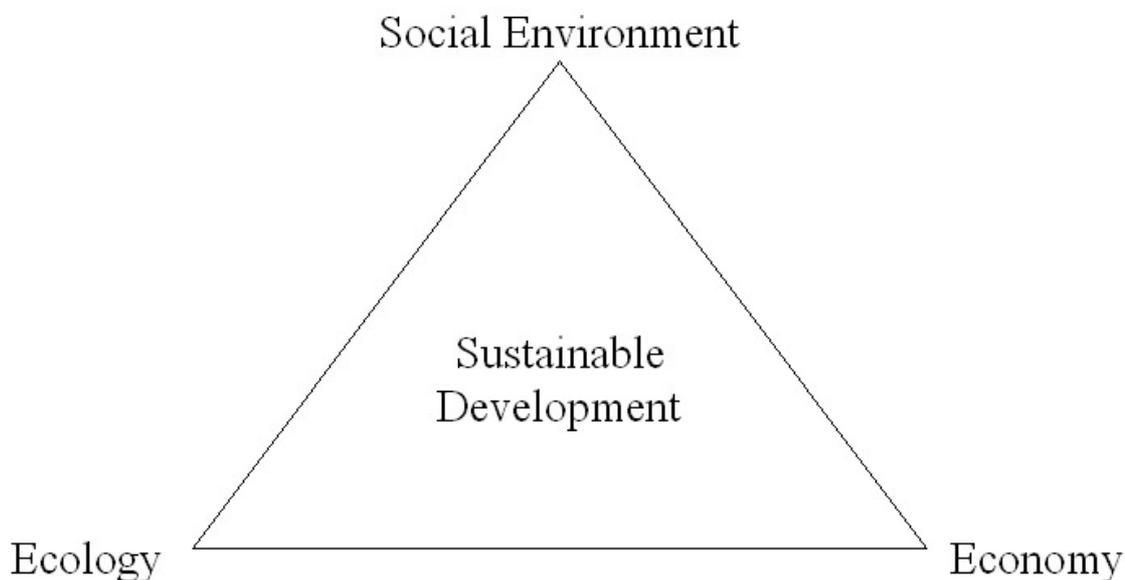


Figure 1: Sustainable development seen as a balance of its three inherent dimensions.

The idea behind this visualisation of the concept of sustainable development is that the triangle is balanced as long as social, ecological and economic considerations are taken into account. If one of the three fundamental dimensions is however stronger weighted to the expense of the others, the triangle gets out of balance and changes its form away from the balanced equilateral state. This leads to unbalanced and thus unsustainable development and to social, ecological or economic disturbances and possible problems. The concept of sustainable development thus demands the integration of ecologically sustainable resource use and economic development in order to satisfy social needs.

Sustainable development can be seen as a goal or an ideal at which humanity should aim, and also as a kind of conflict prevention strategy between the interests tied to these three, often antagonistic angles (Klötzli 1992). There is no doubt that finding a way towards a sustainable development equilibrium represents a difficult balancing act. This has provoked the writing of many critiques of the term and the concept behind it. Sustainable development has been portrayed as a contradiction in itself by, for example, Dovers (1993). Dovers and Handmer (1993) and Kläy (1995) note that the lack of an agreed operational definition of the term has opened the doors for a wide range of interpretations fitting any purpose and turning it into a meaningless shell used and misused for any conceivable purpose. Burger (1997) countered such criticism by saying that the concept of sustainable development should be seen as a central theme providing orientation for the definition of operational objectives for concrete situations. As such, the concept should not be confounded with the operational objective derived from the concept for concrete situations.

Definitions of “sustainable development” and “sustainability” vary from one another reflecting different purposes, values, beliefs and interests. This makes sustainability “a complex and contested concept” (Pretty 1995). Some authors put the emphasis of their definitions on the capacity of a process or an action to continue. Others focus more on the

resilience of a system to flip back to a previous state after having been exposed to a particular burden. In the context of economy, sustainability means to some that the natural resource base is not harmed; to others it implies a continuous growth at the same rate. Given these different definitions and meanings of the concept, Pretty (1995) underlines that “In any discussions of sustainability, it is important to clarify what is being sustained, for how long, for whose benefit and at whose cost, over what area and measured by what criteria”.

Glasby (1995; 2002) describes the term “sustainable development” as misleading by pointing to the fact that we currently live in a markedly unsustainable world in terms of the ever increasing need for economic growth and general resource use, whereas sustainability would mean “living in harmony with the biosphere”. While he acknowledges that “sustainable development as commonly used is a useful concept in stimulating us to upgrade environmental procedures to more appropriate levels”, he emphasizes that “we should not delude ourselves that we live in a sustainable world” (Glasby 2002).

The idea of an equilibrium between economy, ecology and the social sphere behind “sustainability” and “sustainable development” might get clearer if one thinks of the sustainability triangle being balanced on a support, as illustrated in Figure 2a. The more this support is moved away from the centre of gravity of the triangle towards one of its angles, the more this very angle gets lifted whereas the two others are lowered.

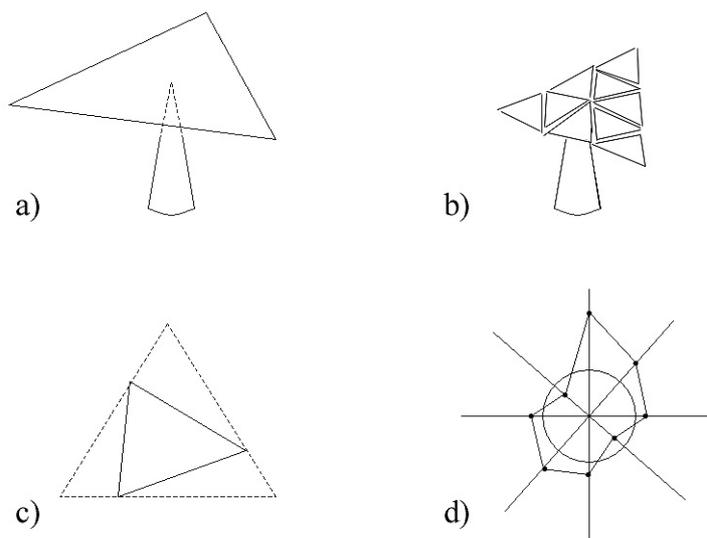


Figure 2: Playing with the idea of sustainability; a) balanced sustainability on a support; b) smaller subsystems forming a larger system; c) unsustainable state with reduced social, ecological and economic sustainability; d) illustration of a sustainability assessment showing sustainability criteria on the axes and threshold levels as a circle.

A sustainability triangle can also be thought of as a sum of several smaller triangles representing sub-systems of the overall system as illustrated in Figure 2b. Unbalanced, hence “unsustainable” states can also be visualised as triangles of different size within the contours of the ideal equilateral triangle, as shown in Figure 2c.

At the social end, one could think of the erosion of the social fabric in a society leading to tensions and an ever wider-meshed social security net as an example for an unsustainable state. As an example regarding economic sustainability, one could add the growing indebtedness of a State or any other economic entity that results in increasing financial

burdens to be borne by future generations. The latter see their opportunities washed away by the consequences of their predecessors' or ancestors' high level of spending.

Illustrative examples in the field of ecology are the case of erosion of fertile soil or little or no regeneration in a forest. While a given forest might be able to continue providing its products and services for a while, typically for several human generations, regardless of whether there is regeneration of its species or not, a forest with insufficient or even no regeneration will eventually become less productive and eventually fail to provide the goods and services needed by forest users. The alternative, sustainable route is that each generation of forest users should limit its demands for forest products in a way that allows the forest ecosystem to be continuously regenerated. While this might mean lower annual yields of forest products for present generations it means, on the positive side, the absence of dramatic falls in productivity and a continuous supply of forest products in the long-term.

The picture of the triangle representing the three basic dimension of sustainability evolves to a multidimensional representation of sustainability if further axes are introduced, typically representing additional dimensions or sustainability criteria, as shown in Figure 2d. Such complex attempts to illustrate sustainability often also include further elements, such as the sustainability levels aimed at or the critical threshold levels because, for a given parameter, a sustainability threshold can be defined. A series of parameters can be assessed and the emerging picture allows decisions to be made to decide whether the encountered situation can be judged as sustainable or not.

It is clearly a matter of definition and judgement, at which point a situation becomes unsustainable or at what level such thresholds should be set. Under certain circumstances a degree of temporary imbalance might be judged to be unavoidable and hence tolerable. There is a certain consensus that a system's inherent capacities to recover after a phase of increased burden - other relevant terms in this context are stability and resilience of a system - must be conserved at all times. If these are damaged, sustainability is clearly violated. To give an example: a given forest can keep its regeneration capacity as long as seeds are available and suitable germination and growing conditions prevail on the ground, even if some major trees are felled. But if, for example, bush fires destroy the reservoir of seeds and alter the favourable microclimate at ground level, then the forest system becomes unsustainable, as the regeneration process gets harmed.

A differentiation of the concept of sustainability that allows distinction between different degrees of sustainability, are the notions of weak and strong sustainability (Ninck 1997, p. 58; Luckert & Williamson 2005; Munier 2005, p. 15). Economically speaking, the concept of weak sustainability is based on the assumption that natural capital can be substituted with human-made assets (Daly 1991, p. 250; Krysiak & Krysiak 2006). The decisive criteria to decide whether a situation is weakly sustainable or not is the maintenance of the total stock of assets. Thus, a situation in which stocks of natural capital are reduced could still be judged to be weakly sustainable on condition that the stocks of human-made capital increase and hence compensate for the loss of natural capital. However, the basic assumption of weak sustainability, i.e. the limitless substitutability of natural by man-made capital, is often challenged (Daly 1996, p. 5). If one accepts that there are limits to such a substitution, then there is a possibility that "natural capital declines to a point where scarcity of natural capital becomes a constraint to current and future economic development and well-being" (Luckert & Williamson 2005). Accordingly, strong sustainability stipulates that natural capital, including services provided by natural resources, and man-made capital are maintained separately. This is based on the assumption that these capitals complement one another in

most production functions (Daly 1991, p. 250) and that hence current and future development depends on the preservation of irreplaceable natural assets (Luckert & Williamson 2005).

The examples given in this Section underline the multitude of meanings given to sustainability and sustainable management of natural resources. Thus, having to rely on aspects of definition and judgement makes for difficulties in the management of natural resources for sustainability.

2.4.3 Sustainable livelihoods

The “sustainable livelihood” (SL) approach or framework emerged from the debate following the publication of the UK Government’s “White Paper on International Development” in 1997 and the declaration of the Millennium Development Goals by the UN in 2000. It was devised as a means to enhance progress in poverty elimination (Ashley & Carney 1999) and builds on the ‘assets/processes/activities’ framework that was utilised in different guises by researchers concerned with poverty reduction, sustainability, and livelihood strategies (Ellis 1999) (c.f. also Chambers and Conway (1991) for an early concept of sustainable livelihoods). It, thus, reflects changes in recent development thinking and experience gained with participatory approaches to development and a renewed focus on poverty alleviation. Today, the sustainable livelihoods approach is widely used in various adaptations in development and development-oriented research throughout the world.

Ellis (2000, p. 10) defines livelihood as that which comprises: “... the assets (natural, physical, human, financial, and social capital), the activities, and the access to these (mediated by institutional and social relations) that together determine the living gained by the individual or household.” Sustainability is one of a set of core concepts underpinning SL approaches. Ashley and Carney (1999, p. 46) see livelihoods as “sustainable when they:

- Are resilient in the face of external shocks and stresses;
- Are not dependent upon external support (or if they are, this support should itself be economically and institutionally sustainable);
- Maintain the long-term productivity of natural resources; and
- Do not undermine the livelihoods of, or compromise the livelihood options open to, others.”

Figure 3 below illustrates the SL framework, showing the livelihood assets (sometimes also referred to as “livelihood capitals”), the vulnerability context influencing the assets, livelihood strategies and livelihood outcomes. The policies, institutions and processes, shown in the middle, have multiple influences on the assets, the vulnerability context and on the resulting livelihood strategies.

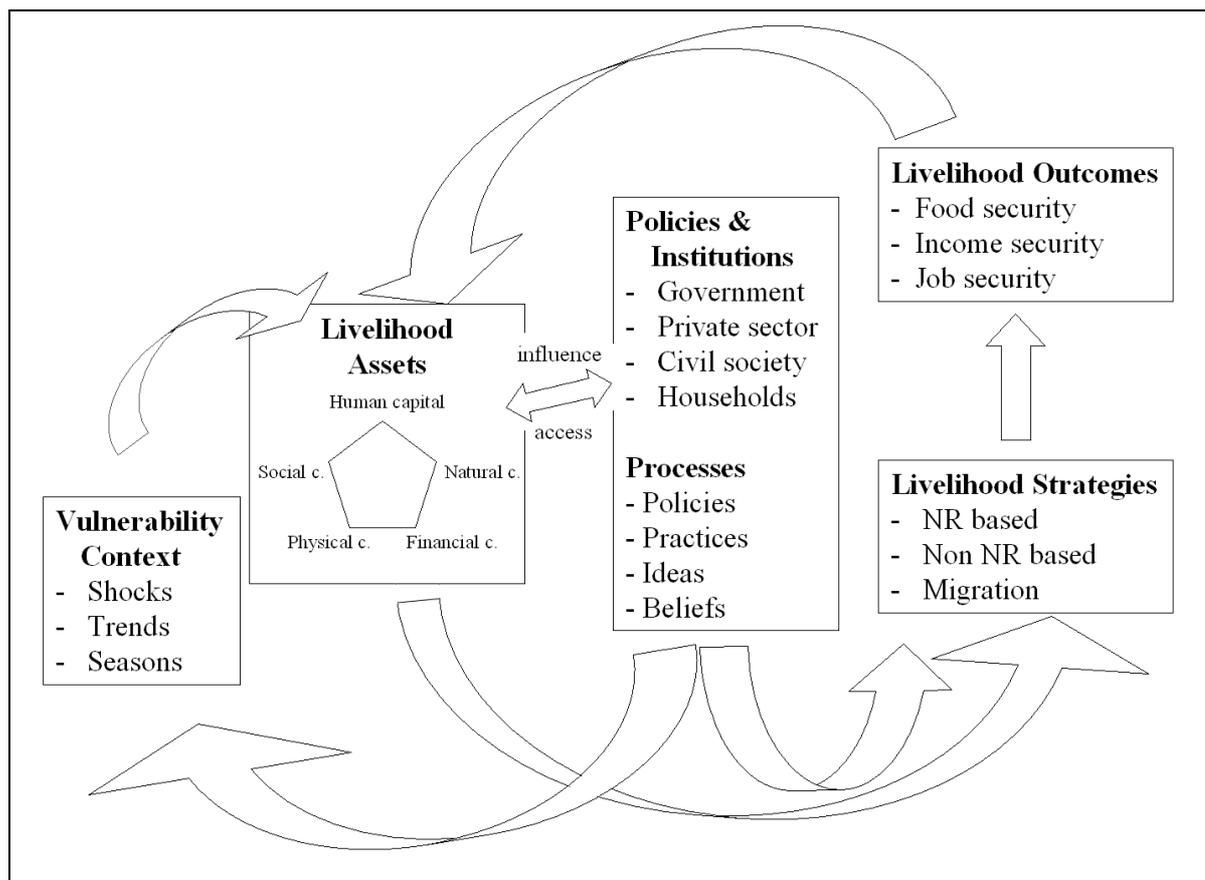


Figure 3: DFID's SL framework, adapted from: www.livelihoods.org/info/tools/SL-Proj1b.ppt (27/02/2006). NR = natural resource(s).

The sustainable livelihoods approach has also been introduced to the domain of forest management and development, often with a link to poverty reduction (e.g. Warner 2000; Baumann 2006). It is adopted in forestry in various ways, for example as a tool to analyse the wider context of a project and particularly the livelihoods of people linked to project or as a general framework to assess the outcome and impacts of a project (e.g. Kaushal & Kala 2004).

For this thesis, with its focus on local knowledge and forests, the following three livelihood assets are of special importance and are therefore defined here:

Human capital

This category of livelihood assets represents the knowledge (including skills), capacity and abilities to work, "and good health that together enable people to pursue different livelihood strategies and achieve their livelihood outcomes" (DFID 1999-2001). Thus, in this thesis, local knowledge is seen as being a part of human capital.

Natural capital

The term natural capital, which is also part of the livelihood assets, refers to the stocks of natural resources available to local people. Particularly relevant natural capital for this thesis includes the WFFs, arable fields, grazing areas, water and other key resources for people living in the WFF-belt. These resources provide both direct (e.g. fruits, crops) and indirect benefits (e.g. environmental services) to the local communities (DFID 1999-2001).

Social capital

For this thesis, social capital is taken to mean the social resources upon which people build their livelihood strategies (DFID 1999-2001). The idea behind the concept is that social bonds and norms are important both for individuals and communities (Pretty 2003). Important features of social capital are: relationships of trust; reciprocity and exchanges; mutually-agreed or commonly accepted rules, norms and sanctions; and social networks and connectedness (Mearns 1996; Pretty 2003; Gillinson 2004). High levels of social capital are generally thought to lower the transaction costs of working together and thus facilitate cooperation between individuals (Pretty & Ward 2001).

As previously described, sustainability of livelihoods rests on several dimensions, including environmental, economic, social and institutional (Ashley & Carney 1999, p. 46). Sustainable livelihoods can hence be seen as a further development of the concept of sustainable development, and also as an example of how the three “classical” dimensions of sustainability (society, ecology and economy) are often complemented or extended by additional dimensions or sub dimensions, such as the institutional dimension in this case, which could be seen as a sub set of “society”.

As indicated by Ellis (1999), the SL approach is clearly a people-centred approach putting much weight on people and ways to increase their well-being, i.e. on the social and economic aspects of sustainability. Although the definition of SL given above includes the conservation of the natural resource base for human development, one notes that the ecological side of sustainability is less prominent than in the case of the “classical, triangular” model of sustainability. This applies particularly to graphic representations of the sustainable livelihoods framework. There, the natural resource base is usually represented as one of five key assets, all five together placed in a pentagon. This might lead the observer to conclude that these five categories of capitals are equal, freely exchangeable and mutually substitutable. But, even though natural capital is shown as being “equal” to the other livelihood capitals in the pentagon, it is the major asset underpinning all natural resource based livelihoods on which the majority of the world’s population relies. While a depletion of the natural resource base for the benefit of man-made capitals might be consistent with the concept of weak sustainability (see Section 2.4.2), it seems that this would in fact violate the definition of SL. Carney (1999) notes clearly that “rural livelihoods can only be achieved if natural resources are themselves used in sustainable ways”. Thus, the ecological dimension of sustainability is indisputably the key part of SL.

2.4.4 Role of forests and particularly NTFPs in rural livelihoods

Forests around the world provide a wide range of goods for subsistence use and income generation to local households (Sunderlin 2005) and other stakeholders and a variety of ecosystem services for the benefit of the local population, entire regions and the society at large. Many attempts to quantify the number of forest-dependent people have been made resulting in a wide range of different figures (c.f. (Byron & Arnold 1999; Wunder 2001, p. 18)). Making such estimates proved to be very difficult. The reasons for the difficulties encountered lie in the diversity of forest ecosystems and of socio-economic conditions, the difficulty to conceptualise “forest dependence” by using clear and comparable criteria and deficient sources of statistical data (Byron & Arnold 1999; Wunder 2001, p. 18). Thus, at best, an informed “guesstimate” can be made.

The World Bank (2004c, p. 16) “guesstimates” that globally “more than 1.6 billion depend to varying degrees on forests for their livelihoods”, of these “some 350 million people who

live within or adjacent to dense forests depend on them to a high degree for subsistence and income,” and about 60 million indigenous people are estimated to be “almost wholly dependent on forests”. Forest patches and trees also play an important role outside dense forests. About 1.2 billion people are thought to rely on agroforestry systems that help to maintain “agricultural productivity and generate income” in developing countries alone. The problem of this often-quoted World Bank “guesstimate” is, as Angelsen & Wunder (2001, p. 18) rightly point out, that it is not backed-up by specific sources. Angelsen & Wunder (2001, p. 18) are more cautious when they say that “probably *tens of millions* of people depend on forests as a *dominant* source of subsistence and cash income, while *hundreds of millions* depend on forest products in some *supplementary* way”. Despite the above-mentioned difficulties, these figures provide at least some indications of the overall magnitude of the dependence of man on forest resources and of the importance of forest-based subsistence and income worldwide.

Following Cavendish (2003) and Vedeld *et al.* (2004) forest resources fulfil the following three functions in rural livelihoods:

- Safety nets; the use of forest products bridges unexpected shortfalls in income and cash needs;
- Support of the current level of consumption; the use, processing and/or sale of forest products allows local people to sustain their current level of consumption;
- Pathway out of poverty; the income generated from forest products allows the households to lastingly increase their income levels, either through a “stepping out” strategy, i.e. other, complementary economic activities, or through a “stepping up” strategy, i.e. the intensification and specialisation in ongoing activities (Vedeld *et al.* 2007).

These three functions are interlinked and certain forest products can fulfil some of these functions simultaneously (Vedeld *et al.* 2004, p. 13). Forests in many instances can sustain local people’s livelihoods. At the same time, it is important to remember that converting forests into other land uses may also be an important pathway out of poverty (Wunder 2001).

Generally, the remaining forests in developing countries and severe rural poverty tend to overlap (Wunder 2001; Sunderlin *et al.* 2005). This raises questions about the forestry-poverty nexus. This aspect and particularly the question regarding the role of forest in poverty alleviation has received much attention in the literature lately (c.f. for example (Arnold & Bird 1999; Arnold 2001a; Wunder 2001; Dürr 2002; Angelsen & Wunder 2003)), especially following the declaration of the Millennium Development Goals (MDGs) by the UN in 2000. This leads on to the important questions regarding the reasons behind the often-observed, aforementioned overlap of forests and rural poverty. If we assume that poverty has largely exogenous reasons, one can ask the question: “Why are poor people forest-dependent?”. One can argue that the poor often use forest products due to a lack of alternative sources of subsistence and income. In this case, forest resources play a role as safety nets for the involved households. If one however assumes that poverty has in fact to do with the characteristics of forest resources, i.e. has endogenous reasons, one must ask a different question: “Why are forest-dependent people poor?”. Often, forest products used by poorer groups of the society are economically marginal, provide relatively low returns (Vedeld *et al.* 2004, p. 17) and hence offer only limited potential to provide their users with sufficient means to get out of poverty. Under these circumstances, a high dependence on forest resources can in fact become a poverty trap (Angelsen & Wunder 2003, p. 21).

Amongst the different products and services provided by forests, non-timber forest products (NTFPs) are especially relevant to the livelihoods of local people. In this thesis, NTFPs are taken to be any tangible good of biological origin other than timber that occur in forest ecosystems (Belcher 2003; Robinson & Pfund 2006)¹¹. In the late 1980s, NTFPs emerged as a diverse category of goods in its own rights from what used to be referred to previously as “minor or secondary forest products”. This development is closely linked with the increasing acknowledgement of the stake of local people and their forest use practices in forest management and thus with the shift towards an increasingly inclusive and pluralistic forest management (Lawrence 2003) (see Section 2.2.3.2).

During the early 1990s, NTFPs were widely considered to be the great new hope for integrating sustainable forest management and community development (Arnold & Ruiz-Pérez 2001; Lawrence 2003). Rather optimistic studies about high net values of NTFPs available in tropical forests concluding that extraction of NTFPs can be a competitive form of land use have fuelled these high hopes (c.f. for example Peters *et al.* (1989) or Grimes *et al.* (1994)). More recently, Sheil & Wunder (2002) cautioned however, after a review of two valuation studies (namely the studies of Peters *et al.* (1989) and Godoy *et al.* (2000)), that some of these net values per hectare were based on inappropriate extrapolations from forests rich in NTFPs to larger areas, or on a poor understanding of the perspectives and priorities of local communities using tropical forests (for the latter point c.f. also Coomes & Barham (1997)). The findings from extensive research carried out on NTFPs over the last decade (c.f. for example Neumann & Hirsch (2000) or Belcher *et al.* (2005)) considerably differentiate the general understanding of the role of NTFPs in local livelihoods and of their potential to contribute to poverty alleviation, and thus put the initial enthusiasm about NTFPs into perspective.

The significance of forest resources and specifically of NTFPs for the well-being and the livelihoods of local people is documented in a still growing number of published case studies (e.g. Godoy *et al.* (1995), Campbell *et al.* (1997), Ambrose-Oji (2003), Kusters & Belcher (2004), Sunderland & Ndoye (2004), and Mahapatra & Tewari (2005)). Often, such studies have been undertaken to develop a better understanding of the dependence of local communities and households on forest resources and, more generally, of socio-economic aspects of rural development and ongoing social processes in rural areas of developing countries (Campbell & Luckert 2002).

The role of forest products for local people's subsistence and income of course varies greatly depending on characteristics of the natural resource base, the market and many other factors. Vedeld *et al.* (2004; 2007) found in a meta-analysis based on 51 case studies from 17 developing countries (15 cases from East Africa, 18 from Southern Africa, 14 from Asia, seven from Latin America) that, on average, forest-based income accounted for 22% of the total income of the households. Amongst the different products, wild foods, firewood, fodder, and thatch grass were the economically most important resources.

Generally, forest products used for subsistence and to gain income in the tropics are more important for poorer than for wealthier groups within communities, provided that access to forests is given (Byron & Arnold 1999). Congruently, Vedeld *et al.* (2007) found from the 51 analysed case studies that within the same community poor households depended more on forest products than their wealthier counterparts. As far as NTFPs are concerned,

¹¹ Belcher (2003) provides a discussion of the often contested definition of NTFPs and of related terms.

Neumann & Hirsch (2000, p. 35) observe an “overwhelming evidence that the poorest segments of societies around the world are the populations principally engaged in NTFP extraction”. All these being general trends, there are cases that show converse patterns. The study conducted by Ambrose-Oji (2003) in a forest zone of South-West Cameroon might serve as an example. The author found that the poorest groups got considerably less income from NTFPs than the other income groups, while the middle income groups benefited most from NTFP collection. This underlines the need for careful observations and analysis of resource use patterns in every individual case.

The role of forest products *s.l.* in the livelihood systems of people living in the walnut-fruit forest belt in of Southern Kyrgyzstan will be described and discussed in Chapter 9 of this thesis.

2.4.5 Participation in development

Until the 1960s, the paradigm of “development from above” dominated the development discourse, which got then replaced by the “development from below” paradigm (Stöhr 1981; Chambers 1983). Following the establishment of the latter, “participation” became an increasingly prominent theme in development thinking. Faced with the challenge of sustainable development and the need to integrate social, economic and environmental objectives, it became apparent that the involvement, or participation, of all the stakeholders was the key to the success of any development strategy (Bass *et al.* 1995). Participatory approaches to development aim at putting people at the very centre of development “by encouraging (their) beneficiary involvement in interventions that affect them and over which they previously had limited control or influence” (Cooke & Kothari 2001). More specifically, participation is often seen as a means to make sure that less privileged groups of the society, such as rural poor or women, benefit from development. Guijt (1998, p. 1) writes “the broad aim of participatory development is to increase the involvement of socially and economically marginalized peoples in decision-making over their own lives”. Thus, participation is also seen as a means for gender empowerment, poverty alleviation and promoting sustainable livelihoods.

The exact meaning of participation can, however, be highly context specific, and the extent of local people’s participation can vary considerably from case to case. Various typologies for degrees of citizen participation (Arnstein 1969) or the participation of people in development programmes and projects have been developed (Pretty 1994; Bernstein & Kudat 1995; Pretty 1995). Pretty’s “participation ladder” is shown in adapted form in Table 3 below. “Manipulative participation” and “passive participation”, where people have no say in decision-making and are simply informed about decisions made by outsiders, are at the bottom of this ladder. Pretty’s typology then identifies intermediate types, such as “functional participation”, and continues to the highest level called “self-mobilisation”, where people participate in the development process by taking initiatives themselves while retaining full control over how resources are used, and are thus “empowered” to control and use their resources for their benefit according to their own needs and priorities. Bass (1995) suggest that the term “participation” should always be accompanied with such complementary information in order to clarify the extent and nature of participation of the stakeholders involved in every single case.

Table 3: Participation ladder, adapted from Pretty (1995).

Typology	Key characteristics of each type
7. Self-mobilisation	People participate by taking initiatives independently of external institutions to change systems. They retain control over how resources are used. Such self-initiated mobilisation may or may not challenge existing distributions of wealth and power.
6. Interactive participation	People participate in joint analysis, development of action plans and formation or strengthening of local institutions. Participation is seen as a right, not just the means to achieve project goals. As groups take control over local decisions and determine how available resources are used, so they have a stake in maintaining structures or practices.
5. Functional participation	Participation seen by external agencies as a means to achieve project goals, especially reduced costs. People may participate by forming groups to meet predetermined objectives related to the project. Involvement may be interactive and involve shared decision-making, but tends to arise only after major decisions have already been made by external agents.
4. Participation for material incentives	People participate by contributing resources, for example, labour, in return for food, cash or other material incentives. Farmers may provide the fields and labour, but are involved in neither experimentation nor the process of learning.
3. Participation by consultation	People participate by being consulted or by answering questions. External agents define problems and information gathering processes, and so control analysis. No share in decision-making.
2. Passive participation	People participate by being told what has been decided or has already happened
1. Manipulative participation	Participation is simply a pretence

With “participation” becoming a “silver bullet” in development circles, critiques of the concept and its widespread application in development practice have appeared in recent development literature. Such critiques can roughly be grouped into two categories (Cooke & Kothari 2001, p. 5):

- Fundamental critiques of the core concept of participatory development based on theoretical, political or conceptual grounds;
- Critiques of the technical limitations of participatory approaches and methods to development, such as PRA.

The latter often take the form of “lessons learned” for further improvement, refinement or adaptation of participatory development and methods (c.f. for example Chambers (1994a; 1994b) on PRA). This can be seen as part of the participatory approach itself, in the sense of self-critical awareness (Chambers 1997, p. 32), rather than “a critique of participatory methodology per se” (Cooke & Kothari 2001, p. 5). Also related to the later criticism, Parfitt (2004) notes that much of the criticisms of participatory development arises from what he calls the unavoidable “means/end ambiguity” of participation. Participation is widely used as a means to ensure that development interventions produce better outcomes. At the same time, it often becomes an end from the point of view of equity and empowerment. The latter is based on the assumption that participation enhances the capacity of people to improve their own lives (Cleverly 2001).

Much of these more general considerations regarding participation can also be applied to participation in forest management and will be shown to have relevance to the situation in Kyrgyzstan.

2.5 Sustainability and multi-functionality in forest management - interrelated key concepts

2.5.1 Sustainable forest management and its link to sustainable development

“Sustainable forest management” (SFM) is a key concept that will be used throughout this thesis. This Section will investigate the meaning of the term and how the general understanding of the concept has evolved. The following quote poses a question which indicates the difficulties in “getting to grips” with the term SFM:

"What is that very few people have seen, but which many people have defined, that in practice barely exists, or that doesn't exist at all (according to some people), that is impossible anyway (according to other people), but which, if ITTO¹² and WWF have their way, will become one of the dominant forms of land use in the tropics by the year 2000?" (T.J. Synnott, cited in Johns (1997))

This rhetorical question, although focused on tropical forests, reflects much of the global insecurity, the controversy and the difficulties surrounding the concept “sustainable forest management” and the hope put into this term for the conservation of the world’s forests. The fact that forest degradation is still ongoing, in the tropics as well as elsewhere, suggests that in reality we are still far from a situation in which SFM “has become one of the dominant forms of land use”, despite the boost given to the concept by the United Nations Conference on Environment and Development (UNCED) held in Rio in 1992 and subsequent initiatives.

First, the term “forest management” will be investigated. A fundamental tenet of forestry, considered to be both an applied science and a practice concerned with forest resources, is that “forests provide many different products and environmental services to mankind” (Wiersum 1999, p. 29). Forest management is therefore the discipline and practice which aims at satisfying these needs, as defined by the relevant stakeholders, by influencing forest ecosystems and shaping the man-forest interface. Thus, forest management may be defined as the process of making and implementing decisions about the use and conservation of forest resources and the organisation of the related activities (adapted from Wiersum 1999, p. 29). The reference to conservation indicates that long-term considerations play a part in forest management. However, the term “forest management” does not, in this rather narrow definition, directly and explicitly address the core issue the concept of sustainable development (see Section 2.4.2) as it is understood today, namely the issue of “meeting the needs of the present generation without compromising the ability of future generation to meet their own needs”. The latter issue is taken into account by introducing the element “sustainability” and thus extending the term “forest management” to “sustainable forest management”.

“Sustainability” as a concept has influenced forestry for many centuries, mostly in the form of the related terms “sustainable yield management” and “sustainable forest management”. The first, earlier concept is rooted in the establishment of the German forest sector on a rational, scientific basis in the tradition of the enlightenment. The first documented use of the German term for sustainability (German “*Nachhaltigkeit*”), albeit in the form of an adjective, goes back to a book published in 1713 (Schuler 2000). One of the earliest

¹² ITTO stands for International Tropical Timber Organization.

definitions of sustainability appeared in the forestry encyclopaedia published by Hartig and Hartig (1836, p. 573) (Zürcher 1965). Here “sustainability” was used in a rather physical sense and confined to the sustainable yield of wood and the associated process of “sustainable yield management”. “Sustainability” was thus viewed primarily in economic terms. Other products and services of the forest than wood (e.g. biodiversity and environmental services) and the role of forest resources in social development were not taken into consideration. The contribution of forest use to human well-being was, in a rather one-sided way, conceptualised in an economic sense. Over time, the definition of sustainability in forestry has gradually evolved from its original connotation of sustained timber production to the more comprehensive term of “sustainable forest management” embracing economic, environmental and social aspects. It is important to distinguish the two related terms introduced at the beginning of this paragraph:

Sustainable yield management stands for a resource management regime in which the rate of extraction does not exceed the regeneration rate.

Sustainable forest management (SFM) means managing a given forest with the goal to conserve the forest ecosystem and its capacities to provide forest products and environmental services for an indefinite future.

Today, the debate revolves predominantly around the second, broader and much more holistic term and its operationalisation. The concept of SFM can also be illustrated with a sustainability triangle as shown in Figure 4. SFM includes the social, economic and technical arrangements made in order to sustain the availability of required forest products and to ensure the continuity of environmental services provided by forest ecosystems. Social arrangements are needed to identify legitimate stakeholders, to agree on management objectives and to implement the decisions. Technical and economic arrangements serve to ensure efficient and economically viable use of forest resources.

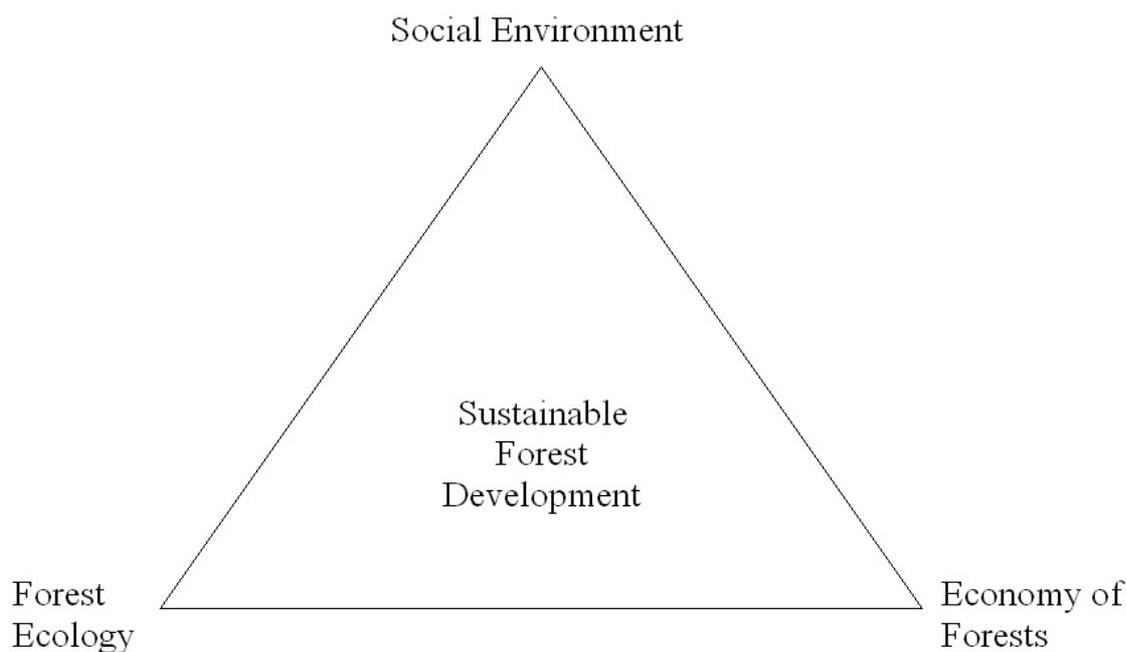


Figure 4: The triangle of sustainable forest management.

There is a wealth of definitions of the term “sustainable forest management” and of references to different approaches to SFM in the literature, all putting different emphasis on particular aspects of the concept. The following explorations of the term illustrate this diversity of interpretation, using first a definition proposed by the International Tropical Timber Organization (ITTO) and secondly the circumscription of the term used by the Forest Stewardship Council (FSC). Both organisations are influential global players in international forest policy with somewhat differing agendas.

“Sustainable forest management is the process of managing forest to achieve one or more clearly specified objectives of management with regard to the production of a continuous flow of desired forest products and services without undue reduction of its inherent values and future productivity and without undue undesirable effects on the physical and social environment.” (ITTO 2005) (see ITTO (1992a) for an earlier version of this definition)

Interestingly, the FSC circumscription avoids using the adjective “sustainable” altogether, which possibly reflects some of misgivings relating to these terms discussed earlier. The FSC, addressing each topic of the sustainability triangle individually - states that:

“Environmentally appropriate forest management ensures that the harvest of timber and non-timber products maintains the forest's biodiversity, productivity and ecological processes.

Socially beneficial forest management helps both local people and society at large to enjoy long term benefits and also provides strong incentives to local people to sustain the forest resources and adhere to long-term management plans.

Economically viable forest management means that forest operations are structured and managed so as to be sufficiently profitable, without generating financial profit at the expense of the forest resources, the ecosystem or affected communities. The tension between the need to generate adequate financial returns and the principles of responsible forest operations can be reduced through efforts to market forest products for their best value.” (FSC 2005)

It seems that the ITTO uses the term “sustainable forest management” to define a process which, if the rather “woolly” criteria (c.f. “undue reduction”, “undue .. effects”) of the definition are stretched, may be far from sustainable. The FSC, on the other hand, does not use the adjective “sustainable”, yet describes a process that has a much greater capacity to sustain a forest. These two examples hence clearly show the range of meanings associated with the term “sustainable forest management” by different interest groups and stakeholders and differences in weight attached to the dimensions of sustainability.

Regarding the ecological dimension, the ITTO definition seems to allow a moderate level of damage to forests, whereas the FSC regulations demand in a positive formulation that the biodiversity of the forest, its productivity and ecological processes are assured. In the social and economic domains, the ITTO definition is satisfied with the avoidance of “undue reduction” of the forest’s future productivity and of “undue undesirable effects” on the social environment. It does not explicitly refer to the beneficiaries of forest management and/or exploitation, while the FSC definition makes it clear that forest management has to be beneficial both for local communities as well as society at large.

Perhaps, the two definitions can be seen as representing minimal and maximal requirements for SFM respectively. The ITTO definition gives the ecological and social thresholds within which forest users can seek to optimise the management of a given forest. In this way, the room for manoeuvre for the actual users of the forest resources in question is weakly delimited. The thresholds for operation might be pragmatically set and therefore acceptable for enterprises, but are undoubtedly rather low. While national programmes developed on the basis of the ITTO guidelines published in 1992 (ITTO 1992b) and on the basis of subsequent publications of the ITTO Policy Development Series might encourage many forest users to sign up to SFM, such a pragmatic approach has the shortcoming of ensuring only rather low-level sustainability. Sustainability as circumscribed by the FSC, on the other hand, has the advantage of ensuring sustainability on a much higher level. It explicitly refers to the maintenance of biodiversity, the forest's productivity, ecological processes, and of the long term benefits for local people as well as the society at large. However, an enterprise or forest owner has to have a strong incentive to commit to this understanding of SFM, since it puts considerably more restrictions on the room for economic manoeuvre and may demand costly improvements of the management system.

Finally, it should be remembered that the concept of sustainable forest management has not only evolved in a Western context, but has been practised and lived by many traditional societies, often well before Western societies, faced with environmental degradation and increased scarcity of resources, were forced to start thinking along these lines. (Poffenberger 1990, p. 9) reports a circumscription of sustainable forest management by a tribe on Irian Jaya who believe that "the ancestors made these goods [the land] at the beginning of time ... and their descendants must be handed these goods in unimpaired condition in the future." However, it is worth recognising that traditional peoples have also practised unsustainable forest and natural resource management. Thus, it would be wrong to romantically associate traditional societies with sustainability. The interesting question is, under what circumstances a society achieves sustainable development and, with it, a sustainable management of the natural resources available. It can be assumed that the fundamental values underpinning a society, especially values associated with nature (e.g. material, moral and spiritual) and values determining the balance between economic growth and social development, play an important part in that process.

Again, the concept of sustainable forest management, whether literally referred to or paraphrased in different terms, has to be translated into approaches and rules at the operational level. This process includes the determination of the boundaries of the system, the identification of the critical parameters and their respective levels to be sustained and the definitions of conditions under which sustainability can be said to have been achieved. The most widespread methodological approach to the operationalisation of the concept is the introduction of a hierarchical system of "criteria and indicators for sustainable forest management", often complemented by higher principles and subordinated verifiers (see Lammerts van Bueren and Blom (1997) for an introduction to the concept and definitions). The selection of specific criteria and the observation of their evolution over time makes it possible to say whether a trend goes down, is steady or goes up (Pretty 1995). Such trends may help to indicate whether a system is being sustained or not. The definition of such criteria represents an extension and refinement of the three basic dimensions of sustainability to a multidimensional understanding of sustainable forest management, as shown in Figure 2d. In a series of regional and international processes, regional and national criteria and indicators for sustainable forest management have been defined (see Lammerts van Bueren and Blom (1997) and Schmidt (1998) for a review of ongoing processes until the late 1990s). Also, various efforts have been made to develop operational criteria and indicators

for forest management units, most of them linked to emerging regional and national frameworks.

From all these different political processes, an increasingly confusing number of catalogues specifying criteria and indicators resulted. This prompted the need for their scientific verification. In 1994, the Center for International Forestry Research (CIFOR) in Bogor, Indonesia, and its international partners embarked on an ambitious scientific programme to test the practicality and meaningfulness of measuring and verifying the emerging criteria in a series of field tests. For this, the criteria were grouped into the four domains “political conditions”, “ecology”, “social aspects” and “production, forest management”. These tests found that, in all these four domains, there were universally applicable criteria and indicators (Prabhu *et al.* 1996). Besides these criteria and indicators with universal application, certain criteria and indicators only applicable in more specific settings were identified. It is not surprising that the percentage of the latter group was especially high amongst the criteria and indicators used to assess the social dimension of sustainability (Droste 1997). CIFOR developed a set of guidelines and recommendations for the subsequent development, modification and adaptation of criteria and indicators, all published in their “Criteria and Indicators Toolbox Series” and accompanied by a series of scientific papers.

Sustainable forest management can be seen as an element in a wider effort to achieve sustainable development. Much of the criticism brought forward against the concept of sustainable development can and has also been applied to sustainable forest management. In reality, global sustainable forest management is still far from having been achieved and in many places degradation of forest resources and deforestation goes on apace despite all the rhetoric in favour of sustainable forest management and all the efforts to operationalise the concept. However, the debate surrounding this key concept has contributed to raising awareness of the persistent problems of forest conservation and has contributed significantly to widening the understanding of forestry as a discipline including the ecological, economic and social dimensions and to strengthening the link between forest management and other relevant disciplines. The specific situation regarding sustainable forest management in Kyrgyzstan is presented and analysed in Chapter 6.5.

For the sake of clarity, the meaning of a few further key terms used in this thesis, should be briefly explained here. In this thesis, the term “**forest management**” stands for a planned process that is informed and guided by ideas for the long-term development of the forest ecosystems and of the man-forest interface. The term “**forest management practice**” is taken to mean a practice that is part of a wider forest management effort. The necessary long-term perspectives depend on clear ideas of the demand for products and services by the stakeholders and the society at large in the present and future and are typically taken into account in forest management plans. The planned forest management is contrasted with more opportunistic forest exploitation or extractive forest use taking place without considerations for the future of the forest and/or the human communities depending on forest resources. In this thesis, such practices are generally referred to as “**forest use**” or “**forest use practices**”. The term “**sustainable forest management**” is primarily used to refer to a guiding principle, a goal for the development of forests and the management of forest resources in the long run taking social, economic and ecological aspects into account.

2.5.2 Multi-functional forest management

“Multi-functional forest management”¹³ (MFFM) is seen here as a complement to the concept of sustainable forest management (see Section 2.5.3 for a discussion of the linkages between these and other key concepts). MFFM means that a given forest ecosystem is managed for a range of different public and private goods and environmental services at the same time. The opposite to MFFM is reflected in a range of mono-functional approaches to forest management aiming at the provision of only one particular good or service. In this model, functions and services, other than the one aimed at, are considered to be side issues and, as a consequence, of little or no importance.

An important assumption of multi-functional forest management is that it can simultaneously provide a range of goods and services to meet the needs of a variety of stakeholders. Effective MFFM thus entails a minimisation of potential conflicts between different forest uses and stakeholders. It is generally expected that such a harmonious integration of various uses will lead to an aggregated benefit exceeding the sum of non-integrated uses (Wiersum 1999, p. 31). In the history of forest management, the coordination of these uses and control over the stakeholders has, as explained in Section 2.2.3.1 above, typically been assumed by the State (Wiersum 1999, p. 32).

Müller and Sorg (2001) point out that it would be wrong and unjust to pretend that multi-functionality has just been discovered and therefore one should talk of a “rediscovery of the benefits of multi-functional forest management”. With this a renewed interest in the role of local communities and other stakeholders has arisen. Forestry history shows that multifunctional forest use has been practised in industrialised countries for a long time before the establishment of forest sectors became dominated by the State and are still widely practised worldwide. In recent years the concepts of MFFM have particularly been promoted for mountain forests (Buttoud 2001b, 2002; Buttoud 2003).

MFFM complements the concept of sustainable forest management by acknowledging the significance of a range of material goods and non-material benefits provided by forests and the legitimacy of the interest of a variety of stakeholders in accessing these goods and benefits. In this way the concept of multi-functionality has made a considerable contribution to broaden the main focus of forestry from a mono-functional perspective, often focussed on timber, towards a more comprehensive understanding of the broader objectives of forest management. The changes in international forest policy over the last 30 years, as described in the following Section 2.4.4, have also resulted in an increasing recognition of the rights of stakeholders other than the State and/or timber companies to have a say in, and derive benefits from, forest management. Hence there also is a growing interest in products other than timber, as postulated by the concept of multi-functionality. The shift from the term “minor forest products”, used in the early days as an umbrella term encompassing all products other than timber (Lawrence 2003; Robinson & Pfund 2006), to the term “non-timber forest products (NTFPs)” - which raises these products to the same level as timber - illustrates this change in focus and thinking.

MFFM requires all stakeholders to negotiate and jointly agree on conditions and arrangements for forest management and hence to participate in the decision-making

¹³ Alternative terms, which are often used as synonyms for multi-functional forest management are: multipurpose forest management and multiple-use forestry; Buttoud (2003) makes a conceptual distinction between these and other related terms.

process. In the following sections, the understanding and evolution of the concept of participation in development in general, and in forest management in particular will be explored.

2.5.3 Interrelations and linkages between sustainability, multi-functionality and participation in forest management

Sustainability and sustainable forest management can be seen as guiding principles, which have become widely accepted both for development processes and forest management. The concept of multi-functional forest management complements the requirements of the sustainability principle inasmuch as it draws attention to the different functions and services provided by forest ecosystems for a variety of stakeholders and seeks to sustain the livelihoods that depend on these resources. Furthermore, it promotes the idea that sustainable management systems, which should be economically viable, socially beneficial, environmentally appropriate (FSC 2005) and adaptable (Carlsson & Berkes 2005), are developed by all stakeholders interested in the particular forest tract under negotiation. Multifunctional forest use practices can also be seen as an outcome of a forest policy aiming at sustainable forest management and therefore granting different rights of use to different stakeholders. The participation of local communities arises, as explained above, from the central requirements of sustainability and the complementary concept of multi-functionality. The involvement of local communities and other non-forester stakeholders can therefore also be seen as a means to ensure sustainable forest management. In most cases a certain level of participation might be a prerequisite for the sustainability of a system. Local knowledge relevant for forest management, i.e. knowledge that is available locally (but outside forestry institutions), becomes important, as members of local communities get involved in forest management. The significance of local knowledge for the success of a particular forest management system varies with the level of participation aimed at, i.e. the particular step of the participation ladder, and the nature of the forest ecosystem under discussion.

2.6 Local knowledge and practices in forest management

Attempts to reform forest policies, forest management practices and to promote the involvement of local people and other stakeholders in forest management need to be informed about local forest management practices and local knowledge contained within local knowledge systems. In this regard, it will be shown that understanding local knowledge will be important in comprehending the conditions prevailing in Kyrgyz communities and to pursuing participatory forest management strategies to sustain the WFFs.

2.6.1 Local knowledge as a resource for rural development and sustainable forest management

Today, knowledge is widely seen as a key factor in sustainable natural resource management. This understanding has become mainstream in development circles (Geiser 2002). Most players in the development arena, be they governmental agencies or NGOs, subscribe to this view and also accept the existence and significance of different categories of knowledge, such as: indigenous, local and scientific knowledge, and skills, factual or complex knowledge. Other indicators accounting for the prominence of the concept of knowledge in development are found in the World Bank Development Report 1998/99 entitled "Knowledge for Development" (World Bank 1999b) and in the establishment of the World Bank initiative "Global Knowledge Partnership" that aims at "working together to help people and communities access knowledge to improve lives, reduce poverty and empower people" (World Bank 2004b). Thus, there is a wide range of initiatives, networks

and programmes fostering awareness for the importance of knowledge in development and, in particular, promoting the incorporation of indigenous or local knowledge in development practice. Mauro and Hardison (2000) carry out a review of the international debate on international law and policy regarding the rights of indigenous peoples and local communities that are defining the role of local knowledge in the management and conservation of biodiversity. They conclude that, in future, rights reinforcing indigenous entitlements will increasingly require the full participation of indigenous and local communities in policy making and management of biodiversity. Examples of development literature promoting indigenous or local knowledge are the newsletters “Indigenous Knowledge and Development Monitor” (until 2001) and “Indigenous Knowledge WorldWide”¹⁴ (since 2001), and FAO’s “Forests, Trees & People Programme” (FTPP)¹⁵.

Local people’s knowledge was no concern in the development thinking of the 1950s and 1960s, which was dominated by a top-down, modernisation approach to the development process. In these decades, knowledge of local people was mainly seen as “inefficient, inferior and an obstacle to development” (Agrawal 1995). Thus, the development of new methods and innovations in agriculture, forestry and other fields was mainly considered to be a matter for the State and scientific experts (Geiser 2002). The thinking began to change when “rural development” emerged as an issue from the development discourse in the 1970s. In the late 1970s and early 1980s, the assumption that local people were “unaware” and were therefore mainly seen as the “objects” of development interventions was increasingly challenged. More and more evidence of relevant well-adapted knowledge and practices in natural resource management held and carried out by local people was available and commanded the attention of wider circles. Thus, local knowledge and local natural resource use practices were increasingly seen as a valuable development resource in themselves.

This change of approach and attitude towards local knowledge and practices and attempts to incorporate local knowledge in natural resource research and development are reflected in the literature, for instance in the publications of Brokensha *et al.* (1980), Chambers *et al.* (1989), Mazur and Titilola (1992), and Blaikie *et al.* (1997). Publications such as the ones by Warren *et al.* (1995), and Sillitoe (1998) reflect the debate on cultural and anthropological dimensions of this new orientation and the application of indigenous knowledge and practices. According to the new strand of thinking, local knowledge and practices should, by no means, be subordinated to scientific or expert knowledge. Chambers’ “Rural development: Putting the last first” (1983) is considered to be one of the most influential, early books promoting this new thinking and coining many notions and terms which became key in development practice and the ongoing international exchange and debate on the usefulness of local knowledge (Geiser 2002).

The growing recognition of the value of local knowledge and practices laid the foundations for the incorporation of local knowledge in research and development. Many authors, such as Müller-Böker (1991), even point out that the incorporation of local knowledge and perceptions is a prerequisite for the success of any development intervention as otherwise a project risks bypassing the needs of the local population. However, in order to merge successfully different kinds of knowledge, such as local and expert knowledge, problems of understanding between scientists and experts with a Western background and the local

¹⁴ www.nuffic.nl/ik-pages/ikww (Accessed 10/10/2004)

¹⁵ www-trees.slu.se (Accessed 10/05/2004)

population have to be solved. In the following discussion, different approaches to the incorporation of local knowledge in development will be explored. Furthermore, important aspects of local knowledge will be discussed in order to provide a balanced image of the role of local knowledge in development in general and sustainable forest management in particular.

Tillmann (1995) distinguishes four models of dealing with knowledge of local people in rural development, which also reflect the changes which have occurred in development thinking over time as described above:

- **Transfer of technology**
Aiming at the substitution of local knowledge by scientific knowledge. This model is based on the assumption that there is one universal pathway for development and that modernisation informed by scientific results is the only key to overcome poverty and other indicators of “underdevelopment”. Thus, this model reflects the modernist development thinking of the 1950s and 1960s.
- **Utilitarian approach**
Developed by specialists on indigenous knowledge to enrich and complement (Western) science and modernisation policy with locally available knowledge. Researchers and development specialists try to complement and extend scientific knowledge by analysing indigenous knowledge and, in this way, create improved, universal knowledge that is relevant for development processes. This model, emerging roughly in the 1970s, reflects a growing realisation of the value of local knowledge and its potential to play a role in the development process. However, local knowledge is seen as a secondary body of knowledge, complementary to the prioritised scientific knowledge.
- **Populist approach**
Emerging in developing countries as a movement to promote endogenous development of non-Western societies. The protagonists of this approach believe in the autonomous potential of the culturally embedded knowledge of local people for new development pathways. This approach represents a different view of development altogether and suggests a rejection of the Western capabilities and rather mechanistic views of development for the benefit of local values including cultural, moral and religious aspects.
- **Intercultural dialogue**
Stressing the importance of a mutually beneficial dialogue between the cultures. This approach is based on the acceptance of the values of local knowledge and Western scientific knowledge. Both knowledge systems are seen as being different from one another, subjective, socially constructed, and culturally specific and having equal rights to co-exist. This paves the way for international, national and local knowledge systems to benefit from each other.

Blaikie *et al.* (1997) discuss the role of local knowledge from the angle of a classic, a neoliberal and a neo-populist development paradigm and term the outcome of development processes involving both local and scientific knowledge as “knowledge in action”; this could be thought of as an overriding paradigm that incorporates all four of Tillmann’s models which were discussed above. This is the approach that has special relevance for this study.

Seen from the perspective of an “intercultural dialogue”, as identified by Tillmann (1995), local knowledge represents a promising pool of ideas and knowledge for locally adapted solutions with which to address the problems of local communities. Important advantages of local knowledge systems are that they have typically developed under local social and

ecological circumstances, have often been tried out over a long period of time and are integrated in a wider cultural context. With the emergence of “sustainable development” and “participation” as dominant concepts and slogans in current development policies, going back to local knowledge has logically become an important component of development efforts (Schröder 1995).

The inclusion of local knowledge in development practice has the benefit of contributing to the empowerment of local communities and of making the views of local people on their problems visible to others (Antweiler 1995). However, local knowledge should by no means be seen as a panacea which, when applied, assures rural development and miraculously solves all problems of development work. Antweiler (1995) lists four important caveats to bear in mind concerning local knowledge:

- Actions based on local knowledge are not *per se* ecologically sound;
- Solutions based on local knowledge are not necessarily socially just;
- Local knowledge is not necessarily democratic or critical of undemocratic local systems;
- Local knowledge is not equal to “people’s knowledge” in the sense that it is not always collectively shared by most or even all members of a community.

While local knowledge has clearly great potential to contribute to the development of sustainable solutions, it would be misleading to take it as a guarantor for sustainability. Thus, local knowledge has to be included in development practice as a precondition for success, but this incorporation does not automatically guarantee sustainable natural resource management.

Whilst acknowledging the potential of local knowledge to contribute to development, one should also be aware of potential dangers and risks of overrating local knowledge. Antweiler (1995) warns that there is a danger for “local knowledge” getting exploited for a particular purpose and idealised. In particular, as the “discovery” of local knowledge has nurtured hopes of sustainable progress in development circles, these circles have often become frustrated after many development approaches failed or yielded less than expected. The danger of idealising local knowledge was stressed by Chambers as early as 1983, when he cautioned that “rural people’s knowledge (is not) always valid or useful”. A further danger is that some observers may be tempted to revive the ‘Noble Savage’” having all the required skills and knowledge and thus being perfectly capable of solving all the problems himself (Chambers 1983, p. 85). Local knowledge can be exploited by simply incorporating it superficially in conventionally planned and externally designed development interventions, despite the fact that it is only meaningful and effective in its local cultural context (Antweiler 1995). Such practices would have to be associated with the lower steps of the participation ladder (see Table 3).

Another problematic area is to contrast “local” or “indigenous” knowledge with “scientific” knowledge in ways which suggests that they are mutually exclusive bodies of knowledge and masks the communalities between them (Antweiler 1995). Such a black-and-white dichotomy of “Western” *versus* “non-Western” thinking is often inappropriate and does not reflect the dynamic reality of knowledge systems (Geiser 2002). Agrawal (1995) therefore suggests accepting the differences within such categories of knowledge and finding similarities across them “instead of trying to conflate all non-Western knowledge into a category termed ‘indigenous’ and all Western knowledge into another category”. In Kyrgyzstan, the linkages between “scientific”, “indigenous” and “local knowledge” will be

shown to be particularly complicated mainly due to the Soviet past, an aspect that will be further explored in Section 2.6.2 below.

Local knowledge that is relevant for forest management and agroforestry, and local forest use practices have been documented in many publications (see, for example, Kunstadter *et al.* (1978), Fortmann & Bruce (1988), Gilmour *et al.* (1989), Redford & Padoch (1992), Colfer *et al.* (1997), Seeland & Schmithüsen (2000), Ojha & Bhattarai (2001)). Initial studies in these fields usually began with descriptions of local taxonomic systems, for example of plants, or firewood. However, later studies have widened their scope to investigate increasingly complex issues (Colfer 2005, p. 32). A particularly well-researched and documented domain is local knowledge of agroforestry and its incorporation in agroforestry development (c.f. Rusten & Gold (1991; 1995), Thapa *et al.* (1995), Walker *et al.* (1995), Sinclair & Walker (1999), Sinclair & Joshi (2000)). In addition to these scientific papers, many documents, often geared at policy makers and development practitioners, have been published to promote the incorporation of local knowledge in development practice (see for example Leeuwen van (1998)).

As with the application of local knowledge in general, there is a growing awareness that forest-related local knowledge is important in development (Seeland 2000) and that “external recognition of forest people’s unique knowledge of their environments can serve both to enhance management and to strengthen the voice of local people in making policies more appropriate to their and the environment’s needs” (Colfer 2005, p. 33). Despite all the progress made in recent years, Colfer (2005, p. 33) notes that, at least in the case of tropical forests, many representatives of the formal forest sector are still unaware of local people’s potential to contribute to their work, and she regrets that opportunities have been ignored by not recognising the capabilities of local people living in association with forests to participate in their own development processes.

2.6.2 Forest related knowledge systems

With the growing recognition of the importance of the involvement of local communities and other non-forester stakeholders in forest management over the last decades, increasing attention has been paid to their particular forest-related knowledge and experience and to their local forest use practices. In this thesis, the term “**local knowledge**” will be taken to include knowledge held by members of local communities regarding the use of trees and forest resources. Hereby, the term “local knowledge” also comprises technical skills and capabilities of local people. The concern here is mainly with knowledge about trees, plants, and products taken from the forest, and the environment in general. The decisive criterion is, whether a particular idea or any other expression of knowledge is available locally, regardless of whether it stems from traditional or scientific sources, and whether it has been rooted in the culture of the indigenous ethnic groups or has recently been brought to the area from outside. Thus, whilst applying the term “local knowledge” in this very broad sense, a more detailed differentiation between knowledge stemming from different sources is made where appropriate.

The author has deliberately chosen to use the term “local knowledge” as defined above for this study, as the application of related terms, such as “traditional knowledge” or “indigenous knowledge”, seems problematic and hardly feasible in the case of post-Soviet Kyrgyzstan. In this context, it is very difficult to draw clear lines between elements that can be attributed to the traditions of one of the many ethnic groups living within the country and typical Soviet elements. Moreover, the Kyrgyz and Uzbek peoples, the dominant ethnic groups in the study area of Southern Kyrgyzstan, have absorbed many features of the formal

forest sector, which was built up by settlers of different ethnic backgrounds (e.g. Slavs, Germans) and based on scientifically informed Russian and European systems. Thus, in the Kyrgyz context, it would be difficult to separate knowledge into separate “indigenous” and “science-based, professional” categories.

The interplay between different bodies of knowledge held by different knowledge bearers over time result in often highly complex knowledge system, as the example of Kyrgyzstan above illustrates. Knowledge and bearers of knowledge stand at the centre of knowledge systems, which can be defined as “the way people understand the world, and interpret and apply meaning to their experiences” (Wiersum 2000). Such knowledge is built through the complex process of selecting, rejecting, creating, and transforming information, and is inextricably linked to the social, environmental, economic and institutional contexts in which it occurs (Acre & Long 1992).

Wiersum (2000) identifies three components of a forest related knowledge system representing different categories of knowledge:

- General worldview of the people involved, i.e. values and beliefs held by people;
- Knowledge of the social environment;
- Biological or technical knowledge that relates to forest resources.

This reflects the double nature of forest management that includes social dimensions (comprising the first and second categories of knowledge from the list above) and the biological and technical dimensions (represented by the third category). Within this third category of knowledge, different sub-categories can be distinguished to include:

- Technical skills needed for forestry work;
- Knowledge about the presence and use options of forest resources;
- Understanding of ecological processes.

These categories and sub-categories of knowledge can relate to all steps in the forest production cycle from growing a woody species from a seed or regenerating a forest stand, to caring for older stands and co-ordinating different conflicting forest uses, to the harvesting of forest products and their processing and marketing.

The knowledge bearers themselves are undoubtedly a crucial element of knowledge systems. As local communities are usually highly diverse, it is often appropriate to look closer and investigate who, in a given local community, has what kind of knowledge and undertakes which particular practices? The roles that different members of the community play in the flow of knowledge within the community and in the exchange of knowledge with outsiders at the interface between different knowledge systems are also important features of such a system; this is of particular importance if one is interested in the dynamic of knowledge systems.

A conceptually important area is the relation and interplay between knowledge and practices. Forest-related knowledge can, but may not necessarily, translate into forest use or forest management practices. In this study the term “forest use/management practice” is taken to mean any action by a human being aiming at getting any product (including e.g. forest products, NTFPs or agricultural products) from forested land. “Knowledge” and “practice” are obviously interrelated. Sometimes, “practice” is presented as a component of knowledge, for example in definitions of traditional knowledge suggested by Berkes *et al.* (2000) and Berkes (1999). In this thesis however, these two terms “knowledge” and “practice” should be distinguished for the sake of conceptual clarity, because, as Sinclair and Joshi (2000) put it, “what people *do* and what they *know* are rather different”. The process of

putting knowledge into practice is also influenced by factors other than biological knowledge and technical skills of the people involved; such factors might include access rules to forest resources and marketing conditions (Wiersum 2000). Richards (1989) has described agricultural practice as a performance, involving the farmer making contingent responses to various events as the agricultural year unfolds. Here, the farmer uses his or her knowledge to make decisions at each point, but the outcome, the field practice, is the result of an interaction between underlying knowledge and other factors representing opportunities and constraints for resource use (Sinclair & Joshi 2000). The observed practice therefore reflects some of the knowledge of people involved, adapted in its application to the concrete circumstances, but knowledge cannot be directly inferred only from observation of practice (Sinclair & Joshi 2000). These agricultural examples have a direct application to both forestry and agroforestry. One can easily think of cases, where a forest product is not used at all, for example due to a lack of market demand, although people know of it and its application and have all the necessary skills to harvest it. For the purpose of this study, it is thus important to make this distinction between knowledge and practices, as this allows considering other factors apart from local knowledge that influence ongoing forest use practices. Accordingly, the results of this study concerning local knowledge and those on forest use practices are presented in separate Chapters (Chapters 8 and 9 respectively).

2.7 Conceptual framework for this thesis

The conceptual framework developed for this thesis is shown in Figure 5. It summarises the essential elements of this theoretical introductory chapter. The framework comprises four interconnected levels that are relevant for the study, namely: the broader level of the political and economic system, the level of important discourses in development and forest management, the policy level and the level of implementation where policies translate into forest use practices and management through a range of stakeholders. At the same time, the framework also illustrates the ongoing transition process with a column on the left showing key features of the Soviet system and a corresponding column on the right depicting important characteristics of the current post-Soviet system.

This framework reflects important theoretical considerations in terms of the transition process, forest governance and, in particular, devolved and collaborative forest management, sustainable forest management and sustainable livelihoods. Thus, it shows both the theoretical foundations as well as the objects of inquiry of this study, namely: i) the relationships and roles of local people, the state forest farms (Russian: *leshozes*) and the municipalities as key stakeholders in forest management, and ii) the man-forest interface in the walnut-fruit forests including local knowledge and forest use practices. The elements shown on the implementation level and their arrangement mirror parts of DFID's sustainable livelihood framework.

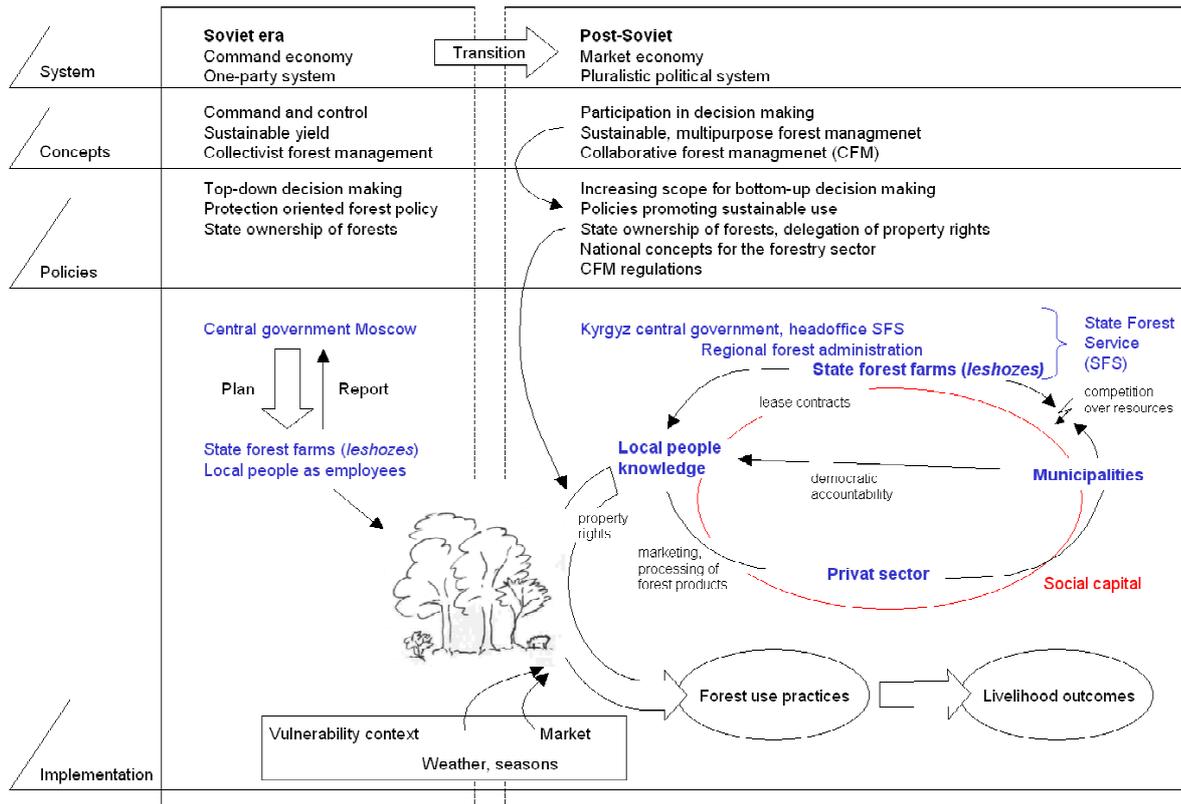


Figure 5: Conceptual framework of the study.

The systemic level illustrates the fundamental changes of the ongoing transition process from a highly centralised command economy and a one-party system towards a capitalist, market-driven economy and a more pluralistic democratic system. This change constitutes the broad framework for the analysis. The terms shown on the conceptual level represent the dominant concepts in development thinking and forest management. As indicated by an arrow, these concepts influence forest policy formulation. Key elements of forest policy at the time of the Soviet Union and in independent Kyrgyzstan are shown on the next lower level.

On the implementation level, key stakeholders involved in forest management are indicated in blue. The illustration on the left hand side highlights the importance of the plan in the process of top-down planning in the Soviet system. The current organisational set-up, including indications on the relationships between key stakeholders, is shown on the right. The relationship between the various stakeholders is underpinned by social capital printed in red colour. Policies, such as the introduction of CFM or other policies affecting forest tenure, define the relationship between the stakeholders and regulate access to the walnut-fruit forests and other natural resources. Local knowledge is especially highlighted as an attribute of local people. As stated in the theoretical introduction on local knowledge and forest use practices, this knowledge translates into forest use practices in function of factors such as property rights granted to local people to forests, weather conditions or market demand for forest products. Finally, forest use practices as well as other livelihood activities undertaken by local households influence their well being.

The story-line of this thesis follows the logic of the conceptual framework, starting with a comparison of forests governance and livelihoods in Soviet and post-Soviet times, followed by an analysis of the roles of key stakeholders, a description of local knowledge and forest

use practices, and, finally, an analysis of the significance of forest resources for the livelihoods of forest leaseholders.

3. Methodology

This chapter gives a short overview on the organisation of the research process, discusses some theoretical methodological aspects and subsequently informs the reader about the research approach and important observed principles. It then provides a detailed account of the research design and the sampling strategy. The description of the methods used for fieldwork, linking research objectives, methods and research steps, is accompanied by a rationale for their use. The reliability of the data, the validity of the findings and the potential for generalising the findings are critically assessed at the end of the chapter.

3.1 Sequence of the research steps and timing of the fieldwork

Fieldwork in Southern Kyrgyzstan was started at the four research sites in August 2001. At the same time, two Kyrgyz postgraduate students started their own research projects in related fields. The research presented in this PhD thesis and the research undertaken by the Kyrgyz researchers were part of a wider research project (see Section 3.3). The researchers involved formed a research group. Some work, such as the selection of the research sites, was coordinated between the members of the research group. This thesis however fully reflects the research work conducted by the author himself. The author conducted the fieldwork in collaboration with a research assistant.

The first major step was the identification of the research sites (see Section 3.5.2). The selection process of the sites was finished in September 2001. The identification of the respondents and their households followed subsequently from October 2001 onwards (see Section 3.5.4).

A pilot research phase was then started on all four research sites with a small group of six to eight households per site. This exploratory phase took place between late September and early December 2001, i.e. at the time of the walnut-harvest. The coincidence with the walnut harvest made it a particularly intensive and very informative time during which many insights into rural livelihood systems and the role of forest resources in the lives of local people were gained. This allowed the researcher to choose and develop the methods and the research tools (e.g. questionnaires, interview guidelines) and to gain first experiences with their application under field conditions. The lessons learned during this time were subsequently used to adjust the original objectives of the research, to adapt the research methods to the local reality and to refine the tools.

The main fieldwork was carried out between early summer 2002 and early autumn 2003. Work was started in Ortok and Uzgen (mainly in 2002), followed by field research in Arstanbap-Ata and Achy (mainly in 2003).

Complementary data gathering took place in July and August 2004. This shorter stay in the field was also used to present preliminary findings, including a number of key issues for the involvement of local people in forest management, to local stakeholders and to discuss them with the project partners, in particular with representatives of the SFS at *leshoz*, regional and national level, with staff of the Kyrgyz-Swiss Forestry Support Programme KIRFOR and with Kyrgyz scientists.

3.2 Methodological options for an interdisciplinary, development-oriented research in the field of natural resource management

3.2.1 Qualitative and quantitative research

In general, two basic research approaches and corresponding methods are available to a researcher: qualitative and quantitative research. According to Flick (2002), qualitative research in the field of social science is concerned with studying subjective meanings and individual ascriptions of sense, the activities of everyday life of people, and the cultural meaning of things, both material and abstract. Qualitative research draws on people's experiences and stresses the socially constructed nature of reality (Denzin & Lincoln 1998, p. 8). In other words, qualitative research is used to explore and understand people's beliefs, experiences, attitudes, behaviour and interactions. It is generally considered to be exploratory and inductive in nature (Abeyasekera 2005). In contrast, quantitative research aims primarily at determining and analysing relationships between independent and dependent variables in a wider population. The observed relationships are measured and represented in numerical form, thus the word *quantitative*. The label *qualitative*, on the other hand, implies a strong focus on processes and meanings that are explored, described and analysed in the form of words (Marshall & Rossman 1990, p. 11) and not measured in quantitative terms (Denzin & Lincoln 2005, p. 10), thus generating non-numerical data (Neuman 1991, p. 27; Denzin & Lincoln 1998, p. 8; Maxwell 2005, p. 22). However, qualitative data can often be converted into quantitative data by categorising or grouping qualitative observations (Marsland *et al.* 2001).

Qualitative studies yield rich, detailed descriptions of the social world. A qualitative approach allows studying a phenomenon in its full complexity and entirety in its everyday context or setting (Marshall & Rossman 1990, p. 10; Mason 1996, p. 1+3; Denzin & Lincoln 2005, p. 3) without reducing it to numerical variables (Flick 2002, p. 5). The strengths of qualitative descriptions include the fact that a particular phenomenon is studied in its natural social context which leads to a high validity of the findings (Marshall & Rossman 1990, p. 145; Holland & Campbell 2005a). The resulting in-depth insights are particularly relevant in the context of international development cooperation, where cultural and social factors play a key role and people from different cultural backgrounds collaborate. From this perspective, the approach adopted by qualitative field-researchers of studying things in their natural environment (Denzin & Lincoln 1998, p. 3) trying to understand the social and cultural construction of the observed phenomena becomes particularly valuable. The trade-off of the generated in-depth understanding is that the described cases and findings of qualitative studies are not necessarily representative for a wider population. Their results can therefore not be easily generalised. Denzin and Lincoln (1998, p. 29) stress the creative and interpretive nature of qualitative research. A comparatively high flexibility concerning the choice of one's research approach and methods, and a high sensitivity of the methods to the social context of data generation (Mason 1996, p. 3) are advantages of qualitative research (Flick 2002, p. 5). But, these characteristics have also prompted critics to portray qualitative research as being at best illustrative and qualitative findings as merely anecdotal evidence (Mason 1996, p. 1; Edwards *et al.* 2005; Silverman 2005, p. 211). Denzin and Lincoln (1998, p. 30) also emphasise that there is no single interpretive truth and that the interpretive practice of making sense of one's findings is inherently political and influenced by the background of the researcher and her/his beliefs. There is thus a distinct subjective element to qualitative research. These characteristics of qualitative research has led to criticism of qualitative research approaches and methods as lacking scientific rigour and thus being soft-

science (Denzin & Lincoln 2005, p. 8), “or only exploratory, or entirely personal and full of bias” (Denzin & Lincoln 1998, p. 7).

Quantitative research is concerned with the systematic investigation of phenomena that can be captured with measurements and described with numerical expressions. It is usually conducted on the basis of larger sample sizes. These samples and thus also the results gained from them are typically representative of the wider population and can therefore relatively easily be generalised (Silverman 2000, p. 1 *et seqq.*). However, this advantage usually comes with the trade-off of less holistic information and thus less in-depth understanding of the subject matter, which, especially in development-oriented research, is often key to develop recommendations from one’s findings that are well adapted to the local context. Additionally, typical quantitative methods used in rural areas in developing countries, such as questionnaire type surveys, were often found to be time-consuming and expensive (Chambers 1994a, 1994b). Further characteristics of quantitative research include comparatively more structured, rigid research methods and the possibility to replicate or repeat the research that gives the results a high reliability. The drawback of this is a limited flexibility and openness for methodological adaptations in function of characteristics of the object of study.

3.2.2 Combining qualitative and quantitative methods

Clearly, both qualitative and quantitative approaches to research have their advantages and shortcomings, also for conducting transdisciplinary research (Klein *et al.* 2001) in the highly complex setting of developing countries and developing applicable policy recommendations. Many authors (see e.g. Mason 1996, p. 4; Silverman 2005, p. 9) stress the potential of integrating the two approaches instead of insisting on stark contrasts between them and portraying them as an unbridgeable dichotomy. In so doing, one should however be aware of the consequences of combining approaches and methods that may have different theoretical underpinnings (Mason 1996, p. 4).

In practice, researchers in the field of natural resource management including forestry often combine qualitative and quantitative methods in their field research (e.g. Rusten & Gold 1991; Carter 1992) in order to overcome the specific shortcomings of each approach and to make good use of the comparative advantages of each approach. In doing so, they try to address the trade-offs of limited generaliseability of a qualitative approach and little in-depth understanding provided by a quantitative approach. Such a combination can allow documenting the detail of a particular phenomenon using qualitative methods and, at the same time, identifying the variance of it within a wider population using quantitative methods (Silverman 2005, p. 8). Thus, qualitative and quantitative methods are often more meaningful and powerful when they used in combination (Holland & Campbell 2005b). It is also argued that the trustworthiness of information and research findings is enhanced if qualitative and quantitative approaches to data collection and analysis are combined (Marsland *et al.* 2001). Since the mid 1990s, increasing attempts have been made to document and conceptualise the complementary use of the two approaches in order to tap the potential synergies of combining qualitative and quantitative methods in the general development context (Stern & Coe 2004, p. 25).

Marsland *et al.* (2001) distinguish three types of combinations of qualitative and quantitative methods: merging, sequencing and concurrent use of tools and attitudes from qualitative and quantitative research. Merging, the most relevant of these combinations for the study at hand, involves swapping tools for data gathering and analysis and attitudes from one

tradition to the other. Sequencing consists of applying qualitative and quantitative methods such as surveys or in-depth qualitative analysis in a temporal sequence (Holland & Campbell 2005b). More information on the combination of methods used for this study is provided in the Sections 3.3 and 3.6 of this Chapter.

3.2.3 Transdisciplinary research

The core idea of transdisciplinarity is mutual learning and joint working of representatives of different academic disciplines and practitioners to solve complex real-world problems. In this process, solutions are devised with the input and help of multiple stakeholders and the knowledge of all participants is enhanced (Häberli *et al.* 2001). With the generated sum of knowledge, the solution is typically greater than the sum of its parts (Young 2000). The transdisciplinary approach to research emerged from attempts to move beyond disciplinary knowledge in order to establish a problem- and solution-oriented research culture. The development of transdisciplinarity was considerably influenced by thinking on participatory approaches in research and development and the challenges of sustainable development. Transdisciplinary research is a particularly needed and appropriate approach for development-oriented research, since conventional one-way knowledge and technology transfers have largely proven to be ineffective in the past. Thus, North-South or West-East research partnerships have become major platforms for the application of transdisciplinary approaches (Klein 2001).

3.3 Research approach

The approach adopted for this research has a series of particular features which are presented in this section. This includes the combination of qualitative and quantitative methods, the transdisciplinarity and participatory elements of the research. Other relevant features of this study, particularly relevant in terms of transdisciplinarity, are the collaboration with other researchers within a wider research project and with an applied silvicultural research project, and the links with an international research programme and a development programme.

Combination of qualitative and quantitative methods

A combination of both qualitative and quantitative methods was chosen for the research to address all the research objectives. Such a combination allowed the compilation of a more comprehensive picture of the forest-related knowledge, the reality of currently ongoing forest use and of opportunities and constraints for the future involvement of local people in forest management in the WFFs. Thus, the author can present the quantitative data embedded in substantive descriptive accounts based on qualitative insights gained from fieldwork. Such an approach is quite typical for a complex development research context such as rural Kyrgyzstan and also reflects the transdisciplinary nature of development-oriented research in the field of forestry.

Semi-structured interviews and a range of diverse PRA tools, such as wealth ranking exercises or participatory mapping, are examples of qualitative methods employed. Quantitative methods used include, for instance, market survey for a range of products and the gathering of some numerical household characteristics.

The combination of qualitative and quantitative methods used in this study corresponds to the swapping of research tools and attitudes that Marsland (2001) is referring to as “merging”. In this study, it involved:

- The development and application of a formal sampling strategy for the selection of the research sites and local households. This helps to reduce sampling errors and thus

to increase the external validity of the findings of qualitative work (Wilson 2000; Marsland *et al.* 2001).

- The complementary use of closed questions, gathering of quantitative data (e.g. on the households' farming system), qualitative interviewing using open-ended questions and other qualitative methods such as participatory mapping of the farming system. This "contextualising" of quantitative data contributes to reduced non-sampling error and to a better internal validity of quantitative data (Marsland *et al.* 2001).
- The categorising of responses to open-ended questions from qualitative research interviews.
- The statistical analysis of binary, categorical data, ranks and scores including the calculation of general linear models for data gained from scoring exercises (Abeyasekera 2001, 2005).

The qualitative and quantitative methods used are described in further details in Section 3.6.

Transdisciplinarity of the research

The research conducted clearly has an interdisciplinary component. Additionally, it addresses a practical problem in collaboration with practitioners and researchers. Given the combination of these characteristics, the research is essentially transdisciplinary (Klein *et al.* 2001).

In the wider research project of which the study at hand was part, development and forestry practitioners, other stakeholders and researchers with different disciplinary backgrounds were involved (see the paragraph after the next), and were jointly working on the development of new approaches to the management of the WFFs. The approach adopted for this research allowed ideas and issues brought forward by local informants, representatives of different stakeholder groups and development practitioners to be taken up in the research process. This applied for the entire research process, but especially for the pilot research phase at the beginning of fieldwork. Preliminary findings and results were presented to the informants and other interested stakeholders and discussed before any final conclusions were drawn. This was seen as a way of being open with respondents and also as a means to check the validity of the results and to ensure that the conclusions are relevant for local partners and for the ongoing processes of change in the field of forest policy.

Participatory elements in the research

Both on a conceptual as well as on a methodological level there were important participatory elements in the research. As pointed out above, local people informed the research process with their views on forests and forest management, and preliminary findings were again discussed with interviewed forest leaseholders and representatives of stakeholders interested in forestry towards the end of the research. The author spent considerable periods of time in local villages in the study area and had many informal discussions on aspects of the research and related topics with a wide range of people with different backgrounds and interests in forests during these stays.

Collaboration with other researchers within a wider research project

The research presented in this thesis is part of a wider scientific project, for which research was conducted by three researchers (the author, two Kyrgyz postgraduate students) and a Kyrgyz research assistant that formed an interdisciplinary research group. The three

researchers, each of whom had a different professional background, conducted individual studies with the following foci:

- Forest governance, local knowledge and forest use practices of local people involved in forest management (PhD studies conducted by the author Mr Kaspar Schmidt);
- Socio-economic aspects of CFM (MSc study conducted by Mr Nurlan R. Akenshaev);
- Forest management and biodiversity in the WFFs (PhD study of Ms Gulnaz T. Jalilova).

The author collaborated with a local research assistant for the fieldwork. First Mr Ulukbek O. Juldashev worked as research assistant, from August 2001 until August 2002. His successor, Mr Nurbek N. Mamatov occupied the same function from September 2002 until February 2004. Both research assistants had a professional background in natural resource management and had previously collaborated with foreigners in applied research projects in the zone of the WFFs.

This collaborative research approach allowed the team to share initial experiences and discuss preliminary results. This permitted the team to identify the issues that arose from different professional perspectives, to validate these initial findings through triangulation of results and, by so doing, to minimise the bias of each researcher's perspective (Häberli *et al.* 2001; Maxwell 2005, p. 108).

Collaboration with other research and development programmes and projects

In Kyrgyzstan, the researcher collaborated with the applied research project "Orech-Les" aiming at developing new silvicultural approaches for the management of the WFFs. On an international level, the project had links to other researchers involved in the research programme on Adaptive Collaborative Management of Forests (ACM) being conducted by the Center for International Forestry Research (CIFOR). This collaboration informed this research regarding the selection of the research sites (see Section 3.5.2) and influenced the thinking on the qualitative aspects of the research.

Furthermore, the research was linked to the Kyrgyz-Swiss Forestry Support Programme (KIRFOR) and in particular to its CFM project. The author regularly exchanged information and discussed upcoming issues with the representatives of the CFM project and of KIRFOR.

3.4 Leading principles for the data collection in the field

3.4.1 Awareness of potential biases

An important principle for the data collection of this study was to be aware of potential biases for the study and to try reducing their impact on the results. During the preparation of the research, the following important, possible biases were identified:

- Project bias;
- Seasonal bias;
- Professional bias;
- Gender bias;
- Wealth bias.

Awareness of these biases allowed the research to address them in the design of the study. This was achieved in the following ways:

Project bias

The activities of a development project, such as the CFM project, might influence the results and findings of a study and thus induce a project bias in research (Chambers 1980). As this study is concerned with participatory forest management in the WFFs in general and not only with the effects of the Kyrgyz CFM model, it was important to deal with a potential project bias induced by the CFM project. This was addressed by deciding that at least half of the research sites should be sites where CFM had not yet been implemented at the time of the selection of the research sites.

Seasonal bias

Relatively long periods of research in the field allowed for the observation of forest use practices and information gathering during all seasons, including winter. This avoided a seasonal bias of the data and observations, which is a frequent shortcoming of shorter-term research (Chambers 1980). The extension of fieldwork over more than two years and two growing/harvest seasons reduced the influence of seasonal variation and annual yield fluctuations of forest and agricultural products. This considerably helped to develop a realistic picture of the importance of forest and agricultural resources in local livelihoods systems. By chance, 2002 was a year with good walnut harvest, whereas in 2003, due to late frosts, there was an almost total lack of walnuts on any of the research sites. This situation - bad luck for local farmers but a lucky coincidence for the researchers - makes comparisons of the observations made and the data gathered in 2002 and 2003 very interesting and revealed interesting insights into the vulnerability of local livelihood systems and people's coping strategies.

Professional bias

Potential problems caused by a professional bias of the researcher (Maxwell 2005, p. 108) were addressed by the collaboration with other members of the research group, who had different professional backgrounds. The author also discussed arising issues with other national and international experts and researchers working on issues of forest and natural resource management in Southern Kyrgyzstan who had different professional profiles.

Gender bias

In order to limit the influence of the gender-bias on the study's findings, women were actively encouraged to participate in discussions and trips to forest plots whenever possible. Opportunities to discuss different aspects of forest use with a woman either alone or in all-women circles were always seized. However, it must be recognised that the information gained from fieldwork is surely male-biased, which is perhaps inevitable as forestry in Kyrgyzstan is widely considered to be a male domain. Female respondents frequently referred the researcher to their husbands by saying, that it was the men who dealt with questions concerning the forest. It should however be remembered, that it was not a primary purpose of this study to illuminate the gender dimensions of forest management in the WFFs; an interested reader can find more on this issue in the studies conducted by Marti (2000), Messerli (2000) and Scherrer (2004).

Wealth bias

There is a considerable danger in socio-economic studies that wealthy people are over-represented in a sample, which leads to a wealth bias (Chambers 1980; McCracken *et al.* 1988). Taking great care to get a balanced sample of households in terms of wealth through wealth ranking exercises reduced any potential wealth-bias.

3.4.2 Triangulation

Triangulation of the data collected was an important principle throughout the fieldwork (Marshall & Rossman 1990, p. 146; Huberman & Miles 1994; Schoonmaker Freudenberg 1994; Flick 2002, p. 49; Maxwell 2005, p. 93 + 112). Triangulation helped to reduce biases by cross-checking, confirming and complementing information, and to see things from different perspectives, which increased the accuracy of the data gathered. For this purpose, multiple complementary methods were used, whenever possible.

A good triangulation of information received and building up trust with local informants turned out to be particularly important for socio-economic aspects of the study. Initially, most informants were rather reluctant to share detailed socio-economic data with outsiders. This attitude is not surprising for people in post-Soviet societies and can also be observed in many others, if not all countries worldwide. But, with time, confidence was built up and informants became more forthcoming. Thus, the possibilities to triangulate information became greater as the research progressed and the rapport with the informants improved.

3.4.3 Clear and open communication

Another important principle of the study was clear and open communication about the purpose and the approach of the research, which was critical in a post-Soviet context; in particular, as somebody from the West was involved in the project, this might have roused expectations of assistance. Local authorities, both *leshozes* and *Ail-Okmot*, on all potential research sites were personally informed about the purpose of the research by the author. A summary of the intended research including the contact address of the research group, written in an easily understandable style in the Russian and Kyrgyz languages, was handed out for reference to officials and to interested local people.

When establishing contact with potential respondents care was taken to explain the purpose of the study and to inform the respondents about the expected effort involved in terms of his or her time. It was particularly important to emphasise that the study was undertaken in the framework of a research project and that an informant would not directly benefit from his or her participation in the study; this was important in order to avoid false expectations. Potential informants also received the written summary of the research proposal. Respondents were also informed that all the information obtained would be anonymous. They were then asked for their oral consent (Mason 1996, p. 80ff) to participate in the study. The researcher also asked the respondents for permission to take notes during interviews and other discussions. At the end of an interview small gifts, such as tea, a teacup, notebooks or pencils for the children, were given to the informants as expressions of respect and gratitude to the informants who had taken time to participate in the research.

3.5 Research design and sampling strategy

In this section, the conceptual and statistical considerations made while preparing and subsequently setting-up the research are presented. Information is given as to how the selection process of research sites, households and of respondents for the interviews focusing on the potential and constraints for the involvement of local people in forest management (research objective 2) unfolded in the field.

3.5.1 Conceptual considerations in the research design

Conditions for forest management, arrangements for the involvement of local people in forest management and characteristics of local households involved in forest management

vary within the walnut-fruit forest zone. For example, there are places with relatively large areas of forest and rather small populations and other places with little forest and high populations. In some places, the newly developed Kyrgyz CFM model is already put into practice. In other places, other long-term lease systems emerged independently of the CFM project. In many places, ethnic Kyrgyz dominate the local population. But there are also settlements that are ethnically mixed or predominantly Uzbek.

The basic idea behind the sampling and selection process of research sites and of households to be interviewed was that the resulting sample of households should reflect the available variation in the most important factors likely to influence local knowledge, forest use practices and the significance of forests for local people's livelihoods. To this end, a purposive stratified sampling strategy of households to be interviewed was applied (Stahel 1999, p. 339; Wilson 2000, p. 14; Stern *et al.* 2004, p. 77). One of the advantages of stratified sampling is that it requires fewer resources than simple random sampling (Stern *et al.* 2004, p. 77). By applying selection criteria that represent factors of interest (e.g. wealth of households) and by making sure that the different factor levels (e.g. "poor", "intermediate" and "wealthy") are represented in the selected sample of households, a good representation of the variation in these factors and thus a good basis for the statistical analysis could be achieved, despite a relatively small sample size.

The factors (independent variables) shown in Figure 6 were considered to potentially influence the dependent variables used in this study. This design allowed statistically exploring and testing the influence of the independent on the dependent variables. This possibility was particularly used to describe the socio-economic role of forest resources for the selected households (see Section 9.7). The collection of additional background information on the households during the research process, such as the age of the person being responsible for the forest plot or the duration of the household's forest lease until the moment of the interview, allowed the researcher to look for additional factors that influence the dependent variables.

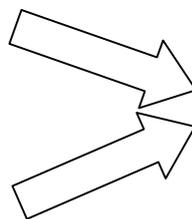
Independent variables

Site level

- Human (population) pressure on forests (factor levels: low, medium, high)

Household level

- Type of forest lease (CFM, non-CFM long-term)
- Wealth of household (poor, medium, rich)
- Ethnic group (Kyrgyz, Uzbek)



Dependent variables

- Local knowledge
- Forest use practices
- Importance of forest resources for the livelihoods of local households

Figure 6: Factors taken into account in the design of the study. The factor levels indicated represent preliminary levels that the author expected there to be when he developed the research design.

The independent variable shown in Figure 6 were selected based on the following considerations and findings from the literature: The factor "human pressure on forest resources" was found to affect forest use patterns by Marti (2000, p. II) with forest use becoming more intense with increasing population pressure on natural resources. The study of Gilmour (1990), who found the attitude of villagers in Nepal to change along the

continuum from abundance to severe scarcity of forests, also points to the potential importance of this factor. The factor “type of forest lease” was considered to be important, as features of the different lease systems, such as the duration of the contract, are likely to influence the leaseholders’ attitudes and actions. A connection between the factor “wealth” and the dependence of people on forest resources has been demonstrated in a series of studies from around the world (Byron & Arnold 1999; Vedeld *et al.* 2007). The fourth factor “ethnic group” was considered to be important since the Kyrgyz and Uzbek have different cultural backgrounds and traditions that influence their attitudes towards forests (Marti 2000).

The implementation of this research design, i.e. the process from the design to the final sample of households involved three steps, described in the following Sections, namely: i) the selection of research sites, ii) the determination of the sample size, and iii) the selection of the households to be interviewed on the research sites.

3.5.2 Selection of research sites

For the purpose of this study the term “**research site**” has been defined as “the territory or parts of the territory of a *leshoz* and associated villages”.

The process of site selection took place in autumn 2001. As a first prerequisite for the selection of the research sites only *leshozes* were considered, in which user rights for forest products are given to local farmers for a period of at least one year. It was expected, that shorter leases would usually not stimulate the tenants to think about long-term management of the leased plots. The consent of the *leshoz* to research activities within its territory was the second prerequisite. All *leshozes* of the walnut-fruit forest belt fulfilling these prerequisites were included in a list of potential research sites. The remote *leshozes* in the Aksi-district, in the very west of Jalal-Abad *Oblast*, were excluded from this list for logistical reasons. Furthermore, Kara-Alma *leshoz* was also excluded from the list, as Marti (2000) had already explored some aspects of local knowledge and forest use practices on this site in her study conducted in 1999.

In accordance with the research design, the following considerations regarding the selection factors were made:

- Human/population pressure on forest;
The sites to be selected should represent different stages on a continuum ranging from low to high human pressure on forest resources. The ratio of human population to forested area was used as an indicator for population pressure on the local forest resources.
- Type of forest lease;
In order to avoid a potential “CFM-project-bias”, it was important to include sites with long-term lease systems for forest plots that had emerged locally without assistance of a development project. Therefore, it was decided that sites where the CFM approach was being practised should not account for more than half of the total research sites.
- Ethnic composition of the population in the villages associated with the *leshoz*;
The research sites should include sites with a population dominated by people of Kyrgyz origin and others dominated by Uzbek people.

During visits to all potential research sites, information about these three factors was compiled. This compilation revealed that the three site selection factors did in fact not vary

independently from one another across the potential research sites. In total four combinations of different levels of the three factors, shown in Table 4, were found. The fact that not all factors vary independently has important implications for the data analysis and the interpretation of the results. It is, for example, not possible to explore the question whether there are differences between tenants with different contracts (CFM, non-CFM long term) in function of human pressure on forests.

Table 4: Available combinations of factor levels amongst the potential research sites. Source: Information collected from the *leshozes* on the potential research sites.

Combination	Human pressure on forests	Type of forest lease	Ethnic group
A	High	non-CFM long-term	Uzbek
B	High	non-CFM long-term	Kyrgyz
C	Medium	CFM	Kyrgyz
D	Low	CFM	Kyrgyz

These four combinations of factor levels had to be represented in the final selection of the research sites. This led to the selection of the following four research sites: Arstanbap-Ata (Combination A + B), Achy (A + B), Ortok (D) and Uzgen (C). Their characteristics are described in more detail in Section 4.3.4.

The *leshozes* on all the selected research sites comprise several forest ranges (see Table 14 in Section 4.4.1 for a complete list of the forest ranges and villages on the research sites). On all sites, certain forest ranges were excluded from the selection of households, in order to avoid a big dispersion of the respondents' households. In the case of Uzgen, the forest range Kolduk was excluded because Nurlan Akenshaev, member of the research team, had many relatives living in this forest range. It could not be excluded that his relatives and acquaintances would not want to disclose any socio-economic information to somebody working in collaboration with Nurlan or that their relationship would otherwise influence the research.

3.5.3 Determination of the sample size and considerations regarding the representativeness of the sample

The combinations A, B, C and D of the factors “human pressure”, “type of forest lease” and “ethnic group” and the levels of the factor “wealth” (poor, medium, rich) results in Table 5 with 4x3 cells. In the context of sampling, the term “balanced” refers to an equal numbers of observations in the cells of this table. It was decided, that seven responses per cell should be aimed at. Five responses are, as a rule of thumb, usually considered to be a minimum for any meaningful statistical analysis (Statistical advisory service ETH Zurich 2001). This resulted in a planned total sample size of 84 households with a long-term forest lease contract or of 21 households for every one of the four research sites respectively. The final sample that resulted from the selection process is presented in Section 3.5.5.

Table 5: Ideal distribution of sampled households over the factors taken into account in the study.

Available combinations of the factors “human pressure on forests”, “type of lease” and “ethnic group”					
	A	B	C	D	Total
Wealth					
“Poor”	7	7	7	7	28
“Medium”	7	7	7	7	28
“Rich”	7	7	7	7	28
Total	21	21	21	21	84

For the considerations regarding the representativeness of the sample, it is important to remember that this study focuses on local people that are involved in forest management in the walnut-fruit forest belt on the basis of a long-term lease for a forest plot (“forest leaseholders”, “tenants”). Thus, statistically speaking, the totality of all long-term forest leaseholders on a research site form the “population” from which households were selected on every site. Table 6 shows the number of households with written long-term forest lease contracts on the research sites in autumn 2001 when fieldwork for this study was started. A comparison with the overall population sizes on the research sites given in Table 16 in Section 4.4.2 reveals that actually only a small percentage of all local households is involved in forest management on the basis of a written long-term lease contract.

Table 6: Number of households with written long-term forest lease contracts on the research sites at the start of fieldwork in September 2001.

Site	Arstanbap-Ata	Achy	Ortok	Uzgen
Type of long-term forest lease according to categorisation used in this thesis	Non-CFM long-term	Non-CFM long-term	CFM	CFM
Number of households with a long-term forest lease in all forest ranges of the <i>leshoz</i>	310 ¹	150 ²	47 ³	43 ³
Forest ranges from which households were selected	Kosth-Terek, Gumchana	Charbak, Sary-Bulak	Ortok, Kuchugen	Jazy, Kyzyl-Too, Ak-Terek
Number of households with a long-term forest lease in the forest ranges from which households were selected	150 ¹	85 ²	27 ⁴	30 ⁵

Sources: ¹ statistics of Arstanba-Ata *Leshoz*, ² statistics of Achy *Leshoz*, ³ Carter (2001, p. 15), ⁴ statistics of Ortok *Leshoz*, ⁵ statistics of Uzgen *Leshoz*; The statistics on forest lease contracts were received from the central offices of the respective *leshozes*.

The determined sample size of 21 households per site allowed including roughly two thirds of all households with a CFM contract from the forest ranges from which households were selected in Ortok and Uzgen. In Achy, 21 households still represent a fourth of all households with a non-CFM long-term lease contract in the selected forest ranges. Thus, the sample of selected households could be expected to be sufficiently representative of the overall “population” of households with long-term leases in Ortok, Uzgen and Achy. In Arstanbap-Ata, the aimed at 21 households would represent a far smaller percentage of all households with a long-term forest lease. It was considered to increase the sample for this site. However, an assessment of the additional efforts *versus* the benefits of an increased representativeness of the sample for Arstanbap-Ata led to the decision to stick to the goal of 21 households to be selected. An increase in households in Arstanbap-Ata, which is the only site with an Uzbek majority, would have increased the number of Uzbek households in the sample. This would have provided a broader basis for statistical comparisons between Kyrgyz and Uzbek households. In terms of the two factors “human pressure” and “type of forest lease” however, a bigger sample for Arstanbap-Ata would not have significantly extended the possibilities for the analysis of the data. Arstanbap-Ata and Achy share the

same levels for these factors (high human pressure, non-CFM long-term lease) and jointly were expected to provide data from 42 households. It was deemed that this figure was large enough for the data analysis.

3.5.4 Selection of local households involved in forest management

The term “**household**” is defined as “a group of co-resident persons in one compound who share most aspects of consumption and draw on a common pool of resources for their livelihoods.” Generally, it is not easy to set the boundaries of a household in a rural setting in Kyrgyzstan where social and economic interactions with members of the wider family beyond the boundaries of a particular compound are part of everyday life (see Kandiyoti (1999) for a discussion on this problem). The pilot research phase confirmed however that the definition of the term “household” given above was explainable, understandable and applicable to the realities on the research sites. Special care was taken to ask informants whom they considered to be members of their households and what they considered their households to consist of.

The term “**forest plot**” refers to “a delimited, at least partly forested plot of the State Forest Fund, which is leased to a household or an individual by the *leshoz*. The leaseholder exercises use rights over this forest plot which are agreed upon with the *leshoz* in a written or oral lease agreement.”

For the selection of households involved in forest management the following factors were taken into consideration:

- Wealth of the households;
The selection process aimed at getting a balanced distribution of households over locally defined wealth categories.
- Ethnic origins of the households;
Households were selected proportionally to the overall ethnic composition of the population on the respective research site.
- Access to relevant knowledge;
Overrepresentation of professional foresters and other current or former *leshoz* employees was avoided in the sample.
- Informed, oral consent (Mason 1996, p. 80ff) to the research by the head of the household and all members to be interviewed.

To assess the first criterion “wealth” of the above list, wealth ranking exercises (see Section 3.6.2) were conducted on all research sites, resulting in three wealth categories, “poor”, “medium” and “wealthy”. It was aimed at selecting seven households from each of the three wealth categories on every site ($3 \times 7 = 21$ households per site). Following the wealth ranking exercises, all households from a site which were known to fulfil the selection criteria were put on a list, to which the results of the wealth ranking exercise was added. In a next step, the list was sorted according to the three wealth categories. Within each wealth category, the entries in the list were then randomly sorted. For the final selection of the households, representatives of the households on the list were subsequently contacted, starting on top of the entries for every wealth category. If there was a danger that i) foresters or other current or former *leshoz* employees would dominate the resulting sample from each site, or ii) it was ethnically one sided, then households which would increase such imbalances were skipped in the list.

The above-described process resulted in the selection of a total of 102 households for this study. The difference to the planned sample size of 84 households is explained by the fact that in Ortok and Uzgen, additionally, seasonal leaseholders were added to the sample for the socio-economic parts of the study. The idea behind this was to use the seasonal leaseholders as a baseline group for comparisons of socio-economic information with CFM households from the same sites.

3.5.5 Distribution of the selected households over the research sites, categories of human pressure on forests, wealth, type of forest lease (forest tenure) and ethnic groups

The distribution of the 102 households selected for this study over the sites and the distinguished categories of “human pressure on forests”, “wealth”, “type of forest lease” (forest tenure) and “ethnic group” is shown in Table 7 below. Generally, one notes that the goal to get a stratified sample representing the variations in the factors taken into account in the selection process was largely achieved.

More information on the research sites, the ethnic composition of the population of the sites, and on the man-forest interface and human pressure on forests on the four sites can be found in Section 4.4. The characteristics of the three wealth categories are explained in detail in Section 6.2.2. Background information on the different categories of forest tenure is provided in Section 6.4.

Table 7: Distribution of the selected households over the four research sites and categories of human pressure on forest resources, wealth, forest tenure and ethnic groups. “n.a.” = not applicable.

	Arstanbap-Ata	Achy	Uzgen	Ortok	Total all sites
	n	n	n	n	n
Total selected households distributed as follows...	20	24	30	28	102
Human pressure on forest resources	High 20	High 24	Medium 30	Low 28	102
Wealth categories; number of households considered to be...					
“Poor”	5	10	9	6	30
“Intermediate”	8	6	10	10	34
“Wealthy”	7	8	11	12	38
Type of forest lease (forest tenure)					
CFM	n.a.	n.a.	21	20	41
Non-CFM long-term	20	18	n.a.	n.a.	38
Seasonal	0	6	9	8	23
Ethnic groups					
Kyrgyz	5	15	30	28	78
Uzbek	15	9	n.a.	n.a.	24

Overall, there are considerable more households from sites with a high level of human pressure on forests ($n = 44$) than from sites with medium ($n = 30$) and low pressure ($n = 28$). This is due to the fact that two (Arstanbap-Ata, Achy) out of the four research sites are associated with high human pressure. In terms of wealth, wealthy households are overall slightly overrepresented. The most important imbalances on the level of the individual sites concern an underrepresentation of poor households in Ortok, and a relatively small number

of households categorised as “intermediate” in Achy. In Ortok, all available poor households with a CFM lease have been included. Therefore, it was not possible to correct the observed imbalance. The reason for the categorisation of six households as seasonal leaseholders in Achy lies in the redistribution of forest plots on that site (see Section 6.4.2). The dominance of ethnic Uzbek households in Arstanbap-Ata and of Kyrgyz households in Ortok and Uzgen reflects the ethnic composition on these sites (see Section 4.4.2). In the case of Achy, Uzbek households are slightly underrepresented in the sample analysed in this study (38% of selected households) compared to their share of the population of the site (44% of the total population, see Section 4.4.2).

In terms of data availability for the various aspects of this research a distinction was made between data garnered from fieldwork on i) local knowledge, forest use practices and ideas for forest management in the long run (c.f. research objectives 3 and 4), and on ii) the socio-economic significance of forest resources for the livelihoods of forest leaseholders (c.f. research objective 4). Data on the first aspect was gathered from all households with the exception of seasonal leaseholders from Ortok ($n = 8$) and Uzgen ($n = 9$), i.e. in total from 85 households ($102 - 8 - 9$ households = 85 households). Information on the socio-economic role of forest resources in the lives of the informants was gathered from all 102 households. However, not all data sets from the interviewed households are complete. Sometimes, an informant did not want to disclose a particular point. On other occasions, informants claimed not to know the answer to a question. In the presentation of the results in this thesis, the precise number of households from which information on the points concerned is available (number of observations) is always indicated.

The reason for the exclusion of seasonal leaseholders of Ortok and Uzgen from data gathering on local knowledge and forest use practices lies in the fact that these leaseholders are only being granted withdrawal rights for forest products for just one harvest season. Thus, they do not practice any other forestry activity than harvesting on the leased plot. Also, these seasonal leases usually do not provide any incentive to develop plans for long-term forest management. The seasonal leaseholders in Achy, on the other hand, were included in the sample for the questions regarding their forestry relevant knowledge and forest use practices, because seasonal leases in Achy provide the leaseholders withdrawal rights for the time of the walnut harvest over several years. This longer association of the leaseholder with her/his plot makes it likely that the tenants has observed the plot and developed some ideas for its long-term management.

3.5.6 Selection of resource persons for interviews on changes in livelihoods since Soviet times, in forest policy and on forest history

For the work on changes in the institutional framework for forest management and in forest policy (c.f. research objective 1) semi-structured interviews with a small number of key informants were conducted. These “expert interviews” provided complementary information to the data gained from the literature review, in particularly regarding livelihoods in general during in Soviet times and since Kyrgyzstan’s independence, and regarding aspects of forest history and forest policy (see Table 9 in Section 3.6).

The author conducted such interviews with the following persons (positions at the time of fieldwork):

- Dr Bronislav Ivanovitch Venglovsky, head of the Laboratory for Silviculture and former director of the Forest Institute of the National Academy of Sciences;

- Mr Rysbek Akenshaev, chief forester of the regional forest administration of Jalal-Abad *Oblast*, former director of Ortok *Leshoz*;
- Dr Irina Kouplevatskaya, leader of KIRFOR's project on forest policy and deputy head of KIRFOR;
- Mr Mairambek Aliev, head of the section responsible for CFM at the SFS's head office in Bishkek, former chief forester of the regional forest administration of Osh *Oblast*;
- Dr Davlet Mamajanov, researcher at the Laboratory for Forest Resources in Jalal-Abad of the Forest Institute.

These resource persons were selected for these interviews based on their longstanding involvement in the forest sector in Kyrgyzstan, their detailed knowledge of the conditions on the research sites and their daily work related to forest policy and the development of participatory approaches to forest management in Kyrgyzstan.

3.5.7 Selection of informants for the identification of potential and constraints for the involvement of local people in forest management

In order to identify important opportunities and constraints for the enhancement of sustainable forest management involving local people (c.f. objective 2 of the research), semi-structured interviews with representatives of different stakeholder groups were conducted. For these interviews, respondents from different backgrounds were purposively chosen to have important stakeholder groups represented in the sample (e.g. State – non-State, foresters – non-foresters). This allowed capturing different perspectives on forest management. Table 8 gives an overview on the composition of the groups of respondents for these semi-structured interviews. In total, 48 informants were interviewed.

Table 8: Stakeholder groups and background of informants with whom semi-structured interviews on opportunities and constraints for the involvement of local people in forest management were carried out.

Informants for interviews on opportunities and constraints		Number of interviewees
Stakeholder group	Function, detailed background of the informants	
Public sector informants from local civil administrations (<i>Ail-Okmots</i> , villages)	Employees of the municipalities (director, deputy, officer in charge of social questions)	5
	Village heads	5
Informants from local social organisations	Representatives of local Council of Women	4
	Representatives of local Councils of Elders	5
Informants from the general public	Other local residents	2
Public sector informants from the SFS	Officer headquarter SFS	2
	Officer Regional Forest Administration	3
	Representative regional Office for Nature Protection	1
	Members of central <i>leshoz</i> staff (director, chief forester, engineer)	8
Scientific, technical informants	Forest rangers	9
	Local scientists	3
	Freelance forester, service provider to the CFM project	1
Total		48

3.6 Methods used for data collection

To achieve the research objectives and answer the research questions qualitative and quantitative data had to be gathered from the field. The factors affecting local forest-related knowledge and the livelihood strategies of local people are very diverse and include historical, social, economic, technical dimensions and other parameters. Thus, they can only be captured by using a number of different, adapted methods. Such a use of multiple methods combining qualitative and quantitative, participatory and formal data gathering is, in fact, considered to be the best way to get insights into local knowledge and resource use patterns from different perspectives (Rusten & Gold 1991; Biggelaar & Gold 1995; Rusten & Gold 1995). Furthermore, it allows reducing bias, increasing the richness of information and cross-checking the accuracy of the information (triangulation) (Schoonmaker Freudenberger 1994). Accordingly, for this study a combination of appropriate qualitative and quantitative methods was used (see Table 9).

The aim of this combined use of qualitative and quantitative methods was to enrich quantitative data with qualitative insights (Marsland *et al.* 2001). In this way, a realistic picture of local knowledge and forest use practices of forest leaseholders that is embedded in a good understanding of local livelihoods in the walnut-fruit forest belt was generated. The applied sampling strategy allowed generalising the results with due caution (see Section 3.8) for the “population” of forest leaseholders in the walnut-fruit forest belt. Qualitative information gained on the same or related issues as the quantitative information enriched the latter, allowed to understand it in its context and thus contributed to a high validity of quantitative results.

Table 9 on the following two pages shows in detail which methods were used at which stage of the research process to achieve the research objectives of this study. The corresponding interview guidelines, the forms to record the results of the use of PRA tools such as ranking and scoring, and the questionnaires used are included in the Appendix 1 to 7 to this study.

Table 9: Research objectives, methods used and sequence of the use of the various research methods. The reasons for the varying sample sizes are explained in Section 3.5.

Research objective	Data source, methods used and sample sizes	Time frame, sequence
<p>1. Document, describe and analyse key changes in terms of the institutional framework and policies for sustainable forest management in the WFFs and local livelihoods in the WFF-belt during the transition process from a Soviet style system towards a more pluralistic political system and a market economy.</p> <p>2. Identify important opportunities and constraints at the governance level for the enhancement of sustainable forest management involving local people.</p>	<p>-) Literature review including published literature (also in Russian), grey literature, review of policy and legal documents;</p> <p>-) Semi-structured interviews with key informants (experts) on aspects of forest history and forest policy.</p> <p>Semi-structured interviews with 48 representatives of different stakeholder groups (interview guidelines see Appendix 2).</p>	<p>-) Literature review mainly during the preparations of the research and the early stages of fieldwork in 2001.</p> <p>-) Interview with key informants in 2003.</p>
<p>(-) Background information on characteristics of the selected households, their forest leases and their livelihood systems.</p>	<p>-) Participatory mapping of farming systems;</p> <p>-) Structured interview using the questionnaire included in Appendix 3;</p> <p>-) Observations.</p>	<p>Initial interview conducted with the informants in 2002 or 2003.</p>
<p>(-) Background information on market prices to understand the dynamic of the market demand for selected products.</p> <p>3. Determine the knowledge available with local people in the fields of silviculture and agroforestry, describe the local knowledge system regarding forests, and identify factors influencing innovation in silviculture and agroforestry.</p>	<p>Sample: 102 households.</p> <p>Market observation to observe the producer prices for 19 selected forest and agricultural products on regional wholesale markets.</p> <p>-) Transect walks on forest plots;</p> <p>-) Semi-structured interviews with forest leaseholders using the interview guidelines included in Appendix 5;</p> <p>-) Observations;</p> <p>-) Analysis of qualitative and quantitative data.</p>	<p>Sept 2001 – Dec 2004: Jalal-Abad</p> <p>-) Transect walks and interviews on local knowledge conducted in 2002 or 2003.</p>
	<p>Sample: 85 households.</p>	

Table 9 continued: Research objectives, methods used and sequence of the use of the various research methods. The reasons for the varying sample sizes are explained in Section 3.5.

Research objective	Data source, methods used and sample sizes	Time frame, sequence
4. Describe and analyse the current forest use practices of forest leaseholders and the significance of forest resources for their livelihoods, and identify factors influencing forest use practices.	<ul style="list-style-type: none"> -) Transect walks on forest plots; -) Semi-structured and structured interviews with forest leaseholders on their leased plots concerning their forest use practices using the guideline included in Appendix 6; -) Ranking and scoring of sources of revenues available to the households (economic activities undertaken by the household) (see Appendix 4); -) Semi-structured interviews complementary to the ranking and scoring exercises on the role of forest products in the informants' livelihoods (see Appendix 4). -) Observations; -) Analysis of qualitative and quantitative data. 	<ul style="list-style-type: none"> -) Transect walks and interviews on forest use practices conducted in 2002 or 2003; -) Ranking + scoring conducted in early 2003 and 2004 to recall the importance of different sources of revenue during the year 2002 and 2003 respectively.
5. Explore ways to implement sustainable multipurpose forest management involving local people and develop conclusions for future forest governance and adequate institutional arrangements in the walnut-fruit forests.	<p>Sample: regarding forest use practices: 85 households; regarding socio-economic information: 102 households.</p> <ul style="list-style-type: none"> -) Analysis of qualitative and quantitative data; -) Presentation of preliminary findings to informants and representatives of key stakeholders; -) Discussion of the findings and development of conclusions and recommendations. 	<ul style="list-style-type: none"> -) First exploratory analysis of data during the main periods of fieldwork 2002 and 2003; -) Main data analysis and synthesis of findings during the concluding steps of the research process from 2004 onwards.

The background information on the households, their livelihood systems and their forest lease contracts were collected i) to be able to describe forest use by the interviewed leaseholders in the context of their overall farming system and other economic activities, and ii) to gain information on factors and characteristics of the households that can potentially explain the observed forest use practices and the knowledge available with the interviewed leaseholders.

The purpose of the observation of producer prices for a range of products on regional wholesale markets was to understand the dynamic of the market demand. During the preparations of this study, it appeared likely that the demand for forest products would influence forest use practices. Furthermore, it might also have an effect on local knowledge.

Knowledge in the field of forestry and forest use practices, the key issues of the research objectives 3 and 4, are interrelated areas. For the reasons explained in Section 2.6.2 (“what people *do* and what they *know* are rather different” (Sinclair & Joshi 2000)) it was however important to make a conceptual distinction between them, which is also reflected in the conceptual framework and the structure of this thesis. In the practice of the research process, however, research on these two issues went often in parallel. Transect walks on forest plots, for example, yielded both information on forest use practices as well as on the knowledge held by the informants.

To investigate the components of local knowledge that are relevant for this study, i.e. technical skills, knowledge on use options for forest products, ecological understanding, semi-structured and structured interviews were used in combination with observation and transect walks on the leased forest plots. Information on forest use practices was received from semi-structured and structured interviews, transect walks on forest plots, ranking of forest products and complementary observations.

The example of the topic of ecological understanding and its application in silvicultural decision-making illustrates how an area of investigation was approached from various sides. The author put a series of open questions related to the composition and quality of the forest plot, and possible problems on the plot to the informants (see interview guideline in Appendix 5). The resulting discussion, which was allowed to follow issues that the informants brought up spontaneously, revealed the informants’ views of their plots and some of their understanding of ecological processes. The discussion on planting activities provided another entry point to explore the ecological understanding held by forest tenants. This discussion was started with the closed question, whether the informant would plant on her/his leased plot. The subsequent open question concerning the factors that the respondent takes into account when planting again provided information on the ecological understanding of the informants, for example regarding site conditions and their impact on seedlings of different species.

The socio-economic information on the role of forest resources in the livelihood systems of the interviewed forest leaseholders was gained from ranking and scoring exercises, that provided both quantitative data as well as qualitative insights, and from complementary semi-structured interviews. By inviting the informants to score their sources of revenues, an estimation of the relative importance of forest resources for the interviewed leaseholders could be generated. This method was chosen from a range of possibilities that had been tested during the pilot research phase in autumn 2001. These included i) record keeping by the informants (Wollenberg & Nawir 1998) combined with frequent checking of results by the researcher (Godoy & Lubowski 1992), ii) interviews to recall the households’ revenues

and expenses using also a checklist of forest products as prompts (Wollenberg & Nawir 1998) (Cavendish 2002; Ambrose-Oji 2003), and iii) ranking and scoring exercises. An assessment of the results achieved with these methods after three months revealed that there was a poor level of participation in record keeping and the absolute values of revenues gained with record keeping as well as with recall interviews were in many cases unrealistic and sometimes obviously even far from the truth. Many informants were reluctant to disclose the absolute values of their revenues to the research team (Schmidt 2002). The relative data gained from ranking and scoring exercises, on the other hand, proved to be more reliable. Therefore, it was decided to limit the socio-economic research to relative values of revenues and to use the ranking and scoring of sources of revenues available to the households in combination with semi-structured interviews as research methods.

The methods employed and relevant aspects of their application are described in greater detail in the following sections.

3.6.1 Semi-structured and structured interviews

Semi-structured and structured interviews with local informants were the main research methods used (Whyte 1977; Bernard 1994, p. 208ff; Fontana & Frey 1994; Mason 1996, pp. 35ff+62ff; Flick 1998, p. 76; Gillham 2000).

The guidelines for semi-structured interviews and the questionnaires for structured interviews were developed based on the author's experience and the insights gained from pilot interviews made during the first visit to the field in 2001. The form to record key data on the interview, the interviewee and the conditions of the interview can be found in Appendix 1. In addition to these planned interviews, informal discussions with informants and other local people whom the researcher happened to meet took place during fieldwork, yielding further useful information and insights.

The guidelines for the interviews on local knowledge and forest use practices included closed as well as open-ended questions. The latter were mainly used to start an open discussion with the respondents on the issues listed in the guidelines. Semi-structured interviews were also used complementary to the ranking and scoring exercises to collect data and gain insights into the significance of forest resources for local people's livelihoods.

The interviews relating to the leased forest plot of a household were, with a few exceptions due to time constraints of leaseholders of remote forest plots, conducted on the forest plot after or in combination with the transect walk on the plot.

While conducting fieldwork, it was intended to restrict the duration of interviews with the local respondents to a maximum of one and a half hours. In so doing, the researcher tried to limit the time burden on the respondents. Furthermore, this time restriction helped to avoid any possible decrease in the quality of the data caused by decreasing attention and increasing tiredness of the respondents, the interviewer or the research assistant.



Figure 7: Nurlan Akenshaev, Kyrgyz postgraduate student, conducting a research interview in Achy.

The main aspects discussed with local informants while conducting semi-structured interviews on potential and constraints for sustainable forest management involving local people (c.f. objective 2 of this research) included the following:

- Role of local people in forest management (interest, non-interest, scope for decision-making, current level of involvement, scope for silvicultural interventions and active forest management);
- Experience with the involvement of local people in forest management made so far;
- Role of foresters concerning the involvement of local people in forest management (tasks of foresters, problems, difficulties, collaboration between the *leshozes* and local people);
- Different models for involvement of local people (forest plot for every household, privatisation of forest, open access, leases leading to exclusive access, individual *versus* group leases, *et cetera*).

3.6.2 PRA tools

Different methods taken from PRA and anthropological toolboxes (McCracken *et al.* 1988; Schönhuth & Kievelitz 1993; Bernard 1994, p. 237ff; Chambers 1994a; Schoonmaker Freudenberger 1994; Messerschmidt 1995) were deployed in the course of this study that yielded both qualitative and quantitative results. Their application for the purpose of this study is explained in further detail in this section.

Wealth ranking exercises

Participatory wealth ranking exercises (Grandin 1988; Bagchi *et al.* 1998) are, if carefully applied, considered as a valid, quick and inexpensive tool for socio-economic stratification (Adams 1997). The number of participants in these exercises varied between five persons in Achy and 15 persons in one exercise conducted in the village of Salam-Alik in Uzgen. A special effort was made to invite different members of the community in the villages to participate (e.g. women, CFM tenants, seasonal tenants, *Ak-Sakals*, young people). However,

not all of these groups were represented in all the wealth ranking exercises. Therefore, the outcome may have been biased in a few cases.

A multiple-step approach was adopted for the wealth ranking exercises. First, the participants were asked to describe how they would assess poverty and wealth of households in their own village. This initial discussion resulted in the creation of a preliminary list of criteria for “wealth” and “poverty” (see Appendix 9). Then, the participants were invited to place the households that were considered for selection for this study on a continuous gradient ranging from “poor” to “wealthy”. For this, the name and, if necessary, an additional attribute of the head of household was written on a piece of paper. Care was taken that the identity of every household in question was clear to all participants. Once the participants had agreed on the position of all households, they were asked to group the households in wealth categories. In some cases, such a categorisation emerged spontaneously from discussion. It was left to the participants to decide how many categories to form. In three research sites, villagers identified three wealth categories. In Ortok, the villagers taking part in the wealth ranking exercise came up with four wealth categories, the fourth being a category of “very poor” families. With the help of local informants, the four wealth groups identified in Ortok were subsequently transformed into three wealth groups in order to make comparisons between the sites easier. The issue of comparability of the results of the wealth ranking exercises between the sites is discussed in Section 3.8. The categorisation of the households and the criteria applied were collectively discussed. The results of the wealth ranking exercises are summarised in Section 6.2.

Participatory mapping, farm sketch map, resource-flow diagrams

At the beginning of interactions the members of a new household were usually invited to draw a farm map (Chambers 1994a) to include their leased forest plot. Often, this proved to be a valuable ice breaking exercise (Schoonmaker Freudenberger 1994) and made the subsequent discussions on the farming system a lot easier. This confirmed that the conduction of such participatory activities prior to any more structured work, such as the conducting of a structured interview using a questionnaire, can create “rapport and a degree of confidence” between informants and researchers (Marsland *et al.* 2001). In a few cases, such farm sketch maps were developed into resource-flow diagrams (Dorward *et al.* 1997) by drawing arrows representing inputs and outputs to and from the resources drawn on the map.

Ranking, scoring

In order to get information about priorities of local farmers concerning different forest products and different resources available within the farming system ranking and scoring exercises were used (McCracken *et al.* 1988; Bernard 1994, p. 252ff; Chambers 1994a). These exercises allowed the assignment of a relative value to different products or resources. They were carried out with at least one representative of each household. If both a senior male and a senior female member of the household were present, they were asked to do these exercises independently and both results were recorded. In the subsequent steps of data analysis, the data from male and female members were first analysed independently. The resulting values from male and female household members were compared to identify possible gender-related patterns and differences. Then a mean value was calculated and used as a household value.

In the first ranking exercise, each informant was asked to identify and rank the products that members of the household collected from their leased forest plot and/or the general forest. In the second ranking exercise, the informants were invited to rank the sources of revenues (in-

kind and cash) and subsistence available to their households. This second ranking exercise was first conducted for the calendar year 2002 and, one year later, repeated for the calendar year 2003. The ranks developed in the second exercise were subsequently converted to scores. To achieve this, 20 pebbles were given to the informants. They were invited to distribute these pebbles over the ranked sources of revenues and subsistence in function of the importance of these sources for the respondents' households. In all instances, the respondents were asked to explain their ranking and scoring results and their considerations. This qualitative information was recorded with the final ranks and scores.

For the ranking exercise, informants were allowed to give the same rank to two or more items for which they had no preference for one over the other. In the literature, this is called "allowing ties" (Abeyasekera 2001). Such items of equal importance to an informant were given the "mean of those ranks which would have been assigned to this group of items if the farmer had been able to distinguish between them" (Fielding *et al.* 1998). If for example an informant ranked walnut as his first choice (rank one), followed by hay on the second place (rank two), and did not have any preference for the other three products, then each of the remaining products got the same rank of four. Four is the average of three, four and five, i.e. of the ranks which would have been assigned to these three items if the respondent had made a distinction between them.

Transect walks on forest plots

During transect walks on the leased plots, informants were asked about their use of their forest plots, forest products available, their use or non-use (Favre 1989; Schneider 1996; Lawrence *et al.* 2000) and about the state of the forest plots. Such walks proved particularly useful in launching discussions on forest use practices and on the management intentions of the farmers for their plots in the long run.

During and immediately after the transect walk, the author noted down key characteristics of the forest plot (description of ecological conditions, forest stand characteristics, land use) in order to be able to recall the context of the qualitative and quantitative information gained from such transect walks at later stages of the research process, especially during the data analysis.

Observations

During the entire periods of fieldwork many observations were made on local people's livelihoods in general and on forest use in particular. The latter mostly took place on the informants' plots as well as in other parts of the forest. Observing the way informants presented their leased forest plots, which features of the plot they considered to be important, which less, and how they acted on their plot provided useful information. The researcher noted the observations in his notebook following the guidelines developed for taking field notes (see Section 3.6.4).

3.6.3 Market observation

The evolution of producer prices for 19 selected forest and agricultural products was monitored on the wholesale market of Jalal-Abad between September 2001 and December 2004 (see market observation form in Appendix 7). The producer prices were determined between two and four times a month, from which an average price per month was calculated. The data was partly gathered by members of the research groups themselves and partly by specially instructed, reliable local informants, most of them sellers on the respective market. In the latter case, a member of the research group collected the data once a month and

double-checked the prices of a few, randomly selected products. The research project remunerated the local informants for their work.

3.6.4 Note taking during fieldwork

While conducting fieldwork, the author kept a field log, i.e. written notes on how he and the research assistant spent time in the field, including date, time, place and a short description of the activities undertaken. The author also kept a research diary to document the research process and, in particular, decisions taken concerning the research design and other features of the research and the rationale behind them (Marshall & Rossman 1990, p. 148). The researcher also recorded his feelings and perceptions of working relationships with others in the diary in order to make him aware of any personal biases (Bernard 1994, p. 181 *et seqq.*). In the same notebook, field notes were made according to the guidelines developed by Bernard (1994, p. 180 *et seqq.*).

The research log, the diary and these systematically organised field notes proved particularly useful during the data analysis, as they allowed the researcher to “reconstruct” situations in which a particular bit of information was received. It also provided the author with much additional qualitative information. The notes of people met in the field enabled the researcher to greet the same person by his name on the occasion of a subsequent meeting and hence helped establishing a friendly relationship with the respondents.

3.6.5 Translation

The researcher and the assistant jointly conducted the interviews and the data gathering in the field. Interviews were held in the language with which the respective informant felt most comfortable, i.e. in most cases in Kyrgyz, sometimes in Russian. Where respondents were comfortable with speaking Russian, the author conducted interviews in Russian himself and also translated written Russian sources to English. During interviews held in Kyrgyz, the assistant acted as translator from Kyrgyz to Russian.

3.7 Methods used for data analysis

The design of the study allowed testing the data on influences from a variety of independent variables and explaining connections found in a plausible way using qualitative information.

3.7.1 Analysis of quantitative data

Quantitative data, either numerical values directly gained from fieldwork or categorical data developed from qualitative data, was first entered in their raw form into MS Excel spreadsheets, checked for validity and data entry errors, and then organised for analysis following the guidelines in Stern *et al.* (2004, p. 141ff + p. 163). To identify outliers, descriptive summaries of data including extreme values in MS Excel (version 2000) and the statistical software package SPSS (version 12.0) were produced and box plots plotted in SPSS. Any data entry errors discovered were corrected. If an outlier was consistent with the raw data, the researcher tried to find plausible explanations for such observations and made a note for the following data analysis.

Quantitative data was analysed using descriptive statistical tools, parametric and non-parametric statistical tests and general linear models (GLM) (Stern *et al.* 2004, p. 283). Non-parametric tests were used when the data did not meet the assumptions on which parametric tests are based (Black 1999, p. 550). The assumptions were tested before deciding on the test to use. In the presentation of the results, the appropriate test statistics are shown, following

the recommendations given by Pallant (2005) concerning the presentation of test results. The statistical analyses were conducted using SPSS. The data analysis was started with an exploratory phase and then further refined along the lines of the research questions which guided the data analysis. The statistical methods used were discussed with specialists of the Statistical Advisory Service at the University of Reading to ensure their validity.

3.7.2 Analysis of data from ranking exercises

The data collected from ranking forest products posed some problems for the statistical analysis, as different informants used and hence ranked varying numbers of forest products. Under these circumstances it was not possible to calculate meaningful statistical means for the ranked products. Another, general difficulty in using ranks is that they do not provide any information about the “distance” between ranked items. This distinction was not elicited during the ranking exercises. A further problem with ranks is that their digits (1st, 2nd, 3rd, ... *et cetera*) have no numerical significance (Abeyasekera 2001).

One way to circumnavigate some of these difficulties was to convert ranks to scores, which could then be analysed using standard statistics, in particular calculation of distributional measures. This conversion was done according to the approach developed by Abeyasekera *et al.* (2001). A total of 20 points was hereby distributed between the ranked forest products of every household in relation to the number of items ranked. This fixed number of points or scores gives the data of every household the same weight. The scale used for converting ranks to scores can be found in Appendix 8. It was decided to use the number of 20 scores per household, because the same number of pebbles was used in the scoring exercises undertaken in this study. It was expected that the use of the same number for the direct scoring and the converted scores would make the presentations of the results clearer. The scale of the scores was decided arbitrarily, since no complementary information about the “distance” between the ranks attributed to forest products by local informants was available.

3.7.3 Analysis of qualitative data

The goal of the qualitative data analysis was to identify patterns and meaningful reasons, causes or driving forces explaining the observed patterns and phenomena associated with an individual leaseholder’s use of the lease forest plot. Qualitative data was analysed by grouping and categorising statements, and connections and linkages between different arguments were looked for. Attention was paid to getting enough background information on the informants and their position in the local community in order to be able to analyse the information in its context. Qualitative data is presented using quotes as a means to illustrate and enrich the quantitative analysis done by the author and in the form of visual displays such as tables in order to explain the data and the ideas developed by the researcher (Bernard 1994, p. 365).

3.8 Considerations concerning reliability, validity and generalisations

To identify potential sources of error in the data and findings of this research, the reliability of the data gained and the internal and external validity of the findings are assessed in this section. The concept of reliability in research relates to the question whether a researcher undertaking a given study a second time following the same research procedures would actually replicate the results of the first study conducted by another researcher. Internal validity concerns the confidence that a researcher can have that her/his findings actually represent the „truth“. External validity is related to the possibility to generalise the findings beyond the sample of households interviewed (Mason 1996, p. 145 *et seqq.*; Marsland *et al.*

2001). Potential sources of non-sampling errors include the informants' perceptions of the researcher's background and interests, and the work in different languages.

Qualitative research is prone to a bias induced by researchers tending to select those sources of data which support their research agendas and the arguments of their studies (Zingerli 2003, p. 25). This may compromise the reliability of the data and the validity of the findings and conclusions. While this kind of criticism can also be applied to the present study, it should be stressed that an effort has been made to select the research sites, the households and the respondents for the semi-structured interviews on the potential and constraints for the involvement of local people in forest management in a systematic way. Also, much attention was paid to reproduce the arguments of the informants in an undistorted way.

The reliability of information depends heavily on the qualities of the interactions between researcher and respondents, not only in the way respondents see the researcher as a person, but also in terms of the researcher's interests and connections to other stakeholders. When this study started, some foresters as well as some other people in Ortok and Uzgen knew the researcher from work he had done previously for the Kyrgyz-Swiss Forestry Support Programme KIRFOR. Although the author took great care to emphasise that this study was an independent project collaborating with, but not being part of KIRFOR, it seems that sometimes the researcher and the entire research group were nevertheless perceived as a "satellite" of KIRFOR. It is assumed that this had an influence on the data; in particular, when the discussion touched upon issues on which KIRFOR worked and had an interest in, such as CFM. It was also known that the researcher and the other members of the research group had good relations to the SFS.

In some situations, in particular in discussions with officials, the researcher got the impression that the interviewee was primarily pleasing the researcher whose agenda was assumed to be obvious, for example pro-CFM. In such cases good interview and facilitation skills were needed to start a fruitful discussion despite such misconceptions. If such doubts arose, a special remark reflecting on what had happened, the position of the informant and his possible interests in presenting things in this particular way was made in the research diary to go with the notes of the interview.

The work with a research assistant translating some of the interviews from Kyrgyz to Russian and the fact that Russian is not the mother tongue of the author pose questions about the reliability of data and validity of their interpretation. The researcher has a solid command of the Russian language and of the special vocabulary which was needed for this study from previous work in the field of forest and natural resource management in Kyrgyzstan. The author has also a fair understanding of basic Kyrgyz, which enabled him to cut in on discussions held entirely in Kyrgyz and to intervene if he got the impression that a translation was imprecise. If something was not clear to the researcher he asked the informant or member of the research group to repeat or paraphrase the statement or he double-checked this particular point with somebody else at a later stage. Of course, it cannot be excluded that some information got distorted or lost despite these efforts. However, the author believes that the linguistic challenges involved in this research had no significant negative influence on the validity of the conclusions of this study.

The reliability of some of the qualitative PRA tools use for this study, such as the wealth ranking exercises (Adams 1997), can be questioned. The results gained with some of these tools might be less representative than the results of quantitative surveys. However, there are indications that the information gained was sufficiently reliable for the purpose of this study.

An example for this was the confirmation of the reliability of the results of a wealth ranking exercise by the officer of an *Ail-Okmot* who was, at the time, in charge of social questions. This man participated in one of the wealth ranking exercises conducted in the villages in Uzgen. At the end, he told the research group that the results of the exercise were at least as reliable and accurate as the social survey conducted by the *Ail-Okmot* and gave a better idea of the meaning of “poverty” and “wealth” in the village than the official figures.

In terms of internal validity, efforts were made to triangulate information gained and to reflect on possible relationships between independent and dependent variables, and on possible other factors influencing the dependent variables. By applying the described combination of qualitative and quantitative methods, the researcher tried to understand the observed phenomena in their context. Towards the end of the study, preliminary results were discussed with local informants and other interested parties to check the reliability of data and the validity of conclusions. The study thereby benefited from a growing trust between the researcher and his team and the local informants. After a cautious beginning marked by a certain scepticism and reluctance to share detailed information about their households and livelihood strategies, the informants increasingly “opened up” and were ready to share more information with the researcher.

In respect to external validity and the possibility to generalise conclusions from this study, it is important to remember that potential sources of bias were identified early on in the research process (see Section 3.4.1), and measures were taken to reduce their impact on the research results (c.f. strategy for the selection of the sites and households in Section 3.5). It is also important to remember that the study looked primarily at households with long-term forest leases and not at the local population at large. It does not claim that the findings are representative for the entire population of the walnut-fruit forest. The research design and the sampling strategy resulted in a sample of sites and households that reflect the regional variation in a number of factors that were considered to potentially have an effect on local knowledge, forest use practices and the significance of forest resources in local livelihoods. This created the basis for generalising the findings on other sites with different framework conditions for forest management (e.g. human pressure on forests, different lease arrangements).

Given the number of forest leaseholders in total and the number of leaseholders included in the sample per site described in Section 3.5.5 there is a good basis for generalising the findings from Ortok, Uzgen and Achy on the wider population of local households with a forest lease. In the case of Arstanbap-Ata, the number of households studied is probably too small to claim that the findings are representative for this site, given the higher number of forest leases on this site.

Due to the relatively small number of households per site, data from different sites had to be pooled for some parts of the statistical analysis, in particular for multivariate analyses, to make sure that minimal case numbers were achieved. Despite these statistical limitations, it has been possible to make plausible generalisations of the findings, not least, because of additional qualitative information gained from fieldwork. Also, the applied technique of stratified sampling allowed the researcher to develop a range of generaliseable conclusions concerning different factors of interest despite the relatively small sample size.

A problem for the generalisation of the results concerning the “wealth” factor of local household was that threshold values between the different wealth categories for some of the criteria, for example livestock, varied from site to site. However, there were important

features that households of the same wealth category had in common on all the sites. Generally, the results of the different wealth ranking exercises seemed largely consistent. A household considered to be wealthy in Ortok would thus most probably be put in the same group on another site, for example in Uzgen or Achy. Therefore, careful comparisons between the sites seemed possible and conclusions concerning the factor “wealth” seemed valid of all sites.

4. Kyrgyzstan, its transition process, the walnut-fruit forests and the research sites

This chapter includes key geographical data on Kyrgyzstan, summarises the ongoing transition process with a special focus on the consequences of the transition process for the population and introduces the walnut-fruit forests. Furthermore, it provides background information on the four research sites selected for this study.

4.1 Kyrgyzstan

4.1.1 Geography

Kyrgyzstan is a landlocked, mountainous country in the very middle of Central Asia lying between 39° and 43° N and 69° and 81° E. Its territory is 199,900 km², comparable to the size of England and Scotland taken together. Kyrgyzstan, despite its name¹⁶, has an ethnically mixed population of roughly 5 million people (see Table 10) for key characteristics of the country and its economy). The country borders with China to the east and the former Soviet republics Kazakhstan to the north, Uzbekistan to the west and Tajikistan to the south-west. The Kyrgyz Republic, as it is officially called, became independent in August 1991 and joined the Commonwealth of Independent States (CIS) in December of the same year, when the Soviet Union was formally dissolved. Since then, the country has been going through a difficult phase of economic, social and political transition.

The walnut-fruits forests of Kyrgyzstan are located on the northern and north-eastern slopes of the mountain ranges enclosing the Fergana Valley¹⁷ in the south of the country, as indicated in Figure 8. Today, Uzbekistan, Tajikistan and Kyrgyzstan share the territory of the Fergana Valley.

¹⁶ Literally, the name Kyrgyzstan translates to “home, country” or “place of the Kyrgyz”. The suffix -stan or -sthan is Persian for “home” or “country of” and Sanskrit for “place” (Online Etymology Dictionary www.etymonline.com/index.php (Accessed 05/03/2006), Wikipedia <http://en.wikipedia.org/wiki/-stan> (Accessed 05/03/2006), Oxford English Dictionary Online <http://dictionary.oed.com> (Accessed 05/03/2006)).

¹⁷ Alternative spelling: Ferghana Valley

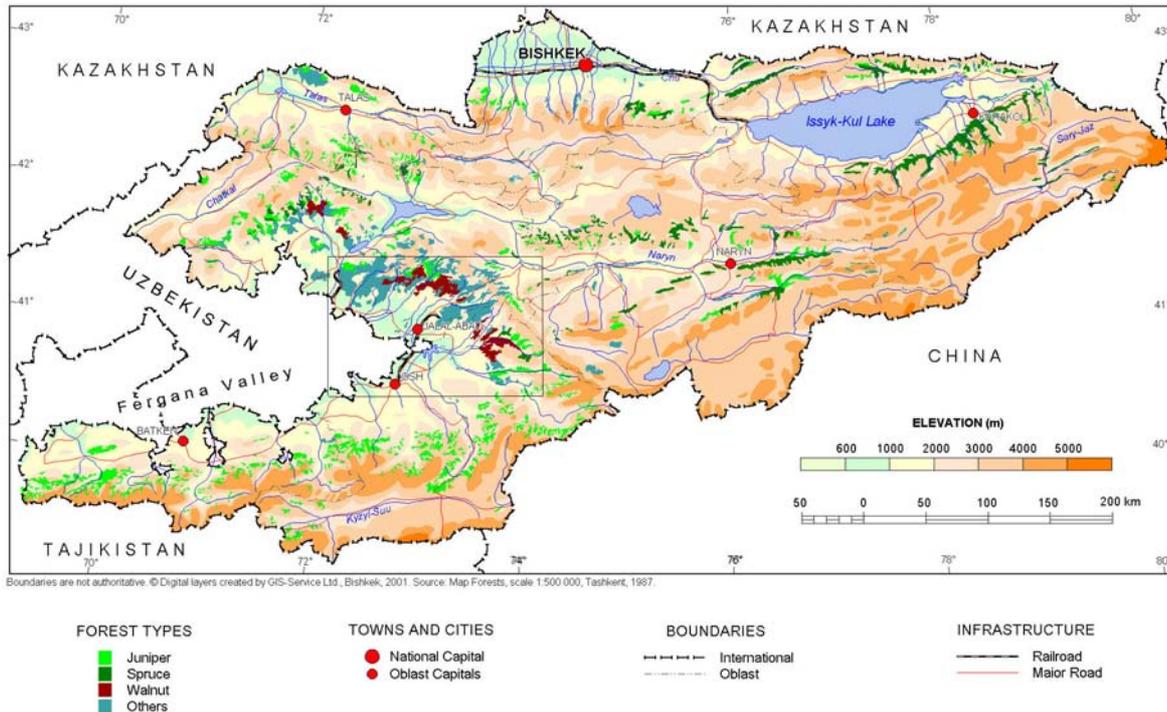


Figure 8: Map of Kyrgyzstan. The study area is marked with a rectangle. A more detailed map of this area is shown in Figure 11 in Section 4.4. Source: GIS - Service Ltd, Bishkek.

Nearly 90% of the total territory of Kyrgyzstan lies at altitudes of 1,500 m a.s.l. and above (Abdymomunov 2001a), and more than 40% of the whole territory lies above 3,000 m a.s.l. (von Maydell 1983). Only about 7% of the total area is suitable for arable agriculture. The country's landlocked status and mountainous nature contribute to difficult and expensive inter- and intra-country communications and make access to world markets a costly and difficult process.

The Kyrgyz national economy is, as indicated by the figures given in Table 10, relatively weak, in particular in comparison to its "heavyweight" neighbours China, Kazakhstan and Uzbekistan, and has only grown little during the first decade of independence. In fact, Kyrgyzstan is considered to be the second poorest ex-Soviet republic after neighbouring Tajikistan. The World Bank categorised the Kyrgyz Republic as a "low-income country" (World Bank 2002a), whereas UNDP classified it in the group of countries with "medium human development" (UNDP 2005, p. 363).

Table 10: Geographical, demographic and economic key characteristics of the Kyrgyz Republic.

Territory ¹	199,900 km ²	
Population ¹	5 million	2004
Population growth ¹	1.07 %	2004
Rural population	65.1%	
Urban population ²	34.9%	2001
Life expectancy at birth ¹	68 y	2004
Infant mortality, per 1000 live births ¹	58.4	2004
Adult literacy rate ¹	98.7%	2004
School enrolment, primary (% gross)* ¹	98.0%	2004
School enrolment, secondary (% gross)* ¹	88.0%	2004
Population per doctor ²	355 persons	2001
Human development index ³	0.702	2003
GDP (current USD) ¹	1.63 billion USD	2002
	1.92 billion USD	2003
	2.21 billion USD	2004
GDP growth (% change to previous period)	1.3%	1982-92 ⁴
	0.7%	1992-2002 ⁴
	7.0%	2003 ¹
	7.1%	2004 ¹
GDP per capita ¹	322 USD	2002
	381 USD	2003
	433 USD	2004

Sources: ¹ World Bank (2005b), ² UNDP (2002), ³ UNDP (2005), ⁴ World Bank (2003b).

* Gross enrolment ratio is the ratio of total enrolment, regardless of age, to the population of the age group that officially corresponds to the level of education shown (e.g. primary, secondary) World Bank (2005b).

The population growth rate is, in comparison to developing countries with similar GDP per capita, relatively moderate. The high adult literacy rate is a typical feature of a former Soviet republic. But worryingly, enrolment in the educational system is now considerably lower than it used to be during the Soviet period. In particular children of poor families are now unable to continue their schooling (Rysakova *et al.* 2002, p. 277). Therefore, Kyrgyzstan currently faces the problem of rising rates of illiteracy. In all, the picture of relatively high living standards during the Soviet era, followed by a sudden and rapid decline in these standards after the breakdown of the Soviet Union, sometimes down to the level of low-income countries in the South, and only partial economic recovery since 1991 emerges. This sudden fall of living standards drastically impacted on people's lives and on their attitudes and motivations.

4.1.2 Population

The population of the country is composed of more than 60 ethnic groups with Kyrgyz, Uzbek and Russians making up more than 90% of the total population (UN 2003a, p. 39). Mainly due to emigration (see Section 4.2.4), the ethnic composition of the country's population has changed considerably over the past decades.

Table 11: Ethnic composition of the population of Soviet Kirghizia and the Kyrgyz Republic respectively in 1989, 1996 and 2003.

Ethnic group and percentage of total population	Year		
	1989 ¹	1996 ²	2003 ³
Kyrgyz	52.0%	60.8%	66.9%
Russian	21.4%	15.3%	10.7%
Uzbek	12.8%	14.3%	14.1%
Ukrainians	2.5%	1.5%	0.8%
Germans	2.4%	0.4%	0.3%
Tatars	1.6%	1.2%	0.8%
Others	7.3%	6.5%	6.4%

Sources: ¹ Heleniak (1997), ² UNDP (2005), ³ UN (2003b, p. 39).

In demographic terms, the population of the Kyrgyz Republic is young. In 1999, children and teenagers (age 0-15) comprised 38.1% of the population (National Statistical Committee 1999). Due to topographic and climatic conditions, the majority of the population is concentrated in areas of lower altitude of the country such as the Fergana Valley in the south of the country.

The Kyrgyz are a Turkic ethnic group originating from the upper regions of the river Jenisseji in Siberia and in the Altai (Choukourov & Choukourov 1994, p. 37). Traditionally, the Kyrgyz lived as nomad herdsmen and horsemen, organised in clans. Today, the affiliation to clans or tribe groups plays still an important role amongst ethnic Kyrgyz. The Kyrgyz speak a Turkic tongue and are Sunni Muslims. The Uzbeks are also a Turkic group and Sunni Muslims traditionally living as sedentary farmers and traders in the lower parts of the Fergana valley. Russians and other Slavic migrants came to Kyrgyzstan from the last nineteenth century onwards and in particular during the period from the late 1920s through the 1950s. During the Second World War, other ethnic groups, especially Tatars and Germans, were forcibly deported to Central Asia and Kyrgyzstan by Stalin's regime.

4.2 The process of transition in Kyrgyzstan

4.2.1 Political transition towards democracy

After independence, the then president of the country, Askar Akaev, initiated determined political reforms. Significant progress was made towards a democratic, less-centralised system during early years of reform, earning the country the title "Island of Democracy in Central Asia". In the mid 1990s, however, the pace of change and the determination for democratisation slowed down, resulting in a political regime which has been described as "authoritarian .. with democratic elements" (Elebaeva & Pukhova 2001). A significant, incremental expansion of the powers of the President at the expense of the legislative (Kubicek 1998; Elebaeva & Pukhova 2001), major interferences by government bodies in recent elections, the imprisonment of members of the opposition for alleged corruption, the closure of opposition newspaper (International Crisis Group 2002) and, generally, greater repressive pressures on the mass media are examples of recent setbacks for the democratisation process.

Growing political discontent following parliamentary elections in February 2005 led to a month of unrest peaking in the ousting of President Askar Akayev in March 2005. The newly-elected leadership under the new President Kurmanbek Bakiyev faces a series of tough challenges in areas such as the reduction of widespread corruption, the implementation of transparent governance and the development of the rule of law

(International Crisis Group 2005b, 2005a). Some observers fear that, unless significant progress is made in these and other key areas, the central government might lose control of institutions and territory and Kyrgyzstan risks becoming a faltering State (International Crisis Group 2005a).

4.2.2 Today's government system

Kyrgyzstan is a presidential republic with a strong executive, comprising the President and the Government, and a national one-chamber parliament. The Constitutional Court, the Supreme Court and other court bodies represent the judiciary. Ministries and a powerful presidential apparatus, which is a typical feature of post-Soviet State organisation, form the administration. The President, who is elected by the citizens for a period of five years, appoints the Prime Minister and the other members of the Government upon the recommendation of the Prime Minister. Members of the parliament are equally elected for five-year terms in popular elections. Aspects of governance, policy and politics during the transition period will be explored in Section 4.2.

Administratively the country is organised through seven provinces (Russian: *Oblasts*) and the capital Bishkek. The provinces are again divided into districts (Russian: *Rayons*) including, besides the district's centre, towns and municipalities (Abdymomunov 2001a). These municipalities, called *Ail-Okmot* in Kyrgyz, typically comprise several settlements.

Provinces, the capital Bishkek, districts and municipalities are governed by the head of the State administration at the appropriate level and have their own self-government assemblies (Kyrgyz "*Kenesh*"). At the local level, there are usually additional, informal as well as legally formalised institutions, such as village heads, elders' councils and courts, and women's and youth councils, concerned with customary and written laws, local social problems and conflicts. Governors of *Oblasts* and heads of district administrations are appointed by the President with agreement of the respective assemblies. Heads of municipalities, villages and members of the assemblies on all levels are elected in direct elections (Matsuzato 2001).

4.2.3 Economic transition at the macro level

The breakdown of the Soviet Union's integrated economy, the resulting loss of its vast market and the sudden stop of direct and indirect subsidies from the central Soviet budget had dramatic consequences for all sectors of the economy in newly independent Kyrgyzstan. The country embarked early on an ambitious economic reform programme, including price liberalisation, privatisation, agricultural and land reforms, and an early introduction of its own currency. As a result, Kyrgyzstan gained considerable support for its determined reform agenda from the international community (Rashid 1994, p. 148 *et seq.*; Pomfret 1995, p. 106 *et seqq.*; Slaughter 2002).

During the first years of independence, from 1991 until 1995, the country experienced drastic reductions in output and income in all sectors of the economy. Hyperinflation and rising unemployment led to a dramatic increase in poverty and inequality (Pomfret 1995, p. 106 *et seqq.*). The industrial sector virtually collapsed and agriculture again became the dominant sector. The country's economy recovered from 1996 until 1999. However, this recovery was mainly based on growth in a few sectors (notably agriculture, gold mining and energy), and high budget and balance of payment deficits made the economy extremely vulnerable (World Bank 2001a, p.11). From late 1998 until 2000 the country went through a financial crisis mainly triggered by the Russian rouble crisis. Economic growth resumed in

2000. Until 2002 there was a slowing down of inflation, a reduction of the budget deficit and exchange rate stabilisation, but the external debt problem continued to aggravate the situation (UN 2003a). It is estimated that, in 2002, GDP reached about 70% of its level in 1990 (UN 2003b, p. 11). So, after a sharp post-Soviet dip, the Kyrgyz economy is now on the path of recovery and growth although it is still fragile and prone to external shocks.

Despite some successes of the economic reforms, the Kyrgyz economy still faces a series of crucial challenges, including diversifying its economy, reducing the heavy burden of external debt, strengthening governance, expanding exports, increasing investments, developing both small and medium sized businesses and expanding its agriculture (UN 2003a; World Bank 2003a), the latter in particular in marginalised rural areas.

4.2.4 Emigration and economic migration

Due to the massive economic problems of the country, many Russians, other Slavs and other ethnic groups such as Germans decided to leave the country altogether. Their “repatriation”, which had already begun in the late 1980s (Heleniak 1997), increased dramatically in the early 1990s at the height of the economic crisis (UN 2003a, p. 40). These massive emigration waves coincided with substantial losses of jobs in sectors of the economy in which people of these ethnic groups were mainly employed, such as manufacturing, mining and construction (Abazov 1999). All this led to an important “brain drain” taking place.

Temporary labour migration to other countries, especially to Russia, has considerably increased since independence. Such migrants are typically young people leaving to make a living abroad and to support their families back home with transfer payments. Migration within Kyrgyzstan has been primarily economically motivated. It has been characterised by a few cities attracting people from all over the country and a constant flow of migrants to the capital Bishkek and the Chui *Oblast* which surrounds the capital. This has aggravated social problems in cities (UN 2003a, p. 9, 25 and 65).

4.2.5 Consequences of the transition process for people’s lives

The collapse of the Soviet Union and the following policy of economic reform have had serious impacts on people’s livelihoods in Kyrgyzstan (Kyrgyz Republic & UNDP 1995; World Bank 1999a). The consequences of the economic reforms for the livelihood of people living in rural areas have been described in several case studies (Dobson 1995; Howell 1996b, 1996a; Marti 1996; Yoshida 1999). In the WFF-belt as well as in other rural areas of the country, the economic crisis led to a relapse into subsistence agriculture and an increase dependency on natural resources for the majority of the population, often with detrimental effect on forests.

The period of transition in Kyrgyzstan has been characterised by increasing unemployment (UN 2003a, p. 12) and poverty¹⁸ (Rysakova *et al.* 2002). A participatory poverty assessment in the country has revealed that people from all regions of Kyrgyzstan believed “that the incidence and depth of poverty has increased substantially” since the country’s independence and that “inequality has increased; the gap between the rich and the poor is widening at a rapid rate” (World Bank 1999a, p. 2). “Informants stated that during the Soviet period there was no such category as ‘the very rich’. The proportion of ‘rich’ was much

¹⁸ In Kyrgyzstan the poor groups of the population are identified based on the definition of an absolute poverty line, which includes the cost of a basic foodstuff basket, cost of non-foods and essential services (UN 2003a, p. 11).

smaller than now, the ‘middle class’ was much larger, and the ‘poor’ accounted for a very small percentage of population” (World Bank 1999a, p. 2). A majority of the participants in this poverty assessment shared the viewpoint that the Soviet times were synonymous with a sense of material security and well-being, while post-Soviet times stand for insecurity and ill-being (World Bank 1999a, p. 2).

In 2000, 52.0% and in 2002, 44.4% of the national population was categorised as “poor”. About 70 percent of the people living below the poverty line are to be found in rural areas (UN 2003a, p. 11). A recent household study (Pomfret & Anderson 2002; Anderson & Pomfret 2004, p. 14) found the lowest living standards in the country to be in rural mountain regions and the rural Southern *Oblasts*. In fact, poverty is greater than the national average in the two *Oblasts*, Jalal-Abad and Osh, where WFFs occur, with 54.9% of the population of Jalal-Abad *Oblast* and 52.4% of the population of Osh *Oblast* considered as “poor” in 2002. Monthly per capita income in these two *Oblasts* (2002: 542 Som¹⁹ for Jalal-Abad, 600 Som for Osh) is also lower than national average (2002: 706 Som) (UN 2003a, p. 46).

Widespread corruption and related problems such as bribery and nepotism are additional phenomena of the transition period that pose serious threats to the further development of the country (International Crisis Group 2001; Slaughter 2002). Several cross-country corruption studies indicate a very high level of corruption in Kyrgyzstan (Cokgezen 2004). Transparency International ranked Kyrgyzstan 130 out of 158 countries (score 2.3 out of 10) in its 2005 Corruption Perceptions Index (CPI). Cokgezen (2004) sees low income levels, massive State intervention, weak democratic institutions, a poorly operating legal system and cultural factors as prime causes for corruption in Kyrgyzstan. In a recent survey of 1,000 households in Kyrgyzstan, over half of the respondents reported that “bribery is altogether a definite part of contemporary life – whoever wants to make a living must give,” be it for medical treatment, in the courts or for higher education. Results indicated that 42% of the households said that they had made an unofficial payment in the 12 months before the survey (World Bank 2002b, p. 15). Experience with corruption and its consequences in everyday life ultimately erode trust of people in institutions of the State and thus hampers development considerably.

4.3 The walnut-fruit forests of Southern Kyrgyzstan

4.3.1 Definition, distribution and key characteristics of the walnut-fruit forests

Under the term “walnut-fruit forests” (WFFs) a range of forest ecosystems marked by the occurrence, often even dominance of a variety of fruit-bearing woody species is subsumed; these fruit-bearing woody species include walnut (*Juglans regia* L.), apple (*Malus* spp.), hawthorn (*Crataegus* spp.), Sogdiana or cherry plum (*Prunus sogdiana* Vassilcz.), and rose species (*Rosa* spp.). Sometimes, forest stands with pistachio (*Pistacia vera* L.) and almond (*Prunus amygdalus* Stokes) are also included in this term. However, for the purpose of this study the term “walnut-fruit forests” is used in a more narrow sense referring to forest stands in which walnut trees are at least present, if not dominant. The presence of walnut was a dominant feature of all forest plots included in the research.

The Kyrgyz WFFs occur in the Jalal-Abad and Osh *Oblasts* of Southern Kyrgyzstan. Estimates for the current area occupied by walnut-stands are in the order of 25,000-

¹⁹ Exchange rate 2001: 1 USD ≈ 47 Som; 2004: 1 USD ≈ 42 Som

30,000 ha (Gan 1982; von Maydell 1983; Müller & Venglovsky 1998; Musuraliev 1998, p. 5; Müller & Sorg 2001). Gan (1970) estimated that the surface of the walnut-stands had been reduced by nearly 50% between about 1920 and 1970.



Figure 9: The upper belt of the WFFs in autumn (Ortok).

A virtual walk up through the different forest types in the Northern Fergana Valley starts with mostly pure pistachio stands growing on the foothills and in dry hilly areas at altitudes between 600 and 1,200 m a.s.l. (Chernova 1998). At about the same altitudes open mixed shrub stands, occasionally with almond, are also found in these hills. As one goes higher, hawthorn species become predominant at altitudes between 900 and 1,000 m a.s.l.. In this altitudinal belt, the first naturally regenerated walnut trees appear on richer stations with deeper soils. At an altitude of about 1,200 m a.s.l., walnut becomes increasingly dominant in forest stands on more favourable, richer stations with relatively good water supply, which can typically be found in relief depressions and on valley slopes exposed to the west, north and east. On favourable sites, walnut trees can reach heights of 25 to 30 m (Gan 1970) and form a close canopy, while accompanying species such as apple, maple (*Acer* spp.) and plum trees make up a lower, second layer. Most of the natural walnut stands are located in the altitudinal belt between 1,400 and 1,750 m a.s.l., which is considered as the most productive area the growth of this species. Here, walnut also occupies southern slopes, where it forms open stands in association with maple and apple (Kolov 1998). The percentage of maple and apple increases as one approaches dryer and poorer stations. Walnut forms stands up to an altitude of about 2,100 m a.s.l. (Kolov 1998) and occurs as an associated tree in stands mainly made up by shrub species or maple up to about 2,400 m a.s.l. (Venglovsky 1998). Maple stands form the highest band of deciduous forests in the region. As one climbs even higher, leaving the deciduous WFF-belt, one enters open grasslands, mostly used as pastures, or open forest stands, formed by tree and crawling forms of juniper. Soviet scientists distinguished between three main soil types in the WFF-belt: black-brown mountain forest soils, brown mountain forest soils and dark-grey (grey-brown) mountain soils (Samusenko 1992, p. 151; Samusenko *et al.* 1997).

The origin of the WFFs is still unsure and currently under investigation. In 2003 a palynological research project was started to shed light on the vegetation history of Kyrgyzstan. Preliminary results for the valley of Arstanbap-Ata, one of the four research sites for the present study, points to a sequence of different dominant types of vegetation, shown in Table 12, of which forests dominated by walnut is only the most recent (Beer & Tinner 2004).

Table 12: Chronological sequence of dominant vegetation types in the valley of Arstanbap-Ata according to the palynological analysis of sediments cored from two lakes in Arstanbap-Ata (Beer & Tinner 2004). The palynological study is conducted by researchers of the Institute of Plant Sciences of the University of Berne, Switzerland.

Indicative period of time	Vegetation type
~ 250 – 600 AD	Steppe vegetation Steppe vegetation with a co-dominance of <i>Artemisia</i> , Chenopodiaceae and Poaceae. <i>Juniperus</i> is considered to be the most important arboreal taxon.
~ 600 – 800 AD	Open scrubland and steppe vegetation Scrubland and steppe vegetation dominated by <i>Juniperus</i> , <i>Artemisia</i> , <i>Chenopodiaceae</i> , and <i>Poaceae</i> . <i>Ephedra</i> , <i>Asteraceae</i> and <i>Eremurus</i> are still constantly well represented in the vegetation.
~ 800 – 1050 AD	Open scrubland and steppe vegetation under strong human impact
~ 1050 AD – present	<i>Juglans</i> dominated woodlands <i>Juglans regia</i> expands between 1050 and 1500 AD, the scrubland and steppe vegetation is still present, but less dominant.

Walnut seems to have been present in the valley of Arstanbap-Ata at the beginning of the above sequence. However, its pollen found in the sediment cores drilled in two lakes in Arstanbap-Ata shows a sharp rise starting in the 11th century. Interestingly, this date roughly coincides with the lifetime of Arstanbap-Ata, the legendary founder of the Uzbek village of Arstanbap-Ata. According to the legend he lived around the turn of the 11th to the 12th century and died in 1120 AD. The legend says that today's walnut-fruits forests in the valley have been planted under his leadership (CBT Arstanbap-Ata 2003). The scientific results of the palynological study and this legend are providing interesting insights and pose questions as to the origin and the naturalness of forests dominated by walnut. In fact, the palynological results suggest that forests dominated by walnut are surprisingly young and most likely of anthropogenic origin (Kaiser 2006; Beer *et al.* n.d.). This is an interesting example of agreement of “hard” scientific data or knowledge, in the form of the palynological findings, and of local traditional knowledge.

It is certain that, over the last centuries, human beings have influenced and modified, at least a considerable part if not virtually all of the walnut-fruits forests by planting selected species and varieties, grafting productive stocks to less productive species and by using some of the forested area as grazing grounds and for tillage. Therefore, today's WFFs form a rich cultural landscape, a mosaic of natural and planted forest stands, fields, pastures and drier open areas. This forested landscape is predominantly used in ways that reflect, in the widest use of the terms, agroforestry and silvopastoral practices.

4.3.2 Climate in the walnut-fruit forest belt

In the walnut-fruit forest zone, summer temperatures are moderate and winters relatively mild. Abundant precipitations in early spring and short bursts of rain in the beginning of summer are also characteristic for the local climate, as shown in Figure 10. There is generally little rain in late summer and early autumn (July to September) and a second rise of precipitation from October until December, which does however not reach the spring

level (Ponomarenko & Kenjekaraev 1992). High mountain ranges, closing the Fergana Valley to the north, protect the area from the intrusion of cold northern air streams (Kolov 1998). At the same time, the valley is open to the west, from where humid air enters and then leads to relief rainfall on the slopes of the Fergana Valley.

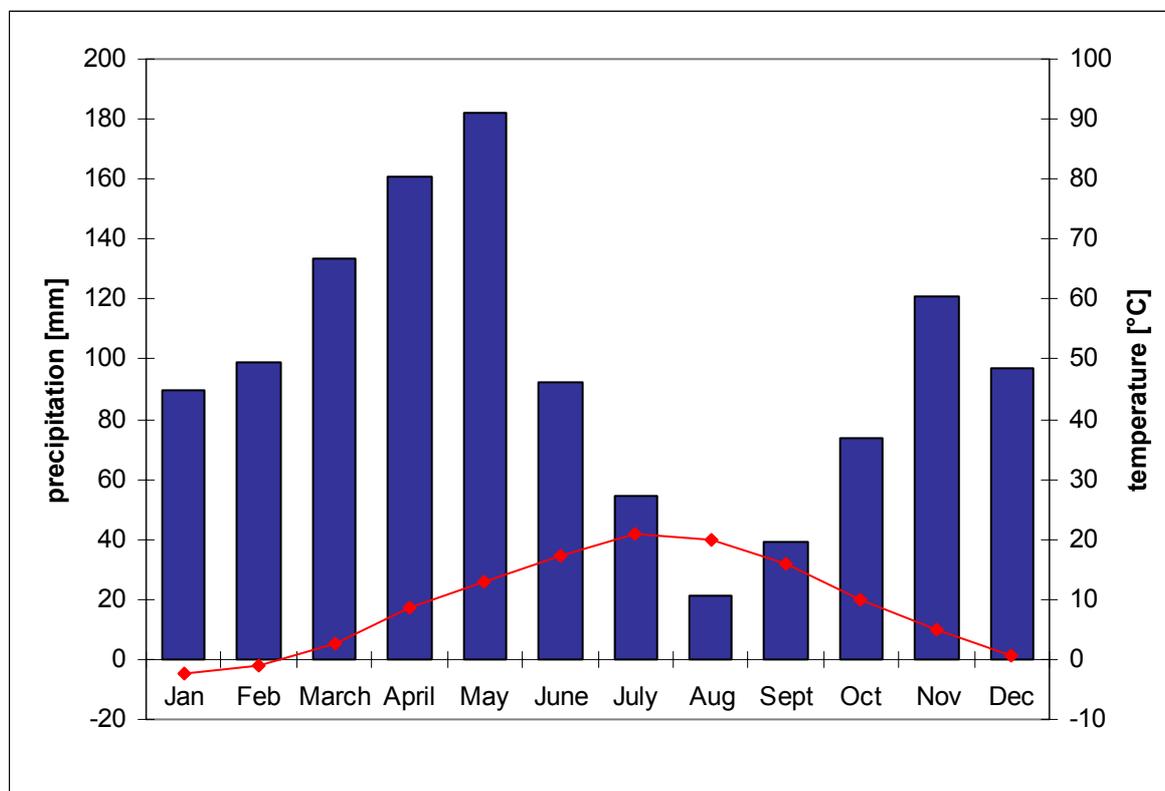


Figure 10: Climate chart for the meteorological station Ak-Terek, Gava *leshoz*, 1,748 m a.s.l., compiled on the basis of meteorological observations for the years 1993 to 1999; total of annual precipitation: 1,164 mm; annual mean temperature 9.2° C; The bars represent precipitations (left Y-axis), the dots indicate the mean temperature for every month (right Y-axis); Source: Forest Inventory Unit (2002, p. 12).

Total annual precipitation increases with increasing altitude while mean annual temperatures and the length of the period with nearly no rain over summer decrease, as Table 13 shows.

Table 13: Annual precipitation, average duration of the dry period over summer and mean annual air temperature in the WFF-belt in function of the altitude.

Altitude [m a.s.l.]	Annual precipitation ¹	Duration of the dry period over summer with nearly no rain ²	Mean annual air temperature ³
1,500 m	1,000 mm	about 35 days	10° C
1,000 m	700 mm	about 80 days	11.6° C
700 m	600 mm	---	---

Sources: ¹ Means for the years 1981 to 1988 (Ponomarenko & Kenjekaraev 1992, p. 83), ² Ponomarenko (1992, p. 85), ³ Ponomarenko (1992, p. 67).

Late frosts may occur in April, sometimes even in early May. Late frosts can damage walnut blossom and can thus lead to the loss of the entire walnut harvest of a year. In autumn, the first frost is usually in October (Ponomarenko & Kenjekaraev 1992, p. 71).

4.3.3 Importance of the walnut-fruit forests

The WFFs form an important natural asset for the maintenance and the development of mountain communities during the ongoing difficult process of transition. It is estimated that

about 50,000 people live in villages within the WFF-belt and about 85,000 people live in settlements at the periphery of the forests (estimation made on the basis of national census results for 1999 Abdymomunov 2001a, 2001b). These people depend, to varying extents, on forest and agricultural products from the forested-areas, and benefit from environmental services rendered by the WFFs, such as protection against soil erosion and mudslides (Matveev 1998).

Regionally, the forests supply markets and processing enterprises in the Fergana Valley with important goods and raw material, in particular non-timber forest products (NTFPs). Timber, in particular highly valuable walnut timber, is less important in terms of volume and added value at the time of writing. This is mainly due to restrictive policies concerning timber harvesting. At the time of the Soviet Union, nuts and fruit were systematically gathered and industrially processed.

On the international level, the WFFs of Southern Kyrgyzstan are considered to be of global significance for biodiversity conservation. They are characterised by a remarkably high biodiversity on all levels (ecosystems, between and within species, genetic diversity) (Krassilov 1995; Turok 1997; Blaser *et al.* 1998; Hemery & Popov 1998). In these forests, there are more than 5,000 plant species, including around 180 woody species, of which more than 50 species of the botanical family Rosaceae have been identified (Kolov 1998). The walnut-fruits forest also show an impressive variety of fruit polymorphism (Venglovsky 1998). The genetic diversity preserved in today's walnut-fruit forest is believed to be of immense international significance for horticulture. About 150 birds and 40 mammal species have been found in these forests (Kolov 1998).

4.3.4 Current condition of the walnut-fruit forests

Today, many walnut and mixed stands in the walnut-fruit forest zone are in a silviculturally-deplorable state. The density of walnut and apple stands are very low and have decreased considerably since the 1960s (Venglovsky 1998). Over-mature and mature forest stands are over-represented while there is a lack of natural regeneration and young forest stands (Kolov 1998; Venglovsky 1998). Thus, a considerable part of the natural stands are too old and are beginning to show the first signs of decay (e.g. rotten wood is widespread). The production potential of such stands in terms of nuts, fruits or timber is low, and many are no longer economically viable. The state of plantations, most of which were established for nut production, also leaves room for improvements. They are often too dense, and the tree crowns too weakly developed for optimal nut yield (Sorg 1999; Sorg *et al.* 2000).

The reasons for the current state of the WFFs are manifold. Widely practised human activities such as cattle grazing, haymaking, selective felling of the best timber, and firewood gathering are believed to be the main reasons which account for the above-mentioned situation (Kolov 1998; Sherbinina 1998; Venglovsky 1998). The forests suffered much from cattle grazing damaging the natural regeneration of woody species, as economic policies in Soviet Kirghizia gave priority to livestock husbandry over forestry. Livestock rearing is still one of the most important economic activities in Kyrgyzstan today (Wilson 1997). Grazing is actually forbidden in the WFFs, but is widely practised in virtually all accessible areas and is largely unregulated. Such grazing practices damage and seriously hamper the regeneration of the forest. Therefore, the long-term sustainability of these forests, for which continuous regeneration is a prerequisite, is not guaranteed at the moment. Other relevant factors include the extremely restrictive nature of the policy for issuing

felling permits, also for regenerative fellings²⁰, throughout the whole walnut-fruit forest region, and a certain level of negligence concerning silvicultural interventions, such as thinning, in newly established plantations. This negligence might partly be explained by the past Soviet “protectionist” approach to forest management and a very distinctive focus on plantations which were seen as the most promising means to increase the forested area after the Second World War and which absorbed a substantial part of the resources available for forest management.

4.4 Characteristics of the research sites and the selected households

This Section²¹ introduces the four research sites selected for this study, Arstanbap-Ata, Achy, Ortok and Uzgen, in greater detail.

4.4.1 Geographical features of the research sites

The four sites all lie in the WFF-belt in Southern Kyrgyzstan as shown in Figure 11. Three of them, Arstanbap-Ata, Achy and Ortok, are situated in Jalal-Abad *Oblast*, whereas Uzgen is part of Osh *Oblast*. The town of Bazar-Korgon is the closest regional centre and market place to Arstanbap-Ata and Achy. The nearest regional centre and market to Ortok (Suzak *Rayon*) is the city of Jalal-Abad. In the case of the research site Uzgen the city of Uzgen is the closest regional centre, and market place.

²⁰ “Regeneration cuttings” aim at creating favourable conditions for natural regeneration of woody species.

²¹ Some of the information gained from fieldwork for this Section has been published in Colfer & Schmidt (2005).

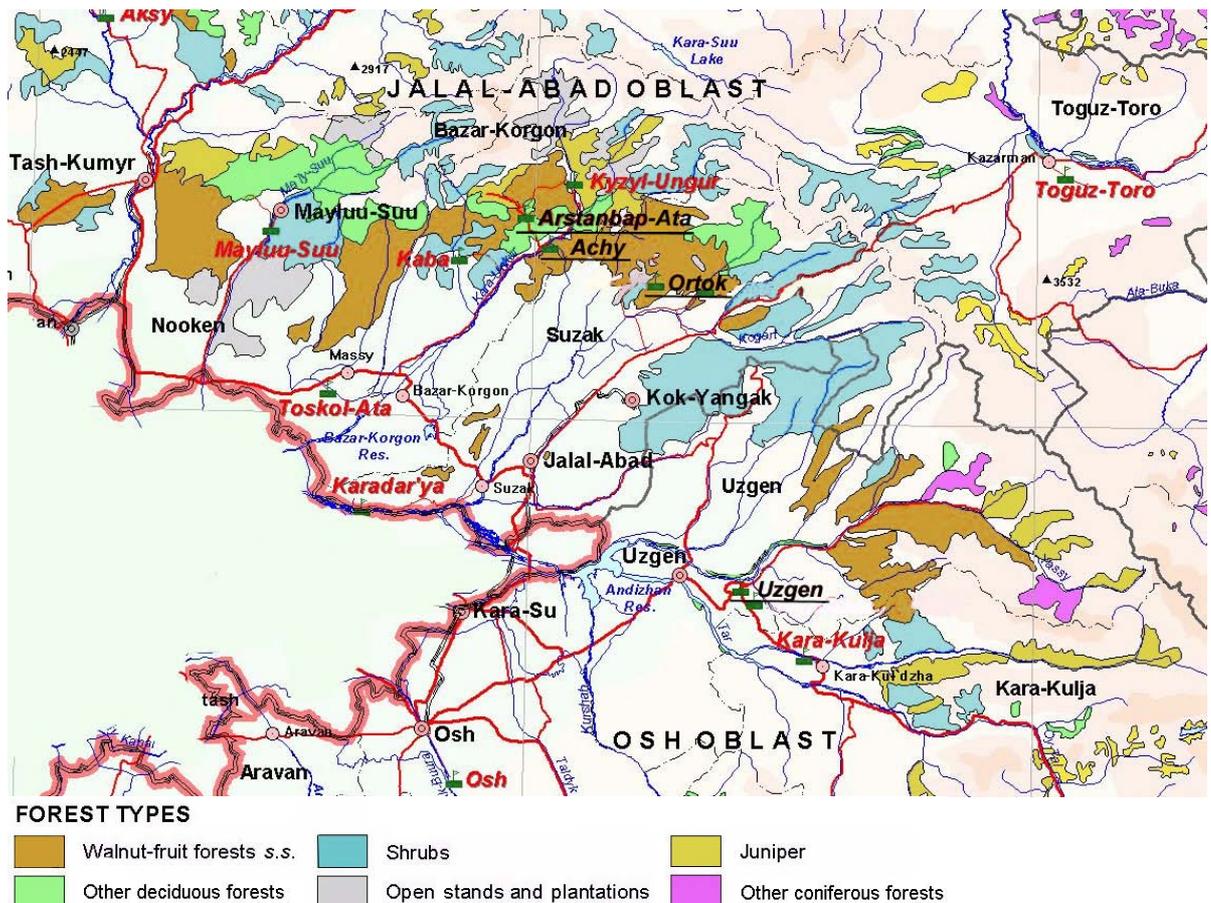


Figure 11: Map showing the four research sites of this study (underlined): Arstanbap-Ata, Achy, Ortok and Uzgen. Source: cutting of the map “Forests of the Kyrgyz Republic” (scale 1:1,000,000) produced by GIS - Service Ltd, Bishkek.

Every research site comprises several settlements and forest ranges as shown in Table 14. The *leshozes* and their subordinated forest ranges are part of the State Forest Service (SFS). The settlements, on the other hand, are under the authority of the civil administration. The existence of these two parallel structures is an important feature of the present Kyrgyz State organisation. Forest ranges and villages from which households were selected for this study are printed in **bold** in Table 14. The villages included in this study lie between 1,100 m a.s.l. (Achy) and approximately 1,500 m a.s.l. (Arstanbap-Ata, Ortok). The settlements on the site “Uzgen” are situated at altitudes of between 1,200 and 1,400 m a.s.l..

Table 14: Forest ranges and villages on the four selected research sites. Printed in **bold**: forest ranges and villages from which households were selected for this study. Sources of geographical names: Abdymomunov (2001a; 2001b).

Research site	SFS organisation		Civil administration	
	<i>Leshoz</i>	<i>Forest Range</i>	Village	Village is part of ... <i>Ail-Okmot</i>
Arstanbap-Ata	<i>Arstanbap-Ata</i>	<i>Kosh-Terek</i> <i>Gumchana</i> <i>Dashman</i>	Arstanbap-Ata Gumchana Bel-Terek Dzharadar	Arstanbap-Ata
Achy	<i>Achy</i>	<i>Charbak</i> <i>Sary-Bulak</i> <i>Koktondu/Köktöndü</i>	Oogon-Talaa Charbak Kyzyl-Suu Sary-Bulak Pravda Kara-Oi	Mogol
Ortok	<i>Ortok</i>	<i>Ortok</i> <i>Kuchugen/Küchügön</i> <i>Kadu</i> <i>Kyzyl-Kija</i>	Ortok Ak-Bulak Kadu Zhylan-Temir Kyzyl-Kija	Kara-Alma Kyz-Kol
Uzgen	<i>Uzgen</i>	<i>Jazy</i> <i>Ak-Terek</i> <i>Ara-Köl</i> <i>Kyzyl-Too</i> <i>Myrza-Ake</i> <i>Kolduk/Köldük</i>	Salam-Alik Kyzyl-Charba Ak-Terek Kosh-Eter 15 Zhash Kyzyl-Bayrak Ara-Köl Kyzyl-Too Donguz-Too Ak-Kija Karchabek Erkin-Too Myrza-Ake Shaman-Terek Zhalk-Oidö	Salam-Alik Kyzyl-Too Myrza-Ake Köldük

The location of the villages, the distance to the nearest market place and the general transport infrastructure are important geographical features influencing market access for local people. These features and additional geographical information are given in Table 15.

Table 15: Distances and features of the local transport system on the research sites.

	Arstanbap-Ata	Achy	Ortok	Uzgen
Capital of the <i>Oblast</i>	Jalal-Abad	Jalal-Abad	Jalal-Abad	Osh
Distance to capital of the <i>Oblast</i> ¹	~80 km	~60-70 km	~55 km	~80-100 km
Nearest market place ¹	Bazar-Korgon	Bazar-Korgon	Jalal-Abad	Uzgen
Distance to the nearest market place ¹	~50 km	~30-40 km	~55 km	~25-45 km
Transport to the nearest market place ²	- ~ 12 daily buses; - Collective taxis; - Tarred road in a deplorable state.	- At least 15 buses a day from most of the villages; - Collective taxis; - Tarred road in a deplorable state.	- Usually 1 bus a day; - Infrequent private cars taking other people along; - Road partly gravelled, partly tarred, after snow or floods sometimes temporarily closed.	- At least 1 bus per day from every village except Donguz-Too; - Some collective taxis; - Relatively good, tarred road.
Average travel time to the nearest market place by bus ²	2 to 4 hours	1 to 3 hours	2 to 5 hours	30 min to 2 hours

Sources: ¹ Topographical maps (scale 1:200,000) published by the Kyrgyz Cartographic Agency, ² Interviews and observations conducted on the research sites.

4.4.2 Population on the research sites

The factor “population” is important as the number of people living on a site is a key determinant of the human pressure on forest resources. This and additional aspects of population, such as its ethnic composition, might also influence the conflict potential on a site. Table 16 includes a few key characteristics of the populations on the four research sites.

Table 16: Key characteristics of the population of the research sites.

		Arstanbap-Ata	Achy	Ortok*	Uzgen*
1	Population of villages associated with the <i>leshoz</i> , lying within or at the edge of the forest (1999)	11,724 persons ¹	12,189 persons ¹	2,445 persons ¹	16,489 persons ^{2**}
2	Population of villages adjacent to the <i>leshoz</i> territory without forests of their own (1999)	-	-	5,851 persons ¹	19,665 persons ^{2**}
3 = 1+2	Population of villages associated with the <i>leshoz</i> , lying within or at the edge of the forest + population of adjacent villages without forests (1999)	11,724 persons	12,576 persons	8,296 persons	36,154 persons
4	Population growth rates (1989-1999)	3.3% per year in the village Arstanbap-Ata ³	3.3% per year in the village Charbak ³	2.5% per year in the Suzak Rayon at large ³	2.6% per year in the Uzgen Rayon at large ⁴
5	Ethnic composition of population	79% Uzbek 20% Kyrgyz <1% others ¹	55% Kyrgyz 44% Uzbek, <1% others ¹	99% Kyrgyz <1% others ¹	99% Kyrgyz <1% others ²

Sources: ¹ Abdymomunov (2001a, p. 213, 214 + 216), ² Abdymomunov (2001b, p. 182-184), ³ calculated on the basis of Abdymomunov (2001a, p. 26), ⁴ calculated on the basis of Abdymomunov (2001b, p. 26).

* In Colfer and Schmidt (2005) slightly different estimates based on a different grouping of the villages in and around the research sites Ortok and Uzgen were published.

** The population of the village of Myrza-Ake (13,896 people) and of the villages of the Ak-Dzhar *Ail-Okmot* (5,769 people) are not included in the figure of row 2, because these villages lie further away from the WFFs, although they are generally associated with the *leshoz*.

In terms of size of the population, Ortok is clearly the site with the smallest population. Population growth in the overall *Rayons* to which Ortok and Uzgen belong are very similar and considerably lower than in the biggest villages of the sites Arstanbap-Ata and Achy.

Uzgen and Ortok, on the one hand, and Arstanbap-Ata and Achy, on the other hand, are quite similar in terms of ethnic composition. In Uzgen and Ortok, the population is virtually all Kyrgyz. Arstanbap-Ata and Achy, on the other hand, are ethnically more mixed. In Arstanbap-Ata there is an Uzbek majority. The majority in Achy is Kyrgyz. Within these two ethnically mixed sites, Uzbek and Kyrgyz people live however mostly separated from one another in different villages. Arstanbap-Ata village is nearly 100% Uzbek. The other three settlements of the site (see Table 14), which are considerably smaller, have distinct Kyrgyz majorities. In Achy, only the village of Oogon-Talaa is ethnically mixed. All other villages are either predominantly Kyrgyz or Uzbek. On all sites, there are less than 1% of the population from other ethnicities, such as Tatars, Russians, or Chechens.

4.4.3 Forest resources and human pressure on forests on the research sites

A few key characteristics of the forest resources available on the research sites are summarised in Table 17. There are important differences between the sites regarding the available forest resources, both in terms of quantity (forested area) and quality (forest composition).

Table 17: Key characteristics of forest resources on the research sites and indicators for human pressure on forest resources.

	Arstanbap-Ata <i>Leshoz</i>	Achy <i>Leshoz</i>	Ortok <i>Leshoz</i>	Uzgen <i>Leshoz</i>
1 Forested area of the respective <i>leshoz</i> ¹	7,489 ha	6,996 ha	10,282 ha	21,777 ha
2 Forest composition ¹ (% of the forested area)				
Walnut (<i>Juglans regia</i>)	40% walnut	11% walnut	47% walnut	25% walnut
Apple (<i>Malus</i> spp.)	16% apple	21% apple	23% apple	8% apple
Juniper (<i>Juniperus</i> spp.)	16% juniper			
Maple (<i>Acer</i> spp.)	7% maple	9% maple	24% maple	
Spiraea (<i>Spiraea</i> spp.)	5% spiraea			
Hawthorn (<i>Crataegus</i> spp.)	5% hawthorn	25% hawthorn		
Dog rose (<i>Rosa</i> spp.)	3% dog rose	19% dog rose		
Pistachio (<i>Pistacia vera</i>)		9% pistachio		
Pearlbush (<i>Exochorda tianchanica</i> Gontsch.)				14% pearlbush
Willow (<i>Salix</i> spp.)				6% willow
Elm (<i>Ulmus</i> spp.)				5% elm
3 Forested area / population of villages associated with the <i>leshoz</i> , lying within or at the edge of the forest (1999) (Row 1 this table / Row 1 of Table 16)	0.6 ha / person	0.6 ha / person	4.2 ha / person	1.3 ha / person
4 Forested area / population of villages associated with the <i>leshoz</i> , lying within or at the edge of the forest + population of adjacent villages without forests (1999) (Row 1 this table / Row 3 of Table 16)	0.6 ha / person	0.6 ha / person	1.2 ha / person	0.6 ha / person
5 Categorisation of human pressure on forests for the statistical analysis	high human pressure	high human pressure	low human pressure	medium human pressure

Source: ¹ Goslesagentsvo & LES-IC (1997)

Henceforth, the hectare of forested area per resident population ratio (Row 3 of Table 17) will primarily be used as the basic, quantitative indicator of human pressure on forest resources for this study. One should, however, keep in mind that particularly in Ortok and Uzgen also people from villages beyond the borders of the research site use forest products from the site. The description of the forests on the sites and the local levels of pressure in the following paragraphs provide complementary information to the bare figure of these indicators.

Arstanbap-Ata

The *leshoz* of Arstanbap-Ata comprises 7,489 ha of mainly broadleaved forests. The main settlement, the village of Arstanbap-Ata, lies at the foot of the Boo-Bash-Ata mountain range peaking at 4,427 m a.s.l.. Clusters of houses, homegardens, fields and strips of forests

dominate the landscape in the lower parts of the valley. Pastures and some open forest stands are the most important landscape elements on the slopes of the Boo-Bash-Ata range closing the valley to the north. More dense forest stands, often dominated by walnut and sometimes interrupted by arable fields, mark the landscape in the middle hills north-east and south-west of the main valley. According to a local senior forester, Arstanbap-Ata *Leshoz* granted villagers the right to cultivate agricultural crops on forested areas at the peak of the economic crisis in the mid 1990s on a leasehold basis, with permission from Central Government. Since then, many of these plots have been fenced off and transformed into small semi-permanent or permanent agricultural plots amidst the forest. Walnut trees dominate about 3,000 ha of the forests in Arstanbap-Ata. Apple and juniper also occupy substantial areas. The forests of Arstanbap-Ata *leshoz* are under relatively heavy human pressure (0.6 ha forests per resident person in 1999), and there are signs of overuse, especially in the immediate vicinity of the villages. This is mainly due to increasing firewood use since the breakdown of the Soviet Union and to unregulated grazing. Illegal felling for commercial purposes (walnut timber and burls for export) has been reported from the area, especially in the late 1990s.

Achy

The research site Achy lies down-river from Arstanbap-Ata, which it borders, in the valley of the *Kara-Unkur* River and its hilly flanks. The general landscape is considerably less forested than in Arstanbap-Ata and is mainly marked by settlements, pastures, haymaking plots, arable fields and mostly open forest stands. In the main valley and its side valleys, large-scale landslides and mudslides occur and their effects can be plainly seen. In total, 6,996 ha of the *leshoz* territory are forested, which corresponded to 0.6 ha of forest per resident person in 1999. The most widespread type of forest is open hawthorn woodlands (~1,750 ha), followed by stands dominated by apple and dog rose. Walnut stands, which grow on an area of only about 760 ha, are mainly located in higher areas in the hills and in the side valleys. Other important species include pistachio, maple, almond and cherry plum. Achy has the greatest pressure on the forest resources amongst the four research sites, especially for firewood and to some extent also for precious walnut burls and timber, as the forest is relatively accessible.



Figure 12: The village of Sary-Bulak on the research site of Achy. The WWF stands lie in the hills in the background.

Ortok

The landscape of the research site Ortok is very hilly and mainly dominated by forests, interspersed with relatively small clearings used for tillage, and some other open areas used for haymaking and as pastures. The village of Ortok, from where all the households on this site were selected for this study, lies in a small, forested valley. The southerly exposed slopes of the valleys of this site bear mainly open forest stands and open pasture areas. Close forest stands, in parts plantations, are mainly to be found on northern slopes and in the bottom of the valleys. Settlements along the road, patches of forests, open areas and arable fields dominate the landscape in the less forested Western part of the *leshoz*. Ortok *leshoz* comprises 10,282 ha of forests, and is the richest, in terms of forest, of the research sites with 4.2 ha per person resident in the area in 1999 and a high percentage of walnut stands. It should be remembered, that this relatively high hectare per head ratio was a calculation based only on the population living in villages within *leshoz* boundaries. But even when the population of villages beyond the *leshoz*'s border which have no forests of their own are taken into account, Ortok remains the site with lowest human pressure on forests (see Row 4 in Table 17). Ortok is the least accessible of all the research sites, which makes it more difficult for people from outside to use forest products. This contributes to a relatively low human pressure on forest resources on this particular site.

Uzgen

The landscape on the research site Uzgen is dominated by a change from flat lowland to mountains, large valleys and rivers, alongside which most of the villages are situated. Open scrublands grow on south-facing slopes of the valleys, while walnut stands are mainly to be found on the north-facing slopes and in the side valleys. Riverside forests grow on the riverbanks. Settlements and arable fields mainly occupy the bottom of the valleys. Pastures and haymaking areas lie in the hills, often considerably higher than the settlements. About 25% of the forest are walnut stands, partly mixed with other species (see Table 17). There

were, on average, 1.3 ha of forest per resident person in 1999. This means that, as far as human pressure on forests is concerned, Uzgen occupies an intermediate position between Ortok, with more forests per inhabitant on the one hand, and Arstanbap-Ata and Achy, where forest resources are particularly limited, on the other hand. Numerically, 1.3 ha/person is closer to the value of 0.6 ha/person in Arstanbap-Ata and Achy than to 4.2 ha/person of Ortok. The categorisation of Uzgen as an intermediate case seems nevertheless justified, because there are additional factors reducing human pressure on forests in Uzgen. Firstly, Uzgen has more income-generating options (Marti 2000) than the other sites. One reason for this is that the villages in this region are easily accessible and situated close to the administrative and market centre of Uzgen. Secondly, in comparison to the situation in the villages on the other sites, relatively large areas of land for tillage are available to farmers in Uzgen. This applies particularly to the villages in the lower parts of the site which lie on the edge of the flat lowlands that are intensively used for tillage. The availability of suitable land for tillage decreases as one follows the rivers upstream and enters the increasingly narrow valleys. Thus, people living in the villages in the higher parts of these valleys usually tend to put more emphasis on livestock rearing than on tillage.

4.4.4 Social capital on the research sites

The situation regarding social capital on the four research sites appears rather contradictory at first sight. Some of the four basic features of social capital (trust; reciprocity and exchanges; common rules, norms and sanctions; and connectedness, networks and groups, c.f. Section 2.4.3), are well developed, others point to rather low levels of social capital. Trust among family, neighbours and friends is generally high on all sites. The level of mutual trust amongst households that are not connected through kinship, friendship or a common interest is, however, rather limited. Generally, people are sceptical towards joint work in larger groups and community-based approaches to natural resource management (see Section 4.4.4.2 below). Also, trust between local households and the State is generally low, as indicated by the existing conflicts described in Section 4.4.4.1. It appears that the Soviet experience and abuse of power by authorities since Kyrgyzstan's independence have lastingly undermined trust between the State and people.

Rules and norms, especially those set by the State, are often not observed and have lost some of their power under the economic pressure of the transition period. But, the existence and functioning of traditional institutions (see Section 4.4.4.1 below) again point to rather high social capital. Some of these institutions, e.g. the elders' council, set norms and decide on sanctions which are generally well observed by the members of the communities. Social networks ensuring reciprocity and exchanges are seen as increasingly important on all sites, as the State is no longer able to provide social security to its citizens. Therefore, participation in community ceremonies and mutual aid is usually high.

Thus, limited trust, in particular in the State and more distant community members, appears to be one of the limiting factors regarding social capital on the research sites. This has important implications on reciprocity and exchanges, and on the observance of common rules and norms. At the same time, there is a high level of connectedness, and there are functioning networks on the research sites. Collaborating in groups seems to be acceptable to local people, as long as these groups are voluntary organisations and evolve spontaneously from within the communities themselves.

Taking into account the above-made considerations and additional factors influencing social capital, such as conflicts, Ortok and Uzgen can be seen as having a similar, high level of

social capital. These are the two more homogenous sites in terms of composition of the communities. Arstanbap-Ata and Achy are categorised as sites with medium social capital. The latter two sites are also more heterogeneous in terms of ethnic composition and have a higher level of conflict than Ortok.

4.4.4.1 Local institutions

On all sites there is a range of local and traditional institutions of interest from the point of view of social capital. These are (modified and complemented after Fisher 1999a, p. 12f):

- Courts of *Ak Sakals*; *Ak Sakals*, literally “white beards” in Kyrgyz, are the village elders who have had a traditional role in leadership, decision-making and conflict resolution. Courts of *Ak Sakals* were institutionalised in 1995 by a Decree of the President of Kyrgyzstan as responsible bodies for the enforcement of customary law along with written laws (Giovarelli & Akmatova 2002, p. 7);
- *Ashar*, a form of voluntary group labour and pooling of funds (Rysakova *et al.* 2002, p. 289) within extended families or a group of friends sharing a common interest;
- *Sherine*, a rotating system of responsibility for hospitality, which is particularly important for social gatherings when lots of guests have to be accommodated and catered for in local communities;
- Local women’s councils, now having the status of non-governmental organisations (Giovarelli & Akmatova 2002, p. 8). These councils are mainly concerned with women’s problems and have the potential of promoting gender equity. In this context, they sometimes take an interest in natural resource use.

Some of these institutions have their roots in Kyrgyz or Uzbek traditions (e.g. *Ak Sakals*, *Ashar*, *Sherine*), others are successors of similar organisations which had assisted the local public administration during the Soviet era (e.g. women’s councils). Some of them became institutionalised in the mid 1990s in the course of decentralisation and the government’s initiatives to strengthen local self-governance (Matsuzato 2001).

4.4.4.2 Scepticism towards collective organisations and work

The experience of forced collective work during the Soviet time offers credible explanation for strong reservations about group- or community-based work and for the widespread determination to be one’s own master and not to become dependent on others (c.f. results of this study on preferences for community/group-based work *versus* individual leases in Section 7.4.4). Messerli (2000), in her gender study which included the *leshozes* of Achy, Uzgen and Ortok, found that almost all the women questioned had difficulties imagining working in a collective way with other families on their leased plots. They preferred working individually or in their family groups, yet complained about a lack of mutual support for a range of tasks such as the transport and marketing of goods. They saw others as being “uncooperative” or “unreliable”. There was generally little trust and much fear of being exploited by others. Given this situation, it seems that halting the further erosion of social capital, building up trust and, thus, improving social capital again in the long run are key challenges for the transition process.

4.4.4.3 Conflicts on the research sites

On all sites, there are conflicts over natural resource and forest use, albeit on different scales. The author’s own observations on local conflicts, in particular conflicts between local people and authorities, and the results of previous studies (Marti 2000; Messerli 2000) suggest that the level of local conflict is highest in Achy, followed by Arstanbap-Ata and then Uzgen and lowest in Ortok. The decisive criteria for this categorisation were the: human pressure on

forest resources, information about local conflicts gained during fieldwork and from literature, fears expressed by local people about unequal access to forest resources, number of stakeholders, and ethnic heterogeneity of the communities. The last criterion was chosen, as there is a certain level of mistrust between the ethnic Kyrgyz and Uzbek. The origins of this mistrust can be explained by differences in their orientations and backgrounds in terms of their traditional occupations and history, and by political events, such as the clashes between Kyrgyz and Uzbek in 1990 in Osh *Oblast* over land issues (de Cordier 1996). Kyrgyz and Uzbek people live rather in parallel than together and rarely integrate. There is hardly any intermarriage between the two groups, and close relationships beyond the family tend to develop within a specific ethnic group. Even in ethnically mixed regions, most villages are either predominately Kyrgyz or Uzbek.

Generally, one can distinguish two types of relevant local conflicts: i) conflicts between individuals and the local *leshoz* or other parts of the SFS, and ii) conflicts amongst individuals themselves, mostly local people but sometimes outsiders. Important grounds for conflict and mutual distrust between local people and *leshozes* on the research sites include:

- Illegal forest and land use practices by local people (e.g. grazing in forests, building of houses in forested areas), which might, in some cases, also be seen as an “incompatibility of legal regulations with the reality of land use”;
- Distribution of access rights to forest resources and other *goslesfund* land, in particular allocation of forest plots, sometimes on questionable grounds;
- Tax rate for the walnut-harvest by non-CFM leaseholders (c.f. Section 6.4.1);
- Alleged corruption within the forest administration; it is said that higher positions in the *leshozes* and SFS have to be bought like many other jobs in the State administration;
- Informal deals of *leshoz* staff members; the salary of a *leshoz* employee is not sufficient to sustain a family. Taking advantage of one’s position of power as an official or focusing on one’s own farming activities whilst paying rather less attention than necessary to one’s professional duties are two possible and widespread strategies to cope with such conditions. Stealing rent money or produce for personal gain falls in the same category.

Having listed all these causes of local conflicts, it is important to emphasise that the *leshozes* are, unlike the situation in many developing countries, generally very well embedded in the local communities, despite being part of the SFS. Most of the *leshoz* staff is usually local. On all four sites, the *leshozes* are now one of a very small number of remaining employers besides the *Ail-Okmots*, local kindergartens, schools, and, on some sites, medical centres. This contributes to a generally high level of acceptance of the *leshozes* as institutions and of the presence, but not necessarily of the actions of professional foresters within the local communities. The interviews conducted for this study suggest that, generally, local people are more critical of the somewhat remote higher levels of the SFS than of the *leshozes*.

In the following Sections, the situation regarding conflicts is described in more detail. The presentation will start with Achy, the site considered to have the highest level of conflict:

Achy

There was a variety of complaints against the *leshoz* authorities in Achy. They were said to be corrupt, to allocate leases in an arbitrary and inequitable manner, to prioritise their own personal interests, and to have abdicated their responsibility to protect the local environment. Individuals from the forestry authorities are also accused of: clearing forest plots to plant

potatoes or to sell firewood, accepting bribes for leases, and failing to treat forest diseases (Marti 2000, p. 55). Until 2002, access to walnuts at the time of harvest was very unevenly distributed with some leaseholders having huge groves of trees of up to 25 ha while others had no walnut trees at all from which they could collect walnuts. Thus, some local people were forced to steal firewood and walnuts (Messerli 2000, p. 23ff). The redistribution of harvest rights in autumn 2002 reduced such tensions and made the distribution more equal than it was before. Messerli (2000) also mentioned theft, corruption and illegal cutting of trees as important conflict issues. The co-existence between the *leshoz* and the *Ail-Okmot* (see Section 6.4) leads to some conflicts over influence and resources.

Arstanbap-Ata

During fieldwork it was noted that mistrust of the *leshoz* was widespread among local people and accusations of corruption were made. The *leshoz* staff was often accused of being more interested in earning money than in forest conservation, and some people questioned staff competence. Local informants reported a quantitative and qualitative decline of forest resources over the last 10 years. Tensions between the *leshoz* and the *Ail-Okmot* are due to the uneven distribution of land between the *leshoz*, drawing on most land in the valley including pastures and agricultural land, and the *Ail-Okmot*, having no authority over land beyond the borders of the settlements. The head *Ail-Okmot* seemed in favour of models giving local residents an improved say in land use, whereas the *leshoz* tries to keep control over the use of its land.

Within the local communities there were fears concerning equal access to forest resources. This was not surprising given the relatively small average forest area per person. There were also conflicts in forest and land use between local residents. In some instances people taking care of and planting on forest plots were forced by their neighbours to open up the fenced forest plots, as the neighbours feared that there might not be enough land for their livestock to browse. Such land use conflicts can partly be explained by general changes in land use since the break-up of the Soviet Union (e.g., people tend to keep more livestock at home, which then browse in the vicinity of the villages) and a rapidly growing population (3.3% per year for the period 1989-1999, see Table 10). On the other hand, there were examples of collaboration of several households getting different products from the same forest plots, a system which seemed to work well in many cases.

Uzgen

Corruption was also a concern of local people in Uzgen, who accused the SFS of illegally selling the valuable walnut burls and timber. Though less significant than in Achy, theft of walnuts was also a problem in Uzgen (Messerli 2000, p. 32).

Many of the first CFM lease contracts made in 1998 were unrealistic about the amount of work required of the leaseholder. When the CFM tenants could not fulfil all these obligations, they had to pay fines to the *leshoz*; this angered the leaseholders, who felt the agreements had been unfair (Messerli 2000, p. 16). The unfairness of the leases was also recognized by some of the authorities (Fisher 1999a; Carter *et al.* 2003). Additionally, there have been some cases of overlap between new leases and pre-existing land uses. These seem to have been resolved reasonably amicably, but these conflicts could have been avoided by improved lease allocation procedures (Fisher 1999a).

The findings of an RRA in the village of Ak Terek illustrate typical disagreements between the population and the *Ail-Okmot*. People accused the *Ail-Okmot*, the chairman of which keeps changing, of blackmailing people who are in need of various kinds of official

documents. One conflict involved four or five families that were not given land during privatisation. Another revolved around the post office in the village of Salam Alik where pensions and child benefits were supposed to be paid; the post office staff was accused of keeping the funds and using them for their own purposes (DFID 2001, p. 10). Similar accounts have been received from the other sites during fieldwork. This reflects the generally low level of trust in State bodies and their employees in the country. This is also well documented in other studies (cf. World Bank 2002b; Sapsford & Abbott 2006).

Ortok

The general level of conflict in Ortok was considered to be lower than on the other sites. This was primarily due to the relative abundance of forest resources around the village of Ortok, a relatively small population and more difficult accessibility of the site in comparison with the other three sites. However, the author found that also in Ortok, there was some discontentment with the *leshoz*. There were some accusations of involvement in illegal extraction of walnut burls in the past. Inequality of lease distribution was also an issue. There were also conflicts among villagers and between local people and outsiders at the time of the walnut harvest. The allocation of forest plots, delays in proceeding applications, contract conditions and clashes between CFM tenants and people holding traditional access rights were amongst the most frequent causes of conflict concerning CFM.

5. Livelihoods and forest governance during the Soviet era

Departing from the research objective 1 of this study, this chapter provides a description and an analysis of local livelihoods and forest governance in Soviet times, i.e. of the starting point for the transitions process. It begins with a general description of livelihoods under the Soviet regime using the sustainable livelihoods framework and subsequently narrows down its focus again on forestry issues as it describes key features of forest policy and the institutional arrangements in the forestry sector. The chapter builds on information gained from interviews and informal discussions conducted during fieldwork, especially from the expert interviews on historical aspects and forest policy, and on complementary evidence from the literature.

5.1 General overview on livelihoods in Soviet Kirghizia

A dominant feature of policies and institutions during the Soviet period were very strongly developed hierarchies and top down decision-making (Carter *et al.* 2001). The central government in Moscow decreed its policies top down over various administrative levels down to the collectivist organisations, which played a key role in this hierarchy (Saltmarshe 1996). In this way, the policies also reached private households. Most households were, as the interviewed experts point out, part of the various collectivist organisations (e.g. *sovhoz*, *kolhoz*, *leshov*). This is also reflected in the fact that a majority of forest leaseholders interviewed for this study used to work in a local collectivist organisation during the Soviet era (see Section 6.2.3). Thus, private households were mere recipients of these decreed policies. In terms of processes, the informants emphasised the key role of the concept of the plan that dominated the interface between policy and practice. They explained that, on the basis of a 10 years plan drawn for the entire Soviet Union, plans for every single domain of economy and life were elaborated and decreed to the lower levels to be fulfilled. The most important feedback from the collective organisations to the higher levels was their reports on fulfilment of these plans. Within this rigid system of the command economy, there was only limited room for ideas to develop freely. On the political level, the Communist Party was the only political organisation permitted and a system “ultimately based on terror and compulsion” (Saltmarshe 1996) made sure that values and beliefs were brought in line with the Soviet ideology.

In the Soviet economy, the role of private initiative was very much restricted. Therefore, there was no such thing as a formal private sector. Some of the interviewed forest leaseholders recalled that they had small private farming plots whilst most of the land was under managed by the collectivist organisations. This can be taken as an indication of the limited scope for private initiatives. The development of a civil society was largely impeded by the totalitarian regime of the Soviet Union (Saltmarshe 1996). “Modern” forms of self-organisation and various social organisations emerged not until 1989 in Soviet Kirghizia (Anderson 2000). The dominance of the Party and the State in every area of life clearly resorted from the interviews and discussions concerning historical aspects. The Party and the State tried to channel any need (which in a democratic society are satisfied within civil society institutions) through party- or State-controlled institutions, such as socialist youth organisations or cultural clubs run by collectivist or State organisations..

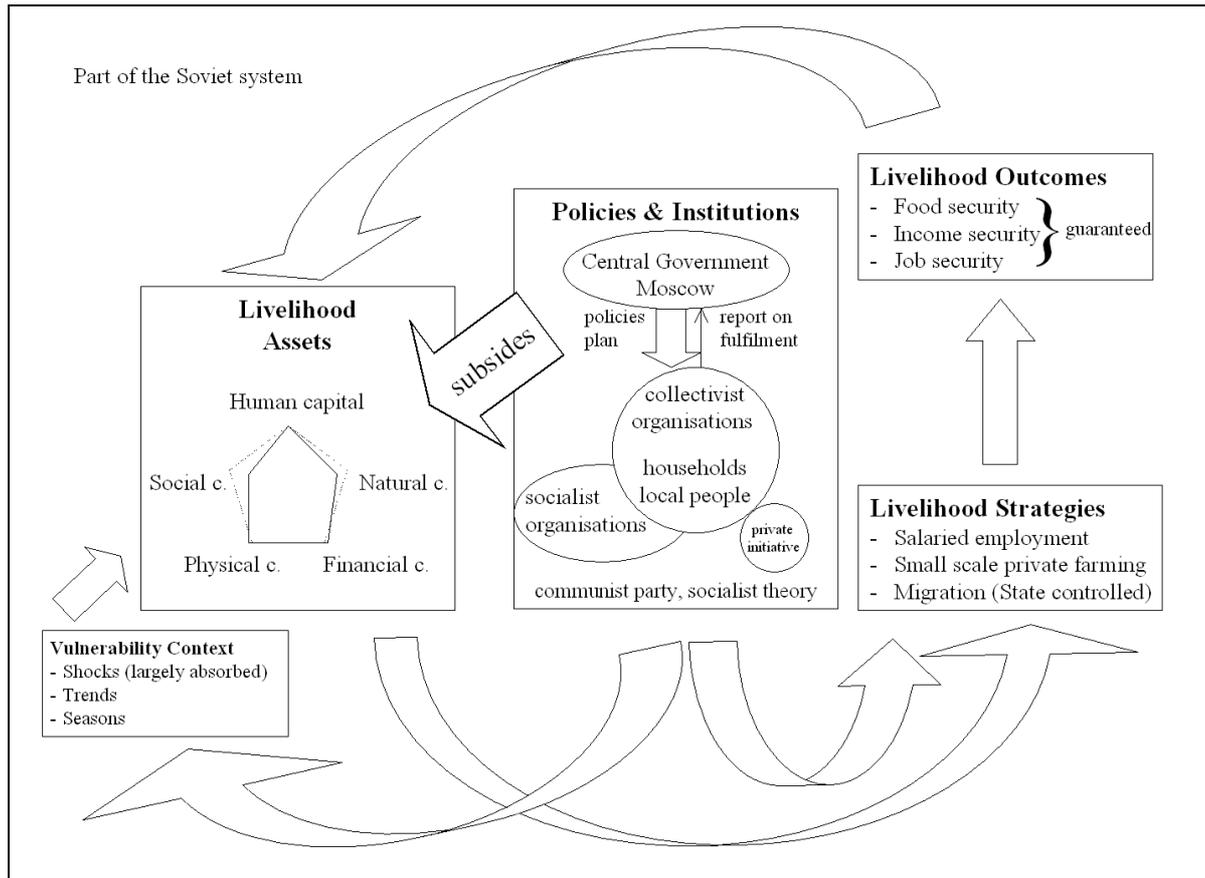


Figure 13: Livelihood system of the post-war Soviet era.

The dominant feature of the economic systems in Soviet Kirghizia and other Central Asian Republics was their complete integration in the Soviet economy (Pomfret 1995, p. 36), mainly as producers and processors of raw material, and with it the constant inflow of financial and of other means from Moscow that sustained the economy of Kirghizia and local livelihood systems (Pomfret 1995, p. 112; Spoor 1997). The author of the study at hand believes that the main motivation for these massive transfers of means to Central Asia and other peripheral parts of the Soviet Union was of strategic and ideological nature. These transfers allowed the Communist Party to preserve the Soviet rule in these areas. Thus, financial capital to support the economy of the Soviet republic was largely available.

It is widely acknowledged that, during the Soviet rule, the country made many important development steps characterised by progress in crucial areas such as agriculture, education, health and industrial development (Pomfret 1995, p. 108 *et seqq.*). Thus, levels of human and physical capital were relatively high. Huge investments were made in human capital at the time. The Soviets succeeded in rapidly reducing illiteracy rates (Pomfret 1995, p. 106) and eventually in nearly completely eradicating illiteracy (von Gumpfenberg 2004, p. 37). People from all backgrounds gained access to formal education (Carter *et al.* 2001). As the interviewed experts remembered from their own experience, trained specialists were brought in from other regions of the Union and people from Kirghizia were sent to other Soviet republics for training and higher education. At the same time, infrastructure and other parts of physical capital were developed on a large scale. Industrial development was mainly pushed during the post-war period, but agriculture remained the backbone of the economy (Pomfret 1995, p. 108).

Regarding natural capital, interviewees from different local stakeholder groups agreed that there was less human pressure on the walnut-fruit forests during the Soviet era than today. This applies equally to other forest types of the Republic (Müller & Venglovsky 1998). The agricultural sector was well developed and diversified and natural resources such as pastures, water or coal were put to economic use (Rashid 1994, p. 149 *et seq.*). However, there are indications that natural resource use was not always sustainable at the time. Priority was given to the development of the agricultural sector, particularly to livestock rearing, over the forestry sector. This led to high cattle stocks and overgrazing of pastures and forested areas hampering forest regeneration (Wilson 1997; Scheuber *et al.* 2000).

The existing level of social capital during Soviet times is rather difficult to judge. There certainly were strong institutions. However, most of these institutions were forced upon the local communities and can therefore not be taken as indicators of high social capital. The forced establishment of the agricultural collectivist organisations during the collectivisation in the early 1930 might serve as an example. It met strong mainly passive resistance from the Kyrgyz clans (Rashid 1994, p. 143; Pomfret 1995, p. 106). In discussions that took place during the research process, many people underlined that trust in State and party-run institutions had been limited during the Soviet era. Therefore, it appears from hindsight that social capital was rather limited. Forced collective work certainly contributed to that.

Factors from the vulnerability context impacted only in a limited way on the livelihoods asset. Of course, there were also seasons, harsh winters and sometimes very dry summers. But the interviewees agreed that, the Soviet system was able to absorb many of the most threatening shocks or to ease the effects of shocks on people's livelihoods. The command economy and the integration of the Republic's economy in the wider Soviet economy meant that there were secure production and trade chains to predetermined "markets" for all produce, mostly within the Soviet Union (Pomfret 1995, p. 36 *et seq.* + p. 112; Howell 1996b).

The information presented in the previous paragraphs of this section, make it clear that the livelihood strategies were by and large shaped by the State policies promoting industrial development, governing natural resource use and planning and controlling all areas of life. The important points regarding livelihood strategies are, as many interview partners remembered, that the State and collectivist organisations provided salaried employment for the large majority of the local population and that all basic needs were cared for by the State.

The interviewees pointed out that migration was not an issue for most people, as there was little necessity to go and seek work somewhere else. Moreover, internal migration within the Soviet Union was thoroughly planned, managed and strictly controlled by the State (permission to migrate to and to settle in certain areas) (Abazov 1999). In terms of livelihood outcomes, the State guaranteed material security for most parts of the population. A well-developed welfare system provided a wide range of cash benefits to almost half the population of Soviet Kirghizia (Howell 1996b). Interviewees from different backgrounds and living in rural and urban areas consistently stressed that material poverty had been negligible during the last decades of the Soviet era.

Trying to make a fair, well-informed balance of the advantages and the negative effects of the Soviet rule would go far beyond the aim of this study. Therefore, it must suffice here to say that the Soviet system allowed the great majority of people to live their lives in relatively good material security and allowed considerable progress in fields such as infrastructure or

education. However, these advantages came with a trade-off in terms of restricted freedom of speech and action, and restrictions of civil liberties.

In conclusion, one can say that, in the Soviet system, local livelihoods in Kirghizia were largely maintained by the inflows of means from the wider Soviet Union. However, on a larger scale, the Soviet Union as a whole was far from being sustainable in the modern sense of the word. The promotion of the socialist model of social and economic development came at the expense of massive ecological problems in many parts of the former Soviet Union. The drying up of the Aral Sea (Klötzli 1997; Spoor 1998) is just one of many examples which springs to one's mind. The eventual breakdown of the Soviet Union and its economy also indicates that the system as a whole was not sustainable.

5.2 Protection and management of the walnut-fruit forests during the Soviet era

In the following, the sustainable livelihoods framework is applied to identify key features of the forest policy and of forest management in the WFFs area during the Soviet era. Many of the features described in this Section still influence Kyrgyz forest policy and organisation today, but are gradually changing with the development of a new forest policy and ongoing reforms.

5.2.1 Institutions and forest policy

The Soviet forest management system was dominated by a centralised, highly hierarchical organisation of the forest sector with most of the power for decision-making at higher levels and top-down planning of both protection and economic management of forest resources. Planning of forest management for the WFFs was done in Moscow on the basis of forest inventories conducted by a special commission of a Moscow-based forest inventory unit. State forest farms (Russian *leshoz*) were responsible locally for the implementation of the forest policy and forest management. The forest and the agricultural sectors were institutionally largely separated, as they were part of different administrations or ministries. Long-term forest management plans, usually for a period of ten years, and detailed annual plans, decreed from above, were the most important management tools. The *leshozes* were accountable for the practical implementation of these plans.

In the early 1950s, following the deterioration of the condition of the WFFs over decades, a restrictive forest policy was developed for the walnut fruit forests which remained in force until the break up of the Soviet Union. This policy aimed primarily at the conservation of the remaining WFFs and at an increase in forest cover (Müller & Venglovsky 1998) and hence predominantly its focus was monofunctional (Intercooperation 1994). An important reason for the prevalence of this monofunctional forest policy was undoubtedly that, during the Soviet era, timber and other important forest products were provided from other parts of the Union. Thus, local communities and the Republic's economy depended only little on internal forest resources for livelihoods and income.

In the 1950s, the WFFs were classified as forests of the "Group I" category according to the Soviet system (von Maydell 1983). This category comprises protected forests in which only sanitary cuttings were permitted and all commercial timber harvesting was prohibited (Braden 1991, p. 116). In the case of the WFFs, maintenance and reconstruction cuttings²²,

²² "Maintenance cuttings" aim at improving the species composition and growth conditions for trees of the main forest species. "Reconstruction cuttings" are undertaken in forest stands of low quality in order to

were sometimes permitted. To reach the latter goal, an ambitious reforestation programme was launched in the 1950s, albeit with limited success in terms of increased forest cover.

5.2.2 Assets available for forest management

The forest sector, similarly to the economy of Soviet Kirghizia as a whole, depended highly on subsidies from the central State budget administered in Moscow to keep forestry activities running. Until about the mid 1980s these financial means were regularly provided by the central government. It was, as local informants reported, only in the late 1980s that they felt the first signs of a coming economic crisis affecting the Soviet Union. The financial means available made it possible to absorb shocks and/or even prevent major damages on natural resources. Rigid pest control can be mentioned as an example. During the Soviet era, the administration had the necessary means to fight pest outbreaks and control the population of damaging organisms such as Gypsy moths by technical means. Pesticides were applied widely in the forest, partly even by helicopter.

The natural capital in the WFF-belt and especially the forests themselves were largely sustained thanks to the conservative forest policy in combination with the decreasing dependency of local communities on forest products during the post-war Soviet era. Forests and other natural resources were however at times negatively affected by livestock numbers that were well above the bearing capacities of the pastures available (Musuraliev 1998). This was largely a consequence of the deliberate prioritisation of livestock rearing as decided on and subsequently decreed by the highest political level.

During the Soviet years, there was considerable human capital in the field of forest management with well-trained technical staff and highly specialised scientists. Slav and other immigrants mainly laid the foundations for the forest sector of Soviet Kirghizia. Russians, Ukrainians, Germans and experts from other ethnic origins played a key role in the development of the forest sector from its formal establishment until the breakdown of the Soviet Union. In terms of physical capital, much of the needed technical means and the necessary infrastructure for forest management operations were available. In some of the research sites, plants to process collected wild fruits from the forest and from local orchards were built and run.

5.2.3 State defined livelihood strategies and the role of the *leshoz*

During the Soviet period the *leshozes* provided salaried employment and covered all basic needs of the residential *leshoz* “community” including provision of products for everyday life, primary health care, nursery care, schooling, and other social services. In this way, the *leshozes* “served as a complete unit of social organisation” (Carter *et al.* 2003), comparable to the role of the *sovhozes* and *kolhozes* in agriculturally dominated areas. Besides a forestry unit, the Soviet *leshozes* often also comprised an agricultural unit, a sawmill, a joinery and fruit-processing workshops or plants. At the time, the *leshozes* were thus not only responsible for harvesting forest products and sometimes also agricultural outputs, but processed these products as well. Thus, the State largely defined the livelihood strategies for the resident population in the villages of the WFF-belt and guaranteed their material well-being.

5.2.4 Forestry in Soviet Kirghizia seen from the viewpoint of sustainable forest management

This analysis of the Soviet legacy follows the model of the sustainability triangle including economic, ecological and social dimensions. The Soviet model of sustainable forestry is illustrated in Figure 14 below.

During the Soviet era, forest management was largely comprehended in the sense of the concept of “sustainable yield management”, which is narrower as the comprehensive concept of “sustainable forest management”. This is also reflected in language. The concept behind the Russian term for sustainable management, literally translated from Russian to English as “rational use” which corresponds to the idea of sustainable yield management. Thus, in Soviet times, there was no term for the modern concept of sustainable forest management in Russian technical forestry language.

Accordingly, the Soviet forest sector and its planning and control system had a distinct technical orientation. Soviet forest management plans did not explicitly include social, ecological and economic aspects (Müller & Sorg 2001). Thus, forestry in Soviet Kirghizia was considered largely to be about trees and forests and their protection and use, and not about people. To illustrate this, the two key dimensions of the Soviet forestry system, ecology and economy, are highlighted in Figure 14.

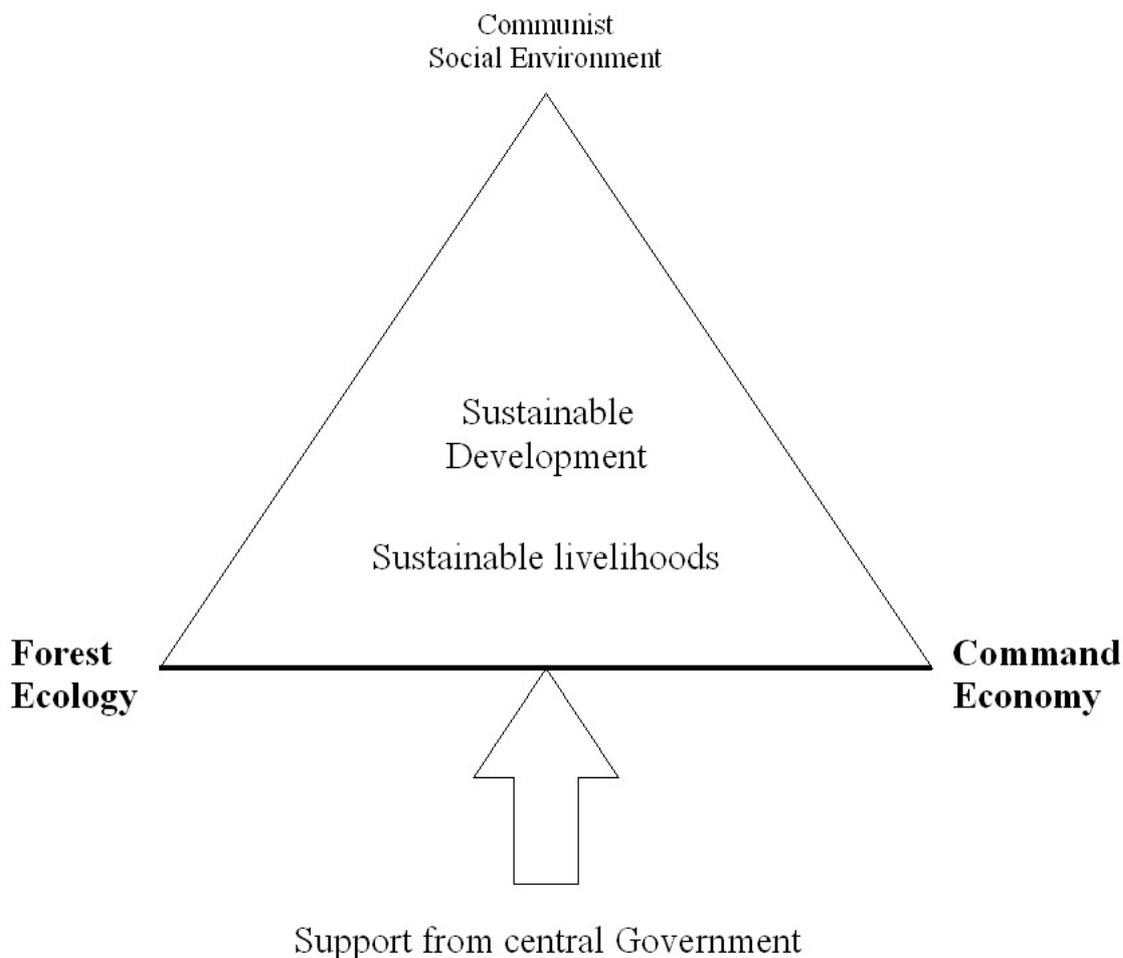


Figure 14: Sustainability triangle for the WWFs during the post-war Soviet time.

It is evident that resources made available from the central State budget in Moscow primarily sustained the conservation of the WFFs and forest management activities during the post-war Soviet period. As indicated earlier, it seems that the command economy provided sufficient goods and means to allow the residents of the WFF-belt to make a decent living and sustain their livelihoods. Natural resources including many non-timber forest products were used, but generally there was considerably less pressure on forest resources than there is today. Coal, for instance, was widely available for cooking and heating, and relatively few people therefore relied on firewood for energy. Thus, it seems that the assistance provided from the central State budget was in fact the prime support that kept the sustainability triangle of the system “WFFs” in equilibrium at the time.

While the social domain was, in the Soviet model, not considered to be part of forest management, it was still the State that furthered social development – as understood by the communist party – in the WFF-belt.

6. Livelihoods and forest governance in times of social, political and economic transition

After the description and analysis of the situation during the late Soviet era in the previous chapter, this chapter focuses on the time after Kyrgyzstan's independence in 1991. In so doing, it contributes to objective 1 of this piece of research. Similarly to the previous chapter, it first briefly describes, based on evidence from the literature and fieldwork, local livelihoods in Kyrgyzstan using the sustainable livelihood framework. This description is subsequently enriched with results from the four research sites that illustrate the effect of the transition period on households in rural areas of Southern Kyrgyzstan. Then, the focus again shifts to an analysis of forest policy and institutional aspects of forestry after the country's independence. The chapter is concluded with an analysis of the meaning of the concept of sustainable forest management in the context of the transition process.

6.1 General overview on livelihoods in independent Kyrgyzstan

The transition period is leading to important challenges on the level of policies and institutions. Generally speaking, the government got weaker despite the size of the apparatus, particularly after the revolution of March 2005 and the subsequent times of political insecurity (International Crisis Group 2005a). Here, the key challenge is to build up an efficient and effective government system assuring a fruitful framework for other stakeholders to develop their initiatives and take over responsibilities. Civil society institutions are emerging only slowly. Their development experienced some setbacks from the mid-1990s onwards which are believed to have their origins in the will of the political elite not to lose its dominance (Anderson 2000). The importance of the households as the basic entity of the new economic system has generally increased. A significant policy change in the area of natural resource management was the stepwise privatisation of agricultural land which also enhanced the role of private households (Delehanty & Rasmussen 1995; Weyermann 2005).

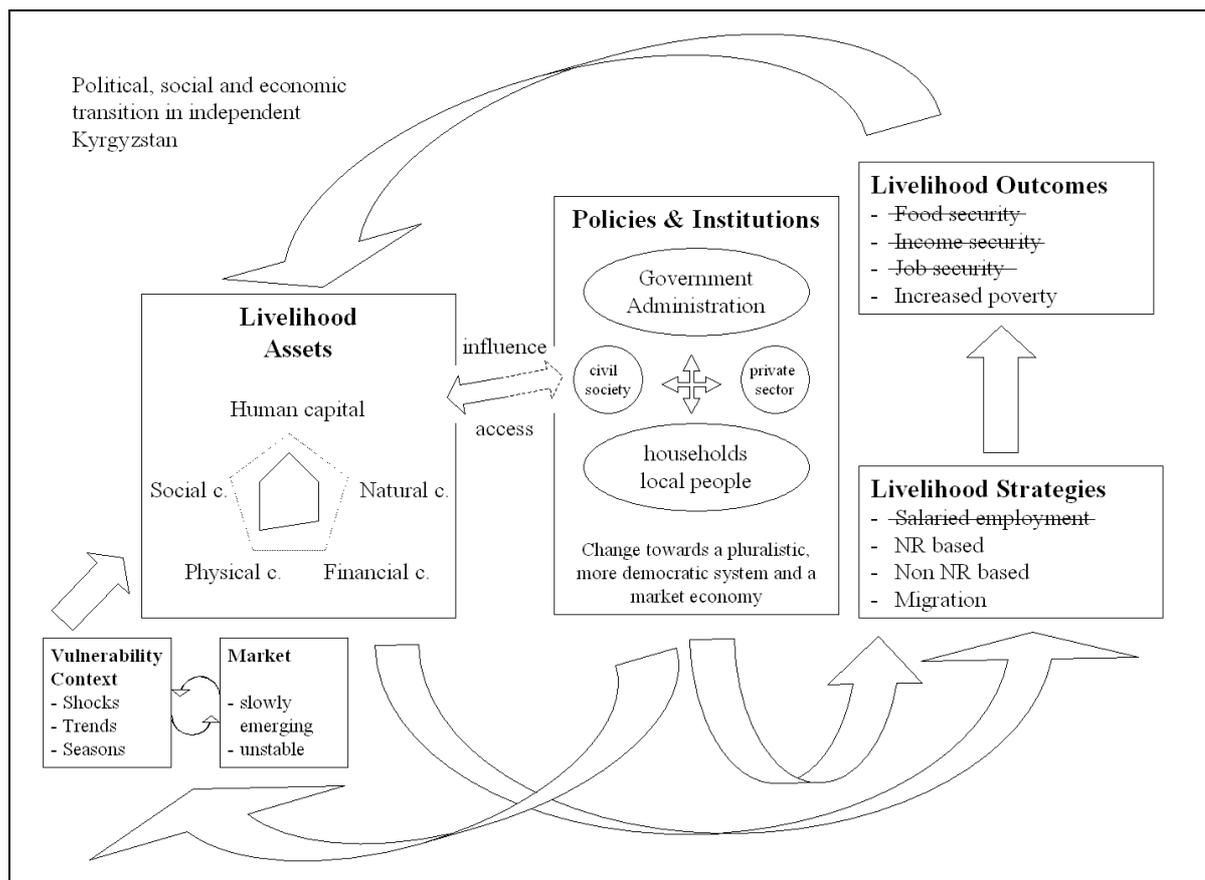


Figure 15: Livelihood system in independent Kyrgyzstan. NR = natural resource(s).

With the collapse of the Soviet Union in 1991 came also the end for the subsidies and transfers from the central State budget (Howell 1996b). Thus, a central pillar which had sustained livelihoods in Soviet Kirghizia fell all of a sudden. The end of the subsidies led to a striking lack in financial capital, and, with the time, also to the gradual deterioration of the Soviet built infrastructure, which could no longer be maintained (Pomfret 1995, p. 111). The loss of most State salaried jobs resulted in people turning again towards subsistence farming (c.f. the changes in occupation of the interviewed forest leaseholders presented in Section 6.2.3), which eventually led to increased pressure on forests and other natural resources (Müller & Venglovsky 1998). In terms of human capital, the disintegration of the Soviet system led to a drastic brain drain as a consequence of the massive emigration waves of Slavs, Germans and other ethnic groups (Elebayeva *et al.* 2000). Social capital was, as the interviewed experts observed, stretched with emerging conflicts over resources and natural resource use, and, in general, with uncertainties and suspicions between local people nurtured by economic crisis and the sudden change to a market economy. Violent clashes between Kyrgyz and Uzbek in the Southern Osh *Oblast* in 1990 (Rashid 1994, p. 146; Anderson & Pomfret 2004, p. 4) put a long-lasting strain on interethnic relationships. Low levels of trust in State bodies and a growing problem of corruption (International Crisis Group 2001; World Bank 2002b, p. 15; Cokgezen 2004) (see Section 4.2.5) also point to a decrease in social capital. Interestingly however, the Kyrgyz still have relatively high levels of trust and confidence in people and institutions compared to seven other countries in transition (Sapsford & Abbott 2006). As the interviewees pointed out, existing traditional institutions such as the councils of the elders could only partly compensate for this further erosion of social capital.

The collapse of the Union was in itself a most reverberating shock that impacted drastically on the livelihood assets, strategies and outcomes. Two major consequences of this shock were the above-mentioned stop of subsidies from Moscow and the collapse of inter-republic trade and with it of distribution channels for Kyrgyz produce (Howell 1996a). Further shocks for the Kyrgyz economy followed over the years. The local informants often mentioned, as an example, the unilaterally imposed, stepwise closure of the Uzbek border from the late 1990s onwards, which greatly affected the Kyrgyz economy and in particular trade with Uzbekistan.

Due to the lack of central support from the Soviet Government the system lost its capability to absorb major shocks and other impacting changes attributed to the vulnerability context. Meteorological shocks, such as late frosts or long periods of rain are again of higher relevance to considerably bigger parts of the population, since the dependency on natural resource management has generally increased in the country. With the country's changes towards a market economy, the newly emerging market forces increasingly influence the vulnerability context.

In terms of livelihood strategies, poor households became to depend solely on natural resources for their livelihoods, as the results of the wealth ranking exercises conducted for this study will show (see Section 6.2.2). Better-placed households, on the other hand, gradually managed to improve their resource base in the years following the disintegration of the Soviet Union. As discussed in the Sections 4.2.4 and 4.2.5, Migration is, particularly by young people, increasingly considered as a livelihood option (UN 2003a, p. 9, 25 and 65) due to a marked lack of salaried employment in the country. Also, poverty and unemployment dramatically increased during the first years of independence (Rysakova *et al.* 2002; UN 2003a, p. 12). Thus, a considerable percentage of the population of Kyrgyzstan is now confronted with issues such as food, income or job security.

6.2 Selected local households and their livelihood systems after a decade of transition

In this Section, the livelihood systems and particularly the assets of the households involved in this study are presented in some detail.

6.2.1 Livelihood systems of local households

Households in the walnut-fruit forest area exploit a range of different resources within their livelihood systems. Figure 16 schematically shows a local farming system, comprising livestock, arable fields, possibly an orchard and a homegarden, a leases forest plot and access to the general forest. Additionally, many households pursue off-farm activities to make a living. This category includes, for example, salaried employment, entrepreneurial activities or transfer payments received from members of the households working temporarily away from home. Social benefits provided by the State represent another source of revenue, which are generally small, but especially important for poor households.

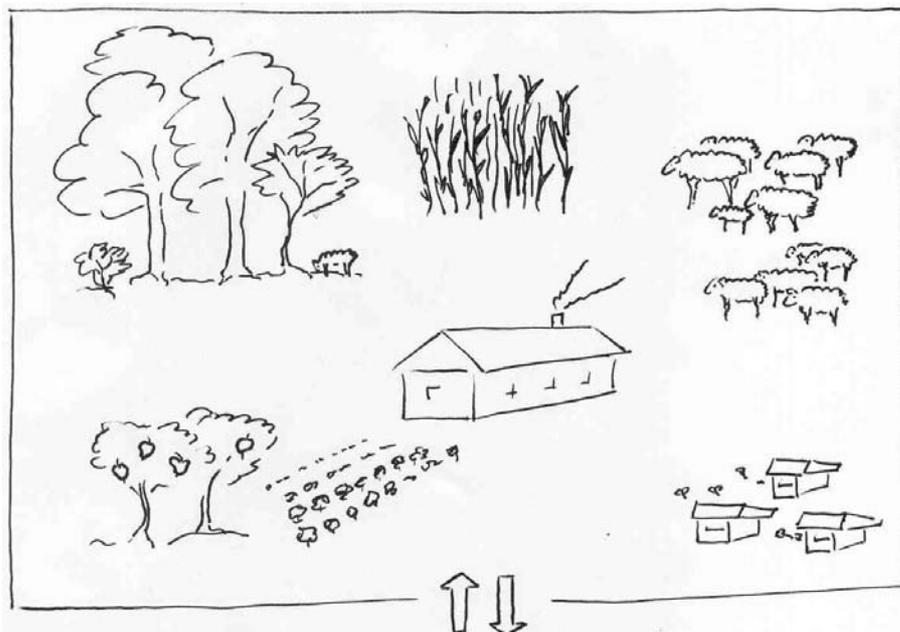


Figure 16: Schematic representation of a local farming system showing (in clockwise order): a forest stand, tillage, livestock, beekeeping, the homegarden, an orchard and, in the middle, a dwelling house.

During the interviews the sources of revenue of each household were recorded in as much detail as possible. For the presentation of the results, the detailed sources of revenues of the households were condensed to the groups shown in Table 18.

Table 18: Categorisation of sources of revenues for local households for the data analysis

Category of source of revenue	Category includes
Livestock rearing	- Livestock rearing (cattle, small livestock, horses, poultry) - Haymaking for livestock rearing
Tillage	- Tillage and horticulture both in the homegarden and plots away from the house, outside the forested area - Beekeeping
Leased forest plot	- Forest products collected on leased forest plots (seasonal and long-term leases) - Agricultural products produced on the leased forest plot
General forest	- Forest products collected outside the borders of one's own leased forest plot
Off-farm revenues	- Wages from employment - Earnings from independent (self-employed) occupations e.g. Driving services (taxi, lorry, tractor); Construction work; Petty trade, commerce; Bed and breakfast for tourists, Processing (e.g. mill, oil press) - Transfer payments from relatives, friends (remittances)
Social benefits	- Pension - Child allowance - Other social benefits provided by the State

6.2.2 Wealth of local households

The wealth ranking exercises conducted in the different villages provided a better understanding of wealth-related local concepts, such as “wealth”, “poverty” and “richness”. These exercises resulted in three wealth groups: a group of people considered to be “poor”, an “intermediate” group and a group of people thought to be relatively “wealthy”. During the wealth ranking exercises local informants used mostly material wealth criteria to categorise local households. Numbers of livestock and poultry were most often applied, followed by: characteristics of natural resources available within the farming system,

characteristics of the buildings, the availability of agricultural and processing equipment, the availability of a car, and the presence of additional sources of income to agriculture (see Appendix 3 for a full list of criteria). The number of household members and, in particular, of children was also frequently used. Additionally, the informants often used more qualitative, social indicators, such as: the role members of a given household play in social networks, health of its members, education of children, and the way household members organise and approach their work.

Table 19 on the next page shows an idealised profile of a poor, an intermediate and a wealthy household, which were compiled from the results of all the wealth ranking exercises conducted on the four research sites. More detailed information on common features and differences in the livelihoods of people from these three wealth categories will be presented in Section 9.7.3.

Table 19: Summary of general characteristics of poor and wealthy households. Source: wealth ranking exercises.

A poor household

- has no cattle, up to 5 head of poultry and possibly 1 or 2 head of small livestock.
 - has only very limited, often not very productive land resources (non-irrigated, land on slopes, *et cetera*) within its farming system.
 - has no other sources of revenue than agriculture and collection of forest products
 - adults are unemployed.
 - is vulnerable to externally induced shocks (e.g. low agricultural yield following bad weather conditions) due to a poorly diversified farming system.
 - has many (small) children and thus relatively high expenses.
 - has members who are poorly dressed.
 - lives on a very basic diet, in difficult times mainly consisting of bread, tea and possibly potatoes.
 - is chronically short of cash.
 - is not or hardly able to sustain a living and thus often depends on support from other households.
 - has difficulties to meet the expected contributions to traditional social events, but often makes these contributions despite the expenses involved in order to remain in the local social network.
 - does not have a car, nor agricultural machinery or any processing technology.
 - lives in poor housing conditions: old small houses built of clay, without insulation, poor heating
 - does sometimes not even own a house and is therefore forced to rent one.
-

An intermediate household

- has up to 5 head of cattle, up to about 15 head of small livestock, possibly a horse, some poultry
 - has limited land resources, mostly no need to lease land from others
 - is just able to sustain its members from subsistence farming, but does not gain sufficiently from farming to make major investments.
 - may have additional sources of revenues to farming, such as a processing workshop for agricultural goods (e.g. mill, oil press).
 - has often members of the household or close relatives working in town or abroad supporting the households by sending remittances.
 - has hardly any cash available in the household at any time of the year
 - does not have a private car.
 - owns its residential building.
-

A wealthy household

- has at least 6 head of cattle, at least 2 horses, and, on average, also more than 15 head of small livestock.
 - has a diversified farming system and additional, off-farm sources of revenues.
 - has at least one member working in a salaried position.
 - has often members of the household or close relatives working in town or abroad supporting the households by sending remittances
 - makes regular net gains from its agricultural activities and additional economic activities.
 - is able to manage agricultural work according to a plan and priorities drawing on its own resources and, if needed, additional contracted labour force and hired machinery.
 - sends children to study at the university.
 - has cash available within the household or is at least able to mobilise cash at any time of the year.
 - has often a private car and/or farming machinery of its own
 - lives in its own well maintained, spacious house; often, these houses are built of baked bricks and not of clay.
-

Local people taking part in the wealth ranking exercises in the villages of the research site “Arstanbap-Ata” provided interesting additional information on the background of households of different wealth categories. They said that wealthy households had had access to land from the very beginning of the transition period. Often they were in a position to secure their access rights at an early stage and were thus able to invest into farming right from the beginning. Now, they are getting their return on these investments. According to the local respondents, wealthy people would often be former high-ranking civil servants and other government officials. People from the intermediate and, of course, from the group considered to be “poor”, were not able to seize such opportunities after the breakdown of the

Soviet Union. Intermediate households would therefore now have to invest a lot into their agricultural activities, but were not yet in a position to get a return on these investments. This underlines the significance of the starting position of local households when the Soviet Union broke down in terms of their power, connections and other resources for their material situation after a decade of transition.

6.2.3 Working experience, professional and educational background of members of the selected households

The information on the former and current occupation of the informants provides useful insights in the changes in local people's lives since Kyrgyzstan's independence.

The households interviewed have on average 7.5 members, as shown in Table 20. Their sizes range from one to 22 members. The average household size varies between the four sites, but only the difference between the means for Uzgen (Mean = 6.7, SD = 1.9) and Achy (Mean = 8.7, SD = 4.2) are statistically weakly significant (P t-test = 0.044, t = -2.107). Of the 102 households interviewed for this study 99 are headed by a man and three by a woman. The male head of household is, on average, 45 years old. The most senior female member of the households sampled is on average 41 years old.

Table 20: All research sites taken together. Number of household members, age of senior male and female members of household. Source: structured interview on household characteristics.

	Mean	Median	Min	Max	n total	Missing data	n total + missing data
Number of household members	7.5	7.0	1	22	98	4	102
Age male head of household [years]	45.5	44.0	22	75	95	7	102
Age female head of household [years]	41.2	41.0	20	70	80	22	102

In terms of origin, all except for four of the senior male members of household live in the same *Ail-Okmot* as they were born and grew up in. The majority of their wives (58%) live still at their place of origin, while 42% immigrated from another *Ail-Okmot*. This has implications for local forest knowledge. While knowledge held by men tends to be kept locally, knowledge held by women is more easily spread to other *Ail-Okmots* when newly wed women move to the villages of their husbands.

The heads of households have, in most cases, undertaken an apprenticeship or got a technical qualification at a professional technical school, as shown in Table 21. Those who took up work directly after having finished compulsory school form the second biggest group. Over all four sites, only a few heads of households, all living in Arstanbap-Ata or Achy, have a higher education. The percentage of households headed by somebody with either a professional or a higher education is generally considerably higher in the sample of households from Arstanbap-Ata and Achy than in these in Ortok and Uzgen (see Table 21).

Table 21: Education of the heads of household. Source: structured interview on household characteristics.

		Total	Arstanbap- Ata	Achy	Ortok	Uzgen
Not finished compulsory education	Count	1	1	0	0	0
	% within site	1.1%	6.3%	0%	0%	0%
Finished compulsory education	Count	40	4	6	16	14
	% within site	44.4%	25.0%	27.3%	61.5%	53.8%
Apprenticeship, professional technical school	Count	42	7	13	10	12
	% within site	46.7%	43.8%	59.1%	38.5%	46.2%
Higher education	Count	7	4	3	0	0
	% within site	7.8%	25.0%	13.6%	0%	0%
Total	Count	90	16	22	26	26
		100.0%	100.0%	100.0%	100.0%	100.0%

Of the 95 households, from which information on their working experience during the Soviet era is available, members of 67 households (71%) have worked in a collective organisation. At least one member of 58 of these households (61%) used to work in a *leshov* during the time of the Soviet Union, and at least somebody from 9 of these households (10%) worked in an agricultural collectivist organisation, either a *sovhoz* or a *kolhoz*. People from households of which nobody was engaged in a collective organisation during the Soviet period worked in other sectors, such as education, health care, or manufacturing. Besides their jobs, two-thirds of the interviewed households conducted their own small-scale farming activities during the Soviet period, and have thus gathered experience and knowledge which proved valuable when rural areas relapsed into subsistence farming after the breakdown of the Soviet Union.

The main occupation of the senior members (both male and female) of the interviewed households has changed considerably since the break-up of the Soviet Union, as shown in Tables 22 and 23 respectively. This points to significant changes in the livelihood and coping strategies of local households since independence. More than one third of the male informants who provided the researcher with information referred to their main occupation during the Soviet time as “worker” of a collective organisation. A smaller percentage of the informants used to work as teachers, drivers or craftsmen during the Soviet period. While nobody mentioned farmer as his or her main occupation in the past, nearly half of the informants describe their current main occupation as farmer.

The second biggest occupational group is that of pensioners, which is, of course, primarily due to the fact that many informants who worked during the Soviet era, have now reach pension age. However, today pensioners usually have to continue working to sustain a living, due to very low, and often irregularly paid State pensions. Therefore, the label pensioner today applies to people above a certain age and reflects, effectively a redundant Soviet idea of a materially secure retirement. A few of the male informants continue to work as teachers. Only a few men, in comparison to their occupation during the Soviet years, gave their current main occupation as worker, driver or craftsman. This reflects the dramatic decrease of job security and the drastic loss of salaried jobs in collective organisations and processing units on all the research sites after the break-up of the Soviet Union. The massive increase of people referring to their primary occupation as farmer on the other hand reveals the relapse of rural areas into subsistence farming, indicates dramatically reduced income security in independent Kyrgyzstan and points to increased pressure on natural resources including forests during the transition period.

Table 22: Main occupation of the senior male member of the selected households during the Soviet and the post-Soviet period. Source: structured interview on household characteristics.

	Occupation senior male in Soviet times (late 1980s)		Current occupation senior male (2002 and 2003)	
	Count	%	Count	%
Worker	30	35.7%	5	5.3%
Teacher	14	16.7%	8	8.4%
Driver	12	14.3%	5	5.3%
Craftsman	11	13.1%	5	5.3%
Technician veterinary service	4	4.8%	-	-
Forest guard	3	3.6%	2	2.1%
Herder	2	2.4%	-	-
Beekeeper	2	2.4%	3	3.2%
Bookkeeper	2	2.4%	-	-
Staff central office <i>leshoz</i>	1	1.2%	1	1.1%
Musician	1	1.2%	1	1.1%
Artist	1	1.2%	-	-
Retailer	1	1.2%	-	-
Farmer	-	-	46	48.4%
Pensioner	-	-	14	14.7%
Forest ranger, deputy forest ranger	-	-	2	2.1%
Shopkeeper	-	-	2	2.1%
Mullah	-	-	1	1.1%
Total	84	100.0%	95	100.0%

Data on the main occupations of the senior female household members during the Soviet era is only available from 35 households (see Table 23). About equal numbers of female interviewees worked as teachers, housewives and workers in the past. Today, the majority of women interviewed call themselves housewives, which, of course, encompasses a broad range of activities including agricultural, domestic and educational work for children. Quite a few women still work as teachers. The same numbers of women call themselves pensioners, whereas only one woman still refers to herself as worker. The relative increase of the main occupation of “housewife” and the clear decrease of women referring to their job as worker again reflect the dramatic loss in jobs in collective organisations and manufacturing since Kyrgyzstan’s independence. With this sudden change at the beginning of the transition period, the women concerned lost a certain degree of financial independence from their husbands that they had previously enjoyed during the Soviet years.

Table 23: Main occupation of the senior female member of the selected households during the Soviet and the post-Soviet period. Source: structured interview on household characteristics.

	Occupation senior female in Soviet times		Current occupation senior female	
	Count	%	Count	%
Teacher	9	25.7%	10	13.7%
Housewife	8	22.9%	45	61.6%
Worker	8	22.9%	1	1.4%
Retailer, shop assistant, shop manager, shopkeeper, post office employee	5	14.3%	3	4.1%
Nurse, midwife	3	8.6%	2	2.7%
Bookkeeper	1	2.9%	1	1.4%
Dressmaker, seamstress	1	2.9%	1	1.4%
Pensioner	-	-	10	13.7%
Total	35	100.0%	73	100.0%

6.3 Institutions, stakeholders and forest policy

6.3.1 Forest sector institutional arrangements

In Kyrgyzstan, the State Forest Service (SFS) is the State body responsible for the implementation of the national forest policy, for forest management, control of hunting, management of national parks and other protected areas and for biodiversity conservation. It is part of the Presidential Administration and has its headquarters in the capital Bishkek. Subordinated Regional Forest Administration units are in charge for forest management at the level of each *Oblast*. Locally, more than 40 State forest farms (Russian: *leshozes*) are responsible for the direct protection and for the management of the forests and of State-owned non-forested land (pastures, arable land). In some cases, they also market and process forest products as well.

A *leshoz* has a central office with technical and administrative staff. Its territory is usually partitioned into several forest ranges, headed by a forest ranger. The *leshozes* report to the Regional Forest Administration which again report to SFS headquarters in Bishkek.

6.3.2 Ownership of forest resources

The entirety of the forested and non-forested land earmarked for forest use in the long run constitutes the State Forest Fund (Russian: *goslesfund*). All this land is State-owned and managed by the SFS. In contrast to this, agricultural land in Kyrgyzstan was largely privatised. The privatisation started with the de-collectivisation and the dismantlement of the *kolhozes* and *sovhozes* launched in 1994 (Matsuzato 2001). Their land was transferred to legal successor organisations, in most cases to *Ail-Okmots*, i.e. to the local municipalities, and subsequently, at least partly, converted into private property (Weyermann 2005).

6.3.3 Stakeholders in current forest policy and management

Besides the SFS, there is a range of governmental and non-governmental stakeholders taking an interest in the WFFs, of which the most important are briefly presented here.

The “State Control of Bioresources” is the responsible State body for nature and biodiversity conservation and thus also supervises nature protection in the WFFs. Representatives of the civil administration, of which the SFS is independent, also often take a keen interest in forests and their management and, in particular, in the distribution of the benefits derived from taxes collected for the use of *goslesfund* land or from selling forest products. Representatives of the Civil Administration have however no guaranteed influence on decisions over land of the *goslesfund*, which is fully controlled by the SFS and its local executive bodies. Officials of the civil administration at the *Oblast* level seem mostly concerned with the long-term conservation of the walnut-fruits forests, which is a popular concern. In at least one case over the past five years, representatives of a *Rayon* administration have intervened to change rules governing access to forest products for the local population. The *Ail-Okmots*, who are in charge of providing a wide range of services to the resident population, such as primary health care, education and social welfare, take a particularly close interest in forest management decisions at the local level. This is especially the case, in situations in which all land, forested and non-forested, outside settlements are controlled by the local *leshoz*, which thus also collects taxes from the users of this *goslesfund*-land. Rivalry over control over resource use, influence and power at the local level between *Ail-Okmots* and *leshozes* is not uncommon.

Other, mostly private stakeholders in forest management, include buyers and processors of different forest products marketed from the WFFs, such as walnut-traders, companies processing various non-timber forest products or joiners. Since the late 1990s market demand for forest products has however grown again, both in terms of number of products requested as well as in terms of overall volume and new channels of communication and trade have been established.

Another stakeholder group comprises members of research organisations. “The Institute of Forest and Walnut Management named in honour of Prof. P. A. Gan”²³ with its centre in Bishkek and its Laboratory for Forest Resources in Jalal-Abad, the Institute of Biosphere in Jalal-Abad and their international research partners take particular interests in the WFFs. They all have considerably contributed to building up the scientific knowledge relating to these valuable forest resources through their long-standing research in various domains (see Gan 1992; National Academy of Science of the Kyrgyz Republic 1997; Blaser *et al.* 1998).

6.3.4 Current national forest policy framework

The “Forest Code of the Kyrgyz Republic”, which was approved in 1999, and the environmental legislation form the legal framework for the forest policy in the country. The national forest policy furthermore includes the following components:

- The Concept of Forestry Sector Development which defines the strategy for the development of the forest sector and the framework for other documents of forest policy and legislation for a period of 20 to 25 years;
- The National Forest Programme which determines the activities and measures for the implementation of the concept for a period of 10 to 15 years;
- The Five-Year Action Plan for the development of the forest sector providing the specific activities needed for the implementation of the National Forest Programme.

The policy formulation and adaptation process to date can, as suggested by Kouplevatskaya-Yunusova (2005), be divided into two main stages: i) the elaboration of a new forest policy from 1997 to 2001 resulting in a new Forest Code and the first versions of the above-mentioned concept, programme and action plan; followed by ii) a revision and reorientation of the new forest policy from 2001 onwards.

A thorough review of the entire national forest policy by the SFS led to the publication of the latest version of the Concept of Forestry Sector Development that was approved in April 2004. This reviewed Concept is based on the following three “corner stones”: forests, people and the State; and identifies ten strategic policy lines for the future national forest policy in the country (Kouplevatskaya 2006, 2007). The following are the two most significant aspects of this review for this study: The role of the State is expected to change from that of an agent, primarily concerned with commanding and controlling, to that of a facilitator or coordinator of the various activities towards development of sustainable, multifunctional forest management. At the same time, the concept advocates an increasing role for local people and other private stakeholders in forest management (State Forest Service of the Kyrgyz Republic & Intercooperation Kyrgyzstan 2004).

On the whole, the new Concept of Forestry Sector Development reflects much of the experiences made in the forest sector since independence and takes also international developments in forest policy into account. It included clear political statements in favour of

²³ This institute is often being referred to simply as “Forest Institute”.

sustainable and multifunctional forest management as a means to ensure forest conservation and of the participation of local people and the private sector in forest management. With these statements, the Concept breaks with the “conservation through protection” approach and the idea of the State as the sole legitimate stakeholder in forest management, which were typical features of the forest management system during the Soviet era. It will however take a while until the political, high-level commitments made in the Concept translate into changes in policy and practice at the local level. Nonetheless, the recognition that people and the private sector are important stakeholders in forest management is a significant development and highly relevant for this research.

6.3.5 State and trends in forest policy concerning the walnut-fruit forests

The forest policy concerning the WFFs after Kyrgyzstan’s independence continued to put much emphasis on conservation of the existing WFFs and, at least during the first 10 to 12 years, on afforestation as a means to increase the forested area. Thus, forest policy and practices were and still are very much influenced by the former conservative Soviet forest policy. According to Article 30 of the Forest Code of the Kyrgyz Republic, the WFFs are categorised as “forests of specially protected nature territories”, and thus enjoy the same protection status as, amongst others, State nature reserves (Russian: *zapovedniki*) and State specialised reserves (Russian: *zakazniki*). The current forest use regime for the WFFs is the one of a forest reserve, in which only the harvest of NTFPs is permitted on a grand scale. The use of timber is severely restricted to cases in which cuttings have to be undertaken in order to maintain or improve the state of a given forest stand (c.f. Article 57 of the Forest Code).

Regarding future management strategies, there are indications that changes towards a more active silvicultural management in the WFFs, possibly including regeneration cuttings, are being considered by decision-makers. There is, for example, a critical remark regarding the negative effects of the ban of forest regeneration fellings in the current Concept of Forest Sector Development in Kyrgyz Republic (State Forest Service of the Kyrgyz Republic & Intercooperation Kyrgyzstan 2004, p. 42). The technical basis for a more active silvicultural treatment of the WFFs is available in the form of a comprehensive new system of silvicultural interventions for the WFFs and other forest types which was approved by the Kyrgyz Parliament in 2003 (State Forest Service of the Kyrgyz Republic 2003). Whilst the range of legal silvicultural interventions might be cautiously extended, it seems however unlikely, that any extensive commercial timber exploitation will be allowed in the WFFs in the near future.

6.3.6 Collaborative forest management in the WFFs – exploring a new approach for Kyrgyzstan

Since January 1998, a Kyrgyz-Swiss project has been working with the SFS, and particularly with certain *leshozes* to develop new, collaborative approaches to forest management in the area of the WFFs in the South of Kyrgyzstan. This ongoing development project, henceforth referred to as the “CFM project”, is part of the larger, Swiss-funded Kyrgyz-Swiss Forestry Support Programme (KIRFOR). The CFM project partners developed the following specific definition for CFM in Kyrgyzstan (c.f. the general definition of CFM given in Section 2.2.2.3):

“Collaborative forest management is management of forests by a local community residing directly on the territory of the State Forest Fund or near

it, including planning and implementation of forest management activities” (State Forest Service of the Kyrgyz Republic 2001, Section 1.2).

During an exploratory phase at the beginning of the CFM project, the focus was mainly on the development of CFM at two levels (Carter *et al.* 2003):

- Piloting a CFM approach at local level in two *leshozes* (Ortok and Uzgen) in the WFF-belt. These two *leshozes* were subsequently selected as research sites for this research;
- Establishing the legal framework for CFM at a national level and developing a national CFM policy. This process was informed by experiences of the pilot introduction of the CFM approach in the field. The CFM approach was recognised in the Forest Code passed in 1999 (Article 47) and was ultimately supported by the coming into force of the national CFM Regulations (Decree No 377, signed on 27th of July 2001 (State Forest Service of the Kyrgyz Republic 2001).

Since 2001 the CFM project has shifted its focus of activities on consolidating and refining the CFM approach developed for Kyrgyzstan and on extending it to other *leshozes* in the WFF-belt as well as to other forest ecosystems in the country. The progress of the CFM project and the challenges of introducing a collaborative approach to a post-Soviet country are documented and discussed in a series of CFM reports by Carter (1998a; 1998b; 1999; 2000a; 2000b; 2001; 2002) and Fisher (1999a; 2003a) and in two analytical policy overviews (Baumann 2002; Carter *et al.* 2003; Fisher *et al.* 2004).

The main assumptions for the development of CFM in Kyrgyzstan at the beginning were that local people in the WFFs depended to some extent on forest products and would therefore have a strong interest in protecting and managing the forests, provided that they were granted guaranteed long-term access to forests and allowed to benefit from harvesting forest products, in particular walnut (Fisher *et al.* 2004, p. 17). At the outset the Swiss side envisaged a group- or community-based approach (Carter *et al.* 2003, p. 7), similar to CFM approaches developed in many other countries. However, the emerging Kyrgyz approach to CFM was rather different. During a preliminary CFM workshop, it was decided that a system of leasing forest plots to individuals or to small groups of households would be the appropriate approach for the beginning (Carter 1997). The two *leshozes* involved in the pilot project quickly developed the necessary arrangements to promote this lease model for CFM. Two main factors were decisive: i) the fact that leases granting access rights to forest and agricultural products from *goslesfund*-land in exchange for cash or in-kind payments were already in place in the WFFs, and ii) a strong preference for individual or family based enterprise amongst local people. The differences between the CFM approach promoted by the CFM project and a variety of leasehold approaches which evolved locally are presented in detail in Section 6.4. .

During the first years of the CFM project the number of CFM leases in the WFFs increased rapidly. However, the experience gained from implementing the Kyrgyz CFM approach in the WFFs and applying it to areas with different types of forests so far points to there being considerable room for improvement, in terms of both policy and practice at field level. A recent study on social aspects of CFM in Southern Kyrgyzstan (Scherrer 2004) has revealed a series of weaknesses in the practical implementation of the leasehold CFM approach. Issues raised include (Carter 2002; Carter *et al.* 2003; Fisher 2003a; Scherrer 2004, complemented by observations of the author):

- Limited awareness of the core ideas underpinning the concept of CFM within the SFS and other stakeholders;
- Overlapping and conflicting legal tenure regulations regarding different types of lease;
- Limited applicability of the developed leasehold approach to forest types other than the WFFs; Adaptation of the developed leasehold approach and/or the development of alternative CFM models for different biophysical and socio-cultural settings (different forest types, level of human pressure on forests);
- Inefficient functioning of the various CFM bodies (see Section 6.4.1) and a lack of enforcement of the social and political checks and balances that these bodies should guarantee. Issues surrounding these inadequacies include: equity of lease allocation; partly intransparent decision-making; unbalanced contract conditions (workload of tenants versus potential benefit); and unreliable information flow on CFM;
- An insignificant role for women in decision-making;
- Weak linkages between the ideas and intentions held by tenants for future management of their CFM plots and official forest management planning made by the SFS.

The CFM project is working on the key issues raised, analysing the legal situation, making suggestions for amendments of the CFM Regulations and other relevant legislation, in an attempt to improve and refine the Kyrgyz CFM approach on the basis of the lessons learned.

6.4 Land and forest tenure

There are important differences in terms of land and forest tenure between the communities in the WFF-belt. Issues of land and forest tenure and of access to land and forested areas are determinants for the livelihood strategies of local people. Such differences are primarily due to i) different situations concerning land tenure during the Soviet era, and ii) different lease models for forested land which have emerged since the 1980s.

In places, where there was both a collectivist agricultural organisation (i.e. a *kolhoz* or a *sovhoz*) and a *leshoz* during the Soviet era, the farming land is now owned by private individuals and/or the *Ail-Okmots* while the *goslesfund*-land remains under the authority of the *leshoz*. This situation is typical for lower parts of the walnut-fruit forest zone. The research site Uzgen is such a case. In higher areas, which are in general also more forested, there was typically only a *leshoz* during the Soviet era and thus only *goslesfund*-land. In such places, all land remained under the authority of the *leshoz* and hence in State ownership. People living in such areas can only lease, but not own their own farming land. This second case applies to the research sites Arstanbap-Ata, Achy and Ortok, where the *leshozes* today control also non-forested land, including arable fields, haymaking areas and pastures. The *Ail-Okmots* on these three sites have hardly any natural resources under their authority and thus also no possibility to charge taxes for natural resource use. However, they get a fixed percentage of the taxes collected by the *leshozes* for pasture use²⁴.

The present situation concerning land tenure and power for decision-making on natural resource use in Arstanbap-Ata, Achy and Ortok still closely resembles the situation during

²⁴ In 2004, tax revenues from leasing *leshoz*-owned pastures were distributed as follows in the Jalal-Abad Oblast: 70% for the *leshoz*, 25% for the respective *Ail-Okmot* or the *Rayon*, 5% for the land registry office (Russian “*Goszemregister*”) (Akenshaev 2004).

the Soviet era. At the time, the local collectivist organisation(s) (*leshoz, sovhoz, kolhoz*) used to be the dominant local institution(s). The director of a collectivist organisation was the real master in the local community, while the chairperson of the Village Council depended on the means provided by the collectivist organisation (Matsuzato 2001) to fulfil his duties in the social sphere. After the breakup of the Soviet Union, the *Ail-Okmot* succeeded the Village Council. So, in Arstanbap-Ata, Achy and Ortok, the typical Soviet feature of a “dual power” (Matsuzato 2001) represented by the *leshoz* as the only remaining State organisation and by the *Ail-Okmot* persists. The municipalisation of important social assets, such as kindergartens, school, hospitals, culture clubs, libraries, and the delegation of the responsibility for their management to the *Ail-Okmots* from 1996 onwards (Matsuzato 2001) has accentuated the financial burdens on the *Ail-Okmots*. In Arstanbap-Ata, Achy and Ortok, they therefore frequently try to get financial assistance for investments to be made into these assets from local *leshozes*.

The forest lease models currently in practice on the four research sites are explained in greater detail in the following Sections. An important feature of these different models is the duration of the lease contract. For this study, this criterion is used for the categorisation of the existing types of leases in two basic groups: long-term leases and seasonal leases. Lease contracts extending over a period of one or more years are categorised as “**long-term leases**”. Within this category, this study distinguishes further between collaborative forest management (CFM) leases (see Section 6.4.1) and other, non-CFM leases (see Section 6.4.2). The category “**seasonal leases**” (see Section 6.4.3), on the other hand, comprises all leases extending over just one harvest period of a product, such as walnut. The duration of such leases is usually some weeks up to a few months, depending on the product and harvesting arrangements.

6.4.1 Collaborative forest management (CFM)

Under the CFM lease system, tenants of the forest plots have, according to the CFM Regulations, the right to harvest, use or sell all forest products except timber from the leased plots. Strictly speaking, the tenant has the user rights for all products that are mentioned in his or her lease contract (Steenhof 2005). In return, the tenants are responsible for forest protection and agree to other forestry work, such as the establishment of nurseries, establishment of plantations or the maintenance of orchards. Thus, the lease fee is paid in form of labour and no cash is expected to exchange hands (Carter *et al.* 2003)²⁵. This cashless leasehold system is an innovation in comparison to other local lease systems. The current rules and regulations for CFM contracts foresee a probationary period of five years for new leaseholders. If, at the end of this period, the assessment of the work done by the leaseholder and of the state of the plot is positive, the duration of a CFM lease contract is, in accordance with the rules in place, extended to a period of 49 years.

A range of institutions has been set up to make decision-making on plot allocation and other CFM matters more transparent, to put decision-making on a broader basis and to solve problems arising from conflicting demands for forest use. The CFM Regulations foresee the establishment of three regulatory bodies each operating at a different level of responsibilities (Carter *et al.* 2003, p. 12; Scherrer 2004, p. 3). There are, within every *leshoz* in which CFM is implemented:

²⁵ This principle might however change in future during a revision of CFM rules and their implementation in the field (Samyn 2006).

- A *leshoz* level (first) commission, overseeing the broad allocation of land for CFM purposes and spreading information about CFM amongst local people;
- Range level (second) commissions (only in forest ranges implementing CFM), with the task of overseeing the specific allocation of plots;
- A CFM Board, again at *leshoz* level, serving as an independent arbitrator for disputes and complaints, monitoring progress in the implementation of CFM and promoting knowledge about CFM.

Membership of all these regulatory bodies comprises representatives of: the *leshoz*, CFM tenants, the *Ail-Okmot* and village elders (Carter *et al.* 2003). Additionally, the Regional Forest Administration and forest sciences are represented on the CFM Board with one member each.

A local resident who would like to lease a forest plot under the CFM system applies to his or her forest ranger for a lease. The CFM (second) commission at range level considers the application and takes a decision. Criteria that the commission takes into account include the applicant's capability to fulfil his or her contractual duties, his or her intentions and motivation for the application and area of residence. In the case of a positive decision, a written contract is made, to be signed by the applicant and a representative of the *leshoz*. If the applicant is turned down he/she can appeal to the CFM Board at *leshoz* level for a revision of the decision (Scherrer 2004, p. 3).

6.4.2 Non-CFM long term leases

Both in Arstanbap-Ata and in Achy, individual long-term leases for forest plots emerged in the 1980s, i.e. during the Soviet era. In Arstanbap-Ata, the *leshoz* began delegating responsibility for forest plots close to villages to selected local households at this time. It was seen as a means to ensure forest protection and improve the state of the forest belt close to settlements. Forest stands on these plots had previously suffered from overuse and, most importantly, from overgrazing and were, therefore, often in a deplorable condition. Tenants of these plots are obliged to undertake protection and conservation efforts. This might include fencing of the plot, guarding and planting. In return, they sometimes get a modest payment from the *leshoz* for their work. More frequently, they are granted the right to use certain products such as walnut or other NTFPs on the plot they are responsible for or on another plot. Usually, they are liable to pay tax for harvesting such products. Only sometimes, they may be allowed to use the agreed product(s) for no fee.

Another scheme of leases in use in Arstanbap-Ata is that the *leshoz* grants user rights for forest stands to people who have a lease for an agricultural or a haymaking plot that is located close by. This is particularly the case if the forest patch lies within the same fence as the haymaking, horticulture or tillage plot. For such agricultural plots *s.l.*, Arstanbap-Ata *Leshoz* applies a system of paid leases. The lease payment depends on the area and the production potential of the plot and is paid either in cash or in kind. Formally, contracts for such paid leases are made only for one year. They are, however, in most cases routinely renewed every year, and can therefore be considered as *de facto* long term leases. Examples of such forest plots adjacent to agricultural areas were included in the study, provided that the following conditions were fulfilled: i) The leaseholder has a *de facto* long term lease for the adjacent agricultural plot, ii) the leaseholder has been collecting forest products over many years and iii) he or she considers the whole plot comprising agricultural elements (arable fields, horticultural system, haymaking area) and the forest stand as an entity.



Figure 17: An agroforestry plot in Arstanbap-Ata; main products available: maize, hay, potatoes, wild apples, cultivated apples, walnuts and firewood.

Interestingly, there are often multiple leaseholders on the same plot in Arstanbap-Ata, each one having user rights for a particular category of products. One tenant is, for example, entitled to make hay on the plot amidst the trees, another to harvest apples or walnut respectively. The co-existence of user rights for different forest products is sometimes further complicated by claims for access rights based on traditional or other longstanding connections between a given household and a plot. This often results in a complex, multi-layered system of claims and access rights. The authority to decide on land use and resolve potential conflicts remains however with the *leshoz* in Arstanbap-Ata which represents the State as the legal owner of all land in the *goslesfund*.

In Achy, the first long term leases of forested plots appeared also in the last years of the Soviet rule when the *leshoz* started encouraging individuals, mostly *leshoz* staff members, to take out leases. These leases served as a means to ensure the fulfilment of the prescribed State Production Plan, despite cuts in State forestry funding, and to motivate *leshoz* staff. When this study started, some households from the villages of Achy, often former *leshoz* employees, were still involved in forest management through this system, with leases typically of 5-10 years in length. The lease payment depended on the area and the production potential. This system meant that a few households had access to relatively large forested areas, a fact that sparked off conflicts over this unequal access to the limited forest resources on this site (see also Marti 2000; Messerli 2000).

In autumn 2002, after some political struggles in which parts of the civil administration were involved, the walnut trees on the territory of Achy *leshoz* were redistributed. Every interested household was assigned a number of walnut trees for the walnut harvests in coming years. The precise number was determined as a function of the number of household members. This was often at the expense of the above-mentioned long-term leaseholders,

who saw the size of their leased plots considerably reduced. It seems that no precise information, as to how many years the households will be entitled to harvest walnuts from these trees, has been given to the households. A written contract fixing the amount of walnuts to be delivered to the *leshoz* by these households is made in years when the walnut yield is deemed to be worth the administrative effort of demanding payment in kind. It is important to emphasise that this new type of lease in Achy extends only for the time of the walnut harvest and the granted withdrawal rights are restricted to walnuts. It is, in fact, very similar to the widespread type of seasonal leases (see Section 6.4.3). For the data analysis, households with this new type of lease in Achy, were therefore put in the same group as seasonal leaseholders from Ortok and Uzgen. The most important distinction between the new lease system for the walnut harvest in Achy and seasonal leases is the fact that, in Achy, the walnut trees were distributed for more than one walnut harvest, whereas in the case of a typical seasonal lease, the tenants usually get the plot just for one season (see Section 6.4.3).

Both in Arstanbap-Ata and Achy, if somebody is interested in taking up a lease for a forested plot, the person to contact would usually be the respective forest ranger. For an agricultural plot on *goslesfund* land it would be the engineer in charge of the agricultural branch of the *leshoz*. Sometimes, local people also turn directly to the director with their application for a lease.

6.4.3 Seasonal leasehold approaches

Seasonal leases are widespread in the *leshozes* of the WFF-belt. The *leshozes* on all four research sites (Arstanbap-Ata, Achy, Ortok and Uzgen) apply them. Seasonal leases are usually granted for the time of the walnut harvest, i.e. for the time between the moment when the harvest is declared to be open by the respective *leshoz* until the first snow falls and covers any remaining walnuts. The walnut harvest usually begins around late September or early October, depending on ripeness of the walnuts, which is influenced by the prevailing weather conditions during the growing season. Seasonal leaseholders usually have to pay a share of their walnut harvest, which varies between 70% and 50% of expected total harvest, to the *leshoz* as a tax. This tax is either paid in-kind in the form of walnuts or in cash. The cash equivalent is calculated on the basis of an assumed and agreed average market price for freshly collected walnuts. The expected walnut harvest is estimated before the harvest starts in the same way as described in Section 6.4.1. During the research period, the *leshozes* in Arstanbap-Ata, Achy and some forest ranges in Uzgen levied this tax in-kind, whereas the *leshoz* Ortok and other forest ranges in Uzgen collected cash payments.

A seasonal leaseholder has no guarantee to receive the same forest plot as in previous years or indeed, a forest plot at all during the following harvest. There are however, numerous examples of households who have collected walnuts from the same plot over many harvest years and have therefore developed a considerable feeling of ownership for the plot. Competition for the seasonal leases of forest plots for the walnut harvest is often stiff, in particular in places with high population pressures on forest resources, such as Arstanbap-Ata. When deciding on a lease, forest rangers often also take into account how promptly an applicant has previously paid up his or her harvest taxes, as they are, in turn, accountable to meet the harvest target set by the *leshoz*.

6.5 Sustainable forest management in times of transition

6.5.1 Exploring the meaning of “sustainable forest management” in independent Kyrgyzstan

The break up of the Soviet Union left newly independent Kyrgyzstan with no capacities for planning and coordinating forest management at the national level. Therefore, the country has first to build up its own forestry capabilities and develop a national forest policy. This has to be done under severe financial constraints, as Kyrgyzstan lacks the resources to sustain the high level of subsidies that were provided from the central budget in Moscow during the Soviet era.

With the breakdown of the Soviet Union and the start of the transition towards market economy and democracy (see Section 4.2) the general framework for sustainable forest management in the WFFs changed fundamentally, as illustrated in the redesigned sustainability triangle shown in Figure 18 below. The cessation of subsidies from the central budget, the sudden change to a market economy and changes on the social side towards a more pluralistic society have put the sustainability triangle into a “tailspin”. The *leshozes* are now in a very difficult economic situation and are increasingly unable to continue effective forest management as a result of a lack of funding (Müller & Venglovsky 1998). At the same time, pressure on easy accessible forests by a variety of impoverished stakeholders has increased, since the economic changes have resulted both in difficulties in obtaining energy supplies other than firewood and in reduced opportunities for salaried employment (Carter 1997). Severe overexploitation leading to decreasing quality of forest stands and a rapid decline of the forest areas are reported from places with relatively small forest cover and high human populations (Marti 2000). Ongoing economic, social and political changes are thus having a great impact on the ecological state of the WFFs (see Section 4.3.4). Increased pressure on forest resources, on the one hand, and the breakdown of a formerly effective forest management system, on the other hand, mean that the long term sustainability of the WFFs is under question as never before. Therefore, a new equilibrium guaranteeing sustainable management of the WFFs has still to be found. In this context, the concepts of sustainable forest management and local people’s participation in forest management may offer new ways ahead.

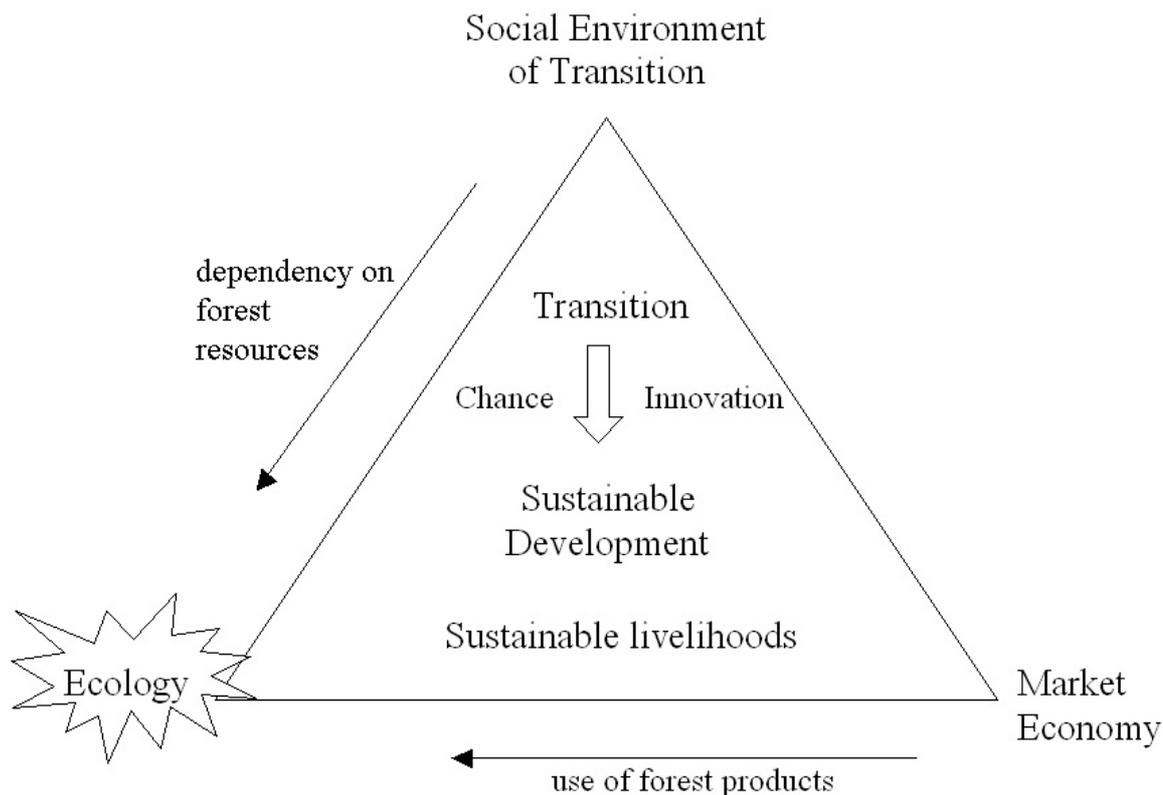


Figure 18: Sustainability triangle for the WFFs after Kyrgyzstan's independence.

On the economic and social angles, the change to a market economy poses the question of how the WFFs could be used sustainably for the benefit of the national economy and society at large and, in particular, to mitigate negative social consequences of the transition period. The forests can be characterised as a common-pool resource as exclusion of potential users is difficult (Wade 1987) or would be disproportionately costly (Ostrom 1990, p. 30), and the forest products harvested by one individual are not available to others (rivalry of consumption) (McKean & Ostrom 1995). The State ownership of this common-pool resource raises questions concerning the distribution of the benefits gained from the WFFs and the legitimate beneficiaries of forest use. Since the mid 1990s, an increasing number of stakeholders claiming to have a legitimate interest in the WFFs has emerged. This dynamic can be seen as a consequence of ongoing changes towards a more pluralistic society. A rather negative interpretation of the appearance of new stakeholders would be to ascribe it to ongoing power struggles between different State bodies and other interest groups over control of the WFFs. Also this leads to uncertainty that allows people to exploit these new "gaps" in what was once a very rigid system.

On the ecological side, questions regarding the long-term sustainability of the WFFs arise. An increased demand for firewood, uncontrolled grazing and other intensified forest use practices since independence have led to changes, for example in the density of forest stands and species composition. Critical issues from the point of view of ecological sustainability include:

- Regeneration capacity of the forest. The question arises, whether the above-mentioned increased pressure on forest resources puts the regeneration capacity of the forest at risk, and thus potentially threatens the very existence of the WFFs and the provision of all its products and services in future;

- Resilience of the forest ecosystems. One could pragmatically argue that, due to the difficult circumstances of transition, certain negative consequences on the ecological side could be temporarily accepted for the benefit of a positive development on the social and economic sides, provided that the resilience of the forest ecosystems is not harmed, i.e. forests' inherent capacities to return to their former state are not undermined.

To address these issues, operational criteria and indicators to assess the state of forest ecosystems are needed. Such tools would allow identifying critical areas for sustainability and documenting change and, hopefully, progress on the difficult way towards sustainable forest management.

Thus, the country and in particular its State Forest Service (SFS) faces huge challenges for the sustainable management of the WFFs. To address these problems and challenges, new ways to manage the resources of the WFFs in a sustainable way have to be developed.

6.5.2 The contribution of this research to the debate on sustainable forest management in the walnut-fruit forests

The considerations made in this Chapter ultimately lead back to the meaning of the concept of sustainable forest management under the circumstances of economic, political and social transition, and thus to the research objectives and questions of this study. Surely, this research cannot provide a comprehensive answer to all the questions regarding sustainable forest management in the WFFs. It will, however, provide elements of understanding gained during the research process that may point the way ahead for the future sustainable management of the WFFs. The identification of opportunities and constraints for the involvement of local people in forest management at the governance level and the description and analysis of available local knowledge and of current forest use practises in the following will point to changes of current forest governance, forest management and livelihood strategies that need to be made in order to get closer to sustainable forest management in the WFFs.

6.5.3 Current challenges for the sustainable management of the walnut-fruit forests

The inversion of a strong top-down system of forest management into a system of subsidiary, decentralised organisation of responsibilities is a major challenge for the transition of the Kyrgyz forest sector. In fact, the inherited Soviet top-down system still dominates many aspects of life in today's Kyrgyzstan far beyond forest management. This considerably hampers the development and implementation of alternative models of decentralised governance that could make room for bottom-up processes.

The history of the forest sector of today's Kyrgyzstan and its connection to the colonisation of the area by mainly Slav settlers in the 19th century and recent expatriations of many forestry specialists pose questions concerning the human capital available for forest management in the WFFs. The mass emigration of Slav and other non-Central Asian ethnic groups in early years of independence has led to a considerable brain drain in forest management and forest sciences alike. This has further aggravated the lack of qualified forestry staff that was described as one of the main problems of the forestry sector in Central Asia already before the breakdown of the Soviet Union (Sukkikh 1991). Despite the fact that many ethnic Kyrgyz and Uzbek received training in forest management and graduated in forest engineering and sciences from renowned Soviet universities and polytechnics, there is still a shortage of well-trained and experienced forest scientists and technicians today. It has also been observed that today's local population is somewhat lacking in longstanding

traditional skills and expertise of managing the WFFs (Müller & Venglovsky 1998). This applies particularly to the Kyrgyz, who lived as nomads on the pastures mainly above the upper tree limit until the 1930s. Until then, relatively few Kyrgyz families lived in the forest belt. To them the use of forest resources was only a subsidiary activity (Marti 2000). The sedentary lifestyle of the Uzbek and the legend of the foundation of the village of Arstanbap-Ata and its surrounding WFFs (see Section 4.3.1) points to at least some association of traditional Uzbek culture with trees, albeit not necessarily with natural forests. Thus, after the country's independence the knowledge base for forest management was considerably eroded due to the emigration of important knowledge bearers. At the same time, little if any complementary knowledge from other sources, such as traditional knowledge systems, could be mobilised to compensate for these losses. Also, there was only little experience in transdisciplinary approaches to problem solving available in the country to tackle the huge challenges.

Concerning the implementation of sustainable forest management, recent changes in Kyrgyz forest policy, show that, at least at the highest political level, sustainability is increasingly understood in a way which encompasses social, ecological and economic dimensions. But still, the comprehensive concept of sustainable forest management is new to Kyrgyzstan and the change will need time to take place, not least because sustainability is still often comprehended in the sense of the more narrowly defined concept of "sustainable yield management" discussed earlier. Only recently, an adequate Russian translation of the term "sustainable forest management" emerged. The difficult translation of the more general term "sustainable development" into the Russian language as "*ustoichivoe razvitiye*", which literally translates to "stable" or "steady development", is increasingly understood to include a socio-economic as well as an ecological dimension (Oldfield & Shaw 2002).

The situation on the ground clearly shows that, despite high-level policy declarations, much needs still to be done to operationalise the concept of "sustainable forest management" at the field level. In this respect, Kyrgyzstan is not alone as such situations are quite typical for other former Soviet republics and other countries in the region (see Fisher *et al.* (Fisher *et al.* 2004, p. 39 *et seq.*) for an overview on ongoing changes in forest policies in countries in Central and West Asia from the viewpoint of poverty alleviation).

The new Kyrgyz forest management plans (e.g. the forest management plan for Ortok *Leshoz* (Forest Inventory Unit 2002)) still do not explicitly refer to the concept of sustainable forest management. However, a first step in making the concept of sustainable forest management applicable at the level of the *leshozes* has recently been made with the publication of a proposal of a first set of criteria and indicators for sustainable forest management for the juniper forests in Kyrgyzstan (Cornet & Rajapbaev 2004). According to the National Forestry Concept, the definition of criteria and indicators for sustainable forest management is an approach that should be applied nationwide in the country in the future (State Forest Service of the Kyrgyz Republic & Intercooperation Kyrgyzstan 2004, p. 50).

Particular challenges for the implementation of the concept of sustainable forest management in Kyrgyzstan lie on the social side. As a consequence of the distinct technical orientation of forest management during the Soviet era, the forestry sector in independent Kyrgyzstan is relying preliminary on staff who have a technical forestry background. The country hence has little or no institutional capacity to address urgent social questions of forest management arising from economic transition. These shortcomings are of particular significance, as current regimes of access to forest products in the WFF-belt are often intransparent and their fairness sometimes questionable (Müller & Venglovsky 1998), which

was confirmed during fieldwork (see Section 7.3). This lack of transparency and equity breeds resentment and divisions within local communities and leads to complex social and political problems which need to be addressed.

The idea of multifunctional forest management is now gaining ground in Kyrgyzstan, although forest conservation remains a clear focus of current forest policy. This increasing recognition of multifunctionality is also reflected in the new National Forestry Concept. The concept of multipurpose or multifunction forest management was known in Soviet forestry (c.f., for example, Koval (1977) and Semenchenko (1978)). But in the Soviet past, there was no need to apply it, as key forest products were brought in from other parts of the Soviet Union. Thus, whilst the concept is new to Kyrgyzstan, the fact that it was known in Soviet forestry might facilitate its application in Kyrgyzstan.

The approach of multifunctional forest management is, in a way, also a realistic means of bridging the gap between policy rhetoric and the situation in the field, since much of the walnut-fruit forest is in fact currently already used in a multifunctional way. Grazing of forest stands is widely practised, despite its prohibition, and a multitude of different forestry as well as agricultural practices take place. Many of these practices are actually forms of agroforestry (Messerli & Juldashv 2000; Messerli 2002), which are prime examples of multifunctional resource use. The acceptance of the reality of current forest use practices, including legal and illegal practices, would be an important first step in the elaboration of an effective forest management system for the WFFs. Pretending that the old protective policies are still in place and working and that the future of the WFFs is secure can serve no purpose. Strong “monosectoral thinking” both in forestry and in agriculture still represents a key challenge for the development of more integrated approaches to natural resource management. However, over the last few years, the author of this study has found that foresters, researchers and other specialists are increasingly opening up to the idea of agroforestry and other examples of more integrated natural resource management.

A critical aspect concerning the sustainability of forest management in the WFFs is the widely accepted lack of regeneration and the poor state of plantations (see Section 4.3.4). As explained, the main reasons for this silviculturally sub-optimal state of much of the natural and planted forest stands are believed to be widespread grazing in the forest and insufficient silvicultural treatments of plantations. The lack of regeneration threatens both the continuous renewal of old or over aged forest stands and their productivity as well as hindering the long-term provision of environmental services. The insufficient silvicultural management of plantations geared at fruit production puts the financial return of the costs of management at risk. A very dense walnut plantation, for example, provides sub-optimal fruit yields, as the trees have not enough space to develop a good crown. Thus, more could have been achieved in terms of production by conducting timely silvicultural interventions.

Regarding the introduction of participatory approaches to forest management both in Kyrgyzstan and, generally, in a post-Soviet context, it can be said, that such an attempt undoubtedly represents a considerable challenge. The general remarks concerning top-down *versus* bottom-up thinking made in this chapter reflects this. The collaborative forest management (CFM) approach needs to be tailored to the particular post-Soviet conditions prevailing in the country, since the social, economic, historical and political conditions in Kyrgyzstan are clearly very different to conditions in countries in which forms of CFM have been successfully developed and practised. A comparison of some important characteristics of the experienced reality of collectivist forest management during the Soviet era with the vision of CFM is given in Table 24.

Table 24: Characteristics of the experience of Soviet collectivist forest management and of an ideal state of collaborative forest management (adapted from Carter 2000c)

Experience from collectivist forest management	Ideal state of collaborative forest management
Planning Top-down approach. Centralised planning and organisation; no participation of ground-level staff or other stakeholders in decision-making.	Bottom-up approach. Ideally, participation of all stakeholders in policy dialogue, forest planning, and decision-making and management.
Value judgements over knowledge Scientific, technical knowledge valued above local knowledge (the latter rarely recognised).	Different knowledge of all the different stakeholders valued and respected.
Communication Lack of free speech; social relations between staff characterised by political discretion; predominately top-down one-way communication	All stakeholders encouraged to speak their mind, free and open discussion, two-way dialogue
Collective action Forced group work and collective action (no choice)	Stakeholders choose voluntarily to work together
Production Focus of, quantity and quality of forest production is decided according to State requirements.	Production decisions made by the key stakeholders, according to local needs and markets (which in ex-Soviet States may need re-identification); idea of general benefit sharing
Forest protection Watershed protection and regional and national conservation measures centrally planned and supervised. Managed and implemented by forest farms.	Watershed and forest protection largely through productive management – with potential for agreed bans on the harvesting of some species/products, such agreements made by all stakeholders .
Social facilities Facilities such as nursery facilities, schools, health centres, meeting halls, <i>et cetera</i> provided by the collective forest farms.	Some social facilities need to be provided by local municipalities and/or the State,
Job security, income Salaried employment readily available for all, “job for life”, little self-responsibility, individual efforts are little if at all rewarded; Women encouraged to work.	Salaried employment is rare and confined to a reduced number of forest officers. Little security, focus on efforts and performance, which are rewarded.
Training of personnel Top-down, marked by scientific, technical knowledge, training to enforce forest policy	Focus on enabling stakeholders to play their agreed specific role, carry out their duties in forest management.

In discussions on the participation of local people in forest management, Kyrgyz informants often point out that local people have been involved in forestry activities for a long time, including the Soviet era, mainly as workers of the *leshozes*. This working relationship between local people and the State did not, however, include participation of local communities in any form of decision-making concerning forest management. In some cases, this working relationship might even have been little more than forced group work. A senior SFS official told the researcher that, during the Soviet period, the SFS had been working for 70 years without the participation of the local people and the SFS was trying to protect the forest from the people! Therefore, the involvement of local people in forestry activities during the Soviet era seems generally to correspond to one of the lowest steps of the participation ladder (see Table 3 in Section 2.4.4). Whilst this assessment might be correct, one should not forget that it may also reflect a Western perspective. Western development models would tend to think of participation in terms of empowerment of local communities.

Empowerment is mostly seen as a state to be aimed at and represents steps on the highest end of the participation ladder. However, this and similar concepts are not necessarily compatible with existing values in Kyrgyzstan either at national policy level or rural village community level. Indeed, the very idea of “empowering” local communities and individuals to negotiate or even challenge people in central authority would be an anathema to supporters of former Soviet styles of government and, in many respects, to many in power today.

7. Institutional aspects of forest management and roles of key stakeholders in forest management

With its focus on institutional aspects of forest management, this chapter addresses the research questions under the objective 2. It also contributes to the research objective 5. It explores a range of issues related to the transfer of property rights from the State to other stakeholders and provides information on the roles of the *leshozes* and the *Ail-Okmots*. The findings are discussed in the last subsection of this chapter against the background of the concepts introduced in Chapter 2. The interviews with representatives of different stakeholder groups on the potential and constraints for the involvement of local people in forest management constitute the main source of information for this chapter. Additionally, also data garnered from interviews with forest leaseholders are used.

7.1 Feelings of informants about their lease contracts and ownership of the plot

What tenants think of their lease contract in general and the extent to which they have developed a certain “ownership” of their leased forest plot is assumed to affect forest use and investments made into a forest plot. A rich tenant from Achy said: “I am sure about my ownership of the leased forest plot, otherwise I would not have planted trees on it” – thus demonstrating a link between what people feel about their contracts and plots and what they are doing or planning to do in future. The fact that there are cases in which people are sure about their access rights, is a sign of confidence in the emerging new order and the norms and rules shaping civil society. The above statement may also reflect the respondent’s strong “social” position. A poor person may not be able to share his confidence in a similar way.

7.1.1 Feelings of informants about their lease contracts

During discussions, the respondents assessed their individual agreements with the *leshoz* for their forest plots quite differently. Their statements are shown in Table 25 below, categorised in two basic groups: i) generally positive statements about the contract; and ii) statements which reflect mixed feelings about the lease agreement, revealed some concerns or made it clear that the informant was not at all satisfied with the contract. The statistical analysis of these data disclosed significant differences (Chi-Square test, Sig. = 0.002, Pearson Chi-Square value = 12.772) between people with different types of lease contracts (CFM, non-CFM long-term, seasonal contracts). About 80% of the interviewed CFM tenants said that they were generally happy with their lease agreements. This contrasts with the leaseholders of non-CFM long-term leases of whom only about 40% expressed the same level of satisfaction with their lease contracts. Seasonal tenants were rather positive about their contracts.

Table 25: Categorisation of statements about the lease contracts; distribution over different types of lease contracts (CFM, non-CFM long-term (NCFM), seasonal). Source: interviews on the households’ forest lease agreements.

	Total n = 88		CFM n = 39		NCFM n = 31		Seasonal n = 18	
	Counts	%	Counts	%	Counts	%	Counts	%
Positive feelings	58	66%	32	82%	13	42%	13	72%
Mixed feelings, concerns, not satisfied with contract	30	34%	7	18%	18	58%	5	28%
Total	88	100%	39	100%	31	100%	18	100%

The most frequently given reason for a generally positive view of the contract was the economic benefit which the household gets by using products from the forest. Clear rules, a key element in a civil society, were also important to the informants. Six CFM tenants explicitly stated the fact that they were allowed to keep the entire walnut harvest as an advantage of their contracts. Five respondents referred to the benefit of having such a contract for a forest plot for future generations. Another positive effect of having a lease contract noted on four occasions was its contribution to forest conservation in general. Two CFM tenants noted that it was positive that their contracts provided them the right to deny other people access to the leased plots.

The fact that the informant did not have a long-term contract over several years or even a permanent contract for the forest plot was the most often stated concern, mostly by people with seasonal or non-CFM long-term contracts. Second most frequently noted areas of concern were i) the lack of a written contract, expressed mostly by people with non-CFM long-term and seasonal contracts, ii) issues related to access rights to the forest plot, and iii) contract conditions which are perceived as being unfair. Four informants with non-CFM long term leases in Arstanbap-Ata and Achy complained that their written lease agreements with the *leshoz* did not resolve persisting problems with conflicting claims for user rights made by different parties. Two informants from rich households in Achy thought that only a complete privatisation of the forest would solve such problems. Complaints regarding unfair contract conditions included high leases payments to be paid to the *leshoz* in the case of non-CFM long-term leases and high workloads in the case of three CFM leaseholders from Uzgen. Another area of concern, brought up by CFM and non-CFM long-term leaseholders, was that they were unsure of the legal power of their contracts and thus the recognition of their rights in case of conflict. One of these informants, who had worked in the *leshoz* for 33 years, said that he needed an official confirmation from the *leshoz* that he was “the master” of his plot as a guarantee against claims of other people.

7.1.2 Feelings of ownership for the leased forest plot

The statements of the informants concerning the extent to which they felt ownership for their leases forest plots were categorised in the following three groups: i) strong, ii) somewhat limited and iii) no feelings of ownership whatsoever (see Table 26). A majority of respondents harboured fairly strong or strong feelings of ownership for their leased forest plot. About 20% of them each had either only a very limited feeling of ownership or even no such feeling at all.

Table 26: Levels of feelings of ownership held by the informants; distribution over different types of lease contracts (CFM, non-CFM long-term (NCFM), seasonal). Source: interviews on the households' forest lease agreements.

	Total		CFM		NCFM		seasonal	
	Counts	%	Counts	%	Counts	%	Counts	%
Fairly strong or strong feelings of ownership for the leased forest plot	43	60%	22	69%	12	50%	9	56%
Limited feelings of ownership, doubts concerning ownership	15	21%	9	28%	2	8%	4	25%
No feelings of ownership	14	19%	1	3%	10	42%	3	19%
Total	72	100%	32	100%	24	100%	16	100%

The proportion of informants who have developed at least a fairly strong feeling of ownership for their plots is highest with CFM tenants and lowest with non-CFM long-term leaseholders. Most of the respondents apparently having no feelings of ownership for their leases forest plots have non-CFM long-term leases in Arstanbap-Ata or Achy.

The most frequently given reasons for a high level of ownership include the possibility to refuse others access to products from the plot and feelings of responsibility for the plot and of confidence of working according to the contract. The feeling of being in control of the plot and having the right to deny access to the plot to other people seems to be decisive. Granting the leaseholders exclusive user rights for certain or even all products on their plots thus effectively turns these products into private goods. For five informants, the mere existence of a contract providing some security of access to the plot was reason enough for their feelings of ownership for the plot. The fact that nine seasonal leaseholders expressed strong feelings of ownership for their seasonally leased plots (see Table 26) might be surprising at first sight, given their seasonally limited contracts. However, most of these seasonal tenants have collected walnut from the same plot for a long time. Sometimes, their parents or other ancestors had used the same plot before them. Such traditional ties which are established through custom and practice substantiate strong feelings of ownership, regardless of the formal, temporarily limited conditions of a seasonal contract.

The main reasons for leaseholders to doubt about the level of ownership they really have over their leased forest plots are open questions regarding either the extent of their user rights now or in the future or the extension of the contract over a longer period of time. One CFM tenant explained that he would have the feeling of being his own master on the leased forest plot only once his contract had been extended on 49 years and registered with the *Goszemregister*, the national agency for the registration of land and real estate entitlements. He added that with these steps the forest plot “will be handed over to me like private property”.

The most frequently stated reason for a complete lack of any feelings of ownership for the forest plot was that the respondents, all seasonal or non-CFM long term leaseholders, had only limited user rights while the plots remained State property controlled by the *leshoz*. The latter could claim the plot back or give it to somebody else at any time. Three informants referred to negative experiences that they had made with false promises or reversed decisions made by the *leshoz* concerning their plots. They pointed out that, due to this experience, they did not trust any decision taken by the forest authorities anymore. One informant categorically stated that he would feel no sense of ownership for the leased forest plot until it was formally privatised.

To sum up, one can say that issues of reliability, the degree of formalisation of contracts, key contract parameters, such as a clear determination of user rights or its duration, and personal experiences shape the informants' attitude towards their contract and their feelings of ownership for the leased plots. CFM leases, which are the most formalised type of lease looked at in this study, are associated with higher level of satisfaction and feelings of ownership held by the leaseholders than the other types of leases studied. Assuming that high ownership is linked with high efforts for the protection of the leased plot, these results imply that a CFM lease creates the most favourable conditions for the sustainable management of the walnut-fruit forest.

7.2 Access to products from forested areas

On the level of forest products, fieldwork has shown that, on all four research sites, there are systems of partly overlaying user rights granting private access to essential products such as firewood, hay, agricultural crops, where available, and walnut. Access to other, commercially less interesting, wild growing NTFPs, on the other hand, is usually open to everybody. The observed pattern of access rights to some important products and groups of products from forested areas on the research sites is summarised in Table 27.

Table 27: Products and groups of products and their access regimes on the four research sites. Source: semi-structured interviews on forest use practices.

Product, group of products	Access regime
- Walnut	Private access granted by the <i>leshoz</i> to the respective leaseholder(s), sometimes passed on by them to other people
- Hay	
- Agricultural crops cultivated on forested areas	
- Firewood to be cut	
- NTFPs other than walnut and firewood	Open access
- Small firewood collected from the ground	
- Grazing on unfenced forested areas	

Table 49 shows which products the households interviewed for this study collect only from their leased forest plot and which they collect from other parts of the forest. The table is sorted in decreasing order of the number of households that use a product only from the leased forest plot.

Table 28: Number of households using a given product either only from their leased forest plot or also from forested areas beyond the borders of the leased plot. Only products that are used by at least eight households are listed in this table. Source: semi-structured interviews on forest use practices.

Product or group of products	Total number of households using the product	... of which households using the product <u>only</u> from the leased forest plot	... of which households using the product <u>also</u> from forested areas beyond the border of their leased forest plot
Walnut (<i>Juglans regia</i>)	84	71	13
Hay	42	34	8
Agricultural crops	26	26	0
Firewood	83	22	61
Wild apples (<i>Malus</i> spp.)	54	18	36
Rosehips (<i>Rosa</i> spp.)	37	10	27
Cultivated fruit	11	10	1
Mushrooms	57	9	48
Sogdiana plum (<i>Prunus sogdiana</i>)	29	7	22
Medicinal herbs	27	6	21
Red hawthorn fruit (<i>Crataegus</i> spp.)	24	6	18
Branches	13	6	7
Berries	10	4	6
Seeds of woody species	21	3	18
Grazing for livestock	8	3	5
Herbs, spices, wild garlic	9	2	7
Berberis fruit (<i>Berberis</i> spp.)	12	1	11
Yellow hawthorn fruit (<i>Crataegus pontica</i> K.Koch)	21	0	21

Agricultural crops, cultivated fruit, such as apples and stone fruit, walnut and hay are in most cases harvested only from a tenant's leased forest plot. Only a small proportion of the interviewed households get these products also from forested areas beyond the border of their leases. Firewood is another product for which, one would assume, competition is stiff, given its importance. However, only a fourth of the interviewed households collect its firewood exclusively from the leased plot. The main reason for this is that on all sites, households are usually assigned special plots for firewood collection outside their lease plots. The other products listed in Table 28, for which competition between local people is low and access is open, are collected wherever convenient by the informants.

A majority of the informants (53 of a total n of 92) said that no other people from outside their households had access to products on their forest plots. Most of them did however say, when prompted, that they did not mind if other people collected wild growing NTFPs other than walnut from their leased plots. Right from the beginning, 38 informants said that others had access to certain products. An important reason for this was that other people had user rights for certain products, mostly hay. Most other cases concerned walnut, which is often harvested with the help of people from outside the household. Some informants also pointed out that other people would steal walnut from their plots, which they could not prevent.

Many households said that on their plots other people had free access to all NTFPs except walnut and, in most cases, except firewood. However, access to otherwise openly collectable NTFPs is often temporarily restricted during the walnut harvest by the leaseholders of the areas concerned to forestall walnut theft. Leaseholders usually guard their plots intensively during the weeks preceding the walnut harvest and at harvest time. During the rest of the year, most plots are only occasionally controlled, with the exception of the plots on which leaseholders cultivate agricultural crops. Most leaseholders told the author that they would let other people collect walnut as soon as they themselves had collected the bulk of the walnut yield and continuing the harvest thus becomes less profitable and very time intensive. At this time, usually in late October and November, mostly children and very poor people who are in urgent need of cash income collect walnut. Some leaseholders ask them for a percentage of what they collect; other leaseholders let them collect for free. Such arrangements, particularly those letting people collect for free, point to feelings of social responsibility coupled with rational economic sense held by the leaseholders involved.

7.3 Access to forest resources and equity

On all sites, there are concerns regarding the fairness of access to forest resources in general and regarding the equity of the current practice of lease allocation in particular. These concerns are fuelled by reports of inequitable distribution of leases and social conflicts. People from different sides (village heads, municipalities, elders, members of women's councils, researchers) criticised the *leshozes* and forest rangers for inequitable and socially unjust allocation of access rights to land and forest resources. They observed tendencies to attribute forest leases on the basis of kinship or personal relation, to give preference to former or current *leshoz* employees, to give forest plots primarily to those who already have plots and to rich and influential households, or to give bigger or more productive forest plots to these groups of households. They also pointed out that the decision-making process was often not very transparent. This would leave households with none of the above characteristics, in particular poorer households, often without formal access rights to forest resources, and would lead to situations in which a few households control huge areas of forest.

The possible allocation of large forest plots to influential outsiders was a particular concern to local villagers. At the time of fieldwork, there were rumours in several villages that rich outsiders were interested in leasing huge forest tracts. In such cases, the *leshoz* finds itself often in between pressure exerted from outside, often through official channels, in favour of such arrangements and the worries of the local population to be barred from using the forests in question. Under such circumstances, the allocation of individual leases and with them exclusive user rights for a given area risks to aggravate local conflicts and social disparities.

Generally, representatives of the SFS at regional or national level did not deny that there were equity problems in the process of granting access rights to forest resources, including CFM plots, due to a tendency of local decision makers to favour their relatives and people with good connections. Usually, they were also aware of the fact that this situation had a negative influence on the trustworthiness of the administration. At the *leshoz* level, some foresters including a *leshoz* director, acknowledged the existence of a danger to exclude poor households from access to natural resources. Other foresters did however simply dismiss the possibility of any discrimination of poor households in the case of CFM by referring to the CFM Regulations or by declaring that wealthier people had no interest in forest resources whatsoever and that, therefore, CFM plots were mainly given to poor people. Paragraph 1.4.5 of the CFM Regulations require equality in plot distribution: “When distributing plots, all local people must have equal opportunities to get a plot for CFM activities, if they are willing and capable to carry out forest management activities on the plots, taking into account the forest plots demand and supply ratio”.

Many SFS-representatives at the *Oblast* and national level equally referred to the CFM Regulations to prevent or solve equity problems and to newly introduced institutions such as the CFM board as a body for the resolution of conflicts. The SFS-representatives stressed that *leshozes* and local decision makers had to observe the CFM Regulations. In the case of non-CFM leases they referred to local conflict solving mechanisms such as bringing an issue to the attention of the council of elders.

In the case of CFM and other long-term leases nearly all foresters stressed the importance of the ability of an applicant to conduct the planned work, which is often linked to relevant working experience. The first condition corresponds to the CFM Regulations which stipulate that CFM-leaseholders have to be “willing and capable to carry out forest management activities on the plots”. But often, the informants went further when describing which characteristics a CFM tenant ought to have. One *leshoz* engineer literally said: “If somebody can make a good contribution to *leshoz* work, we shall give him a plot.” The wording of this statement suggests that this engineer sees CFM primarily in terms of the benefits for the *leshoz* and not for the leaseholder or forest conservation. Sometimes, being a former or current *leshoz* employee was formulated as an explicit condition for taking up a lease by local foresters. Other foresters just said that they would give preference to former or current *leshoz* staff members since they had the necessary knowledge. All these results show, that available rules are often interpreted and applied in a way which suit the decision makers. Foresters also quite often used the fact that former *leshoz* employees had the necessary knowledge to justify why in some places the distribution of CFM leases was clearly biased in favour of current and former *leshoz* employees.

Various approaches to address these existing equity problems were suggested by the informants. As a means to make sure that poor, less influential households can benefit from forest resources, both foresters and non-foresters suggested granting individual leases in the first place to families depending on forest resources for their livelihoods in settings with high populations and little forested areas. Households with ensured permanent incomes from

other sources and economic activities, such as a paid job or commercial activities, should be excluded or only be taken into consideration in a second round. An elder from Arstanbap-Ata who also advocated such a solution pointed to the increasing economic specialisation amongst villagers that he expected to result in a decreasing dependency of an increasing proportion of local households on forest resources. A chief forester suggested that hard-working poor families should get more chances to get income from the walnut harvest than families that are better off. *Leshoz* officials in Arstanbap-Ata claimed to take the economic state of local households into account when granting user rights to them (seasonal leases, CFM leases, haymaking plots *et cetera*) and to give a preference to poor households.

The informants stressed that the precise criteria for the allocation of forest and other plots should be defined and agreed upon by the community. The head of a village in Achy *leshoz* emphasised that the *Ail-Okmot* had all the necessary information on the local households for the implementation of a pro-poor policy. In their village, they had recently assessed the state and the resource base of the households of their neighbourhood. This analysis had shown that some households had access to a range of different resources, whereas others, poor households, had only very limited resources available to make a living. The outcome of this survey was discussed with *leshoz* representatives. The *leshoz* director was subsequently asked to grant access rights to natural resources in the future on the basis of these findings and to collaborate with the village head and the *Ail-Okmot* on these matters. This village head stressed the need for a mechanism that makes sure that, in future, poor households get access rights to natural resources in the first place so that a possible exclusion of poor households from the legal use of natural resources can be prevented. Local leaders from the *Ail-Okmot* and the *leshoz* alike should then provide advice and information particularly to the poor households to make sure that they can use their resources for their benefit. The logic behind these ideas is that every local household gets the opportunity to make a living from either natural resource use or any other economic activity which can be undertaken locally.

7.4 Secured access to forests resources – promoting local ownership *versus* creeping privatisation of forest plots

7.4.1 Increased ownership and forest protection due to individual leases

Generally, there is broad agreement over all stakeholders groups and research sites that local households have to be involved in forest use and management in a way which allows them to take over responsibility for, at least, forest protection. Foresters as well as non-foresters pointed out, that, under the current economic circumstances, the forest sector relied on the contribution of local people and the private sector to ensure forest conservation in the long run. SFS-representatives at regional and national level put the idea of a stronger involvement of private households in the context of the expected shift of an increasing number of management tasks and responsibility for operational forest management to private stakeholders with the State keeping a control function ensuring forest conservation and the preservation of public interests in forest resources.

As to the duration of leases, there is a broad consensus amongst all interviewed stakeholders on the need for long-term agreements with local households. Many foresters suggested a duration of at least five years. Most of the non-foresters spoke in favour of durations up to 49 years or even longer. The allocation of seasonal leases is believed to contribute little to forest conservation. Some informants considered it even to be dangerous due to potential thoughtless overexploitation.

Granting individual exclusive user rights for delimited forest plots has, as many stakeholders consistently stressed, proven to be a good means for the rehabilitation of degraded areas and increased forest protection. The forest plots in vicinity of the village of Arstanbap-Ata over which responsibility was handed over to private people in the 1980s are good examples for the success of this model in terms of increased forest protection. In most cases, the leaseholders have turned such formerly severely overgrazed and degraded areas into flourishing forest stands, sometimes even with regeneration, or into productive agroforestry systems. From the author's own observation conducted in Ortok and Uzgen it appears that the introduction of CFM leases on these two sites has also considerably improved the protection of the leased areas. On all sites, individual leases have clearly promoted ownership for the leased plots amongst the leaseholders. Thus, from the perspective of forest protection, one could suggest expanding the existing leasehold systems. However, individual leases come often with the risk of excluding some parts of the community from forest use. This aspect and possible alternatives to leasehold schemes will be explored in more details in the following Sections.

7.4.2 Ensuring access to forest resources for everybody

The allocation of individual, exclusive user rights raises, as previously noted, questions about equity and fair access to forest resources, especially in places with limited forest resources and high populations. A central concern for nearly all informants, including a representative of the Regional Forest Administration Jalal-Abad, was the granting of forest access to all local residents. Village heads in particular pointed out that the local population demands access to forest resources for everybody. Most informants would prefer an even distribution of rights of use, at least for the time of the walnut harvest, to the current situation in which only a part of the population has permanent access to a considerable proportion of the forested area. Many informants qualified such a distribution of forest access rights to be unjust and sometimes even socially explosive.

The main arguments against a distribution of the whole forested area amongst local households put forward mainly, but not only, by foresters are:

- Insufficient forested area in some *leshozes* to allocate forest plots in economically reasonable sizes to all local households;
- Need for revenues for the *leshozes* and in particularly the forest ranges, which are not longer supported from the State budget, to keep their organisation running;
- Discrimination of the coming generations if the entire forested area was distributed now. Representatives of *Ail-Okmots* often raised this point concerning intergenerational equity. They said that, given the current population growth, provisions should be made to ensure that households to be founded by the coming generations would also have access to forest resources;
- A sudden handing over of the forested area would pose a considerable risk for forest conservation, since the local population is judged not yet to be ready to take over responsibility for forest conservation. The informants making this point thought that a more positive, protective attitude towards forest resources had to evolve first.

Given the above mentioned demands for access to forest resources to all members of local communities and the finiteness of forest resources, even in places with relatively large forested areas and a small population such as Ortok, it appears that difficult political decisions regarding the policies governing access to forest resources have to be made.

7.4.3 Risk of a creeping privatisation

Foresters and non-foresters agreed that granting individual long-term leases which exclude other forest users from the forest plot comes very close to a *de facto*, albeit not legal privatisation. Nearly all informants expect a consolidation of the feelings of ownership felt by the leaseholders for their forest plots over the years to come. It is believed that after a couple of years, leaseholders will consider their plots as their own property, although legally they are still owned by the State. It is therefore generally expected that the user rights will remain with the leaseholder and his descendants well beyond the end of a first lease term. A forest ranger pointed out that now people refused even to hand back haymaking plots or forest plots which they had leased for only a few years. In 2003, local people in Uzgen manifested a high interest in receiving CFM leases despite the lack of walnut in autumn. A forest ranger interpreted this as a sign that people feel that the forest area available for leasing gets increasingly scarce and that they therefore better apply as soon as possible for a lease, as they risk to end up without any forest lease if they applied later.

The respondents from all sides unanimously considered a formal, legal privatisation of forests under the current general economic conditions in the country to be a danger for the conservation of the WFFs. Informants across all stakeholder groups expressed their concerns that such a move would lead to a depletion of forests, in particular for timber. Furthermore, it was feared that such a step would be socially unjust with rich and influential people getting the lion's share and poor households losing out. The head of the *Ak Sakal* council of one of the villages in Arstanbap-Ata explained his rejection of forest privatisation with the negative experience of the agricultural privatisation of the 1990s, which had "further widened the social gap". There were, however, also within SFS, voices in favour of a privatisation of parts of the forest at a later stage whilst ensuring that the private owners can be held responsible for what they are doing and that public interests are safeguarded.

7.4.4 Alternatives to individual leases

Some informants who were involved in the development of CFM pointed out that the system of allocation of individual leases, be it a CFM or any other type of individual long-term lease, will always lead to equity problems and conflicts, because some households will be excluded, in particular in situations with a high population density and little forested area, such as in Arstanbap-Ata or Achy. They therefore identified a need to explore alternatives to individual leasehold approaches. Ideally, such alternatives should guarantee access to forest resources to everybody, or at least to all people interested, and a fair distribution of the benefit from the forest amongst all members of the community. One of the informants with a scientific background suggested that in the long run, once the population has developed an ecological awareness, the local communities could be entrusted with the responsibility for forest management. Measures to raise the levels of awareness of the importance of intact forest ecosystems amongst local people could be part of a long-term strategy aiming at increased social and human capital for the sustainable management of the WFFs.

During some of the interviews the question of individual *versus* group leases came up. The results of these discussions are certainly not representative, given the small number of statements on that matter (13), but they provide some indication on how local people view individual and group leases. Three *Ak Sakals*, one representative of the Regional Forest Administration, two researchers and the chief forester from one of the four research sites stated a clear preference for group leases or, at least, for an allocation of individual, conjoined plots allowing several households to collaborate. Two informants (one woman, one forest ranger) were indifferent, but stressed the importance of the adaptation of the

leasehold system to local conditions, in particular in terms of availability of forest resources. Two women, one *Ak Sakal* and one head of a village in Achy *leshoz* clearly preferred individual to group leases.

Arguments in favour of group leases

- Guarding of forest plot easier to organise (twice mentioned);
- Work is easier to organise (three times mentioned);
- Workload can be shared and group members can help one another;
- There is mutual social control among the group members (mentioned twice);
- It is less boring to do work in a group than alone;
- Less material needed for fences *et cetera* if a larger area can be fenced off;
- Equity problems related to individual leases can be avoided, as long as it is guaranteed that every interested household gets the possibility to participate in the scheme.

Suggestions for the organisation of group leases

- Some households (10-20) together for a bigger plot with subplot assigned to every family for planting and harvesting, some of the work to be jointly organised;
- One lease for groups of households, or at least several households joining forces to organise forest protection and work in the forest;
- Wherever possible entire geographical entities, clearly delimited areas such as valleys, *et cetera* to be given to groups of households;
- Group leases in particular in places with a high population and small forested area, stressing the need for a group member representing the whole group.

Arguments in favour of individual leases as opposed to group leases

- Differences in working attitudes leading to an unequal distribution of the work load and tensions within the group;
- Clear responsibilities in the case of individual leases (three times mentioned);
- Less conflicts than within a group of families;
- Granting of individual leases makes it possible to use competition amongst local households as a source of motivation for forestry work;
- Initiative tenants can motivate others, can set an example for others.

There are illustrative examples of people collaborating on a voluntarily basis in forest management. Fieldwork on one of the sites with heavy human pressure revealed an interesting case in which all households of an entire hamlet agreed on taking up a joint lease for a large forest plot above their houses. This particular forest plot protects the hamlet against erosion and other natural hazards. The combined interests in the conservation of this forest, in forest products and in small arable fields within the forest motivated this small community to get a group-lease. All current and future inhabitants of the hamlet are considered to be legitimate members of this forest user group. They conduct some of the forestry work, like tree planting, jointly. At the same time, all members have clearly delimited individual agricultural plots in small clearings. The interviewed members of this group were generally positive about their joint lease. Some of them conceded that not all members made equal contributions in terms of effort. However, this was not considered to be a fundamental problem.

7.5 Power and decision-making – striking a balance between ensuring public interests in forest conservation and effective, efficient local decision-making

The ongoing institutional reforms in the forestry sector are expected to lead to the administrative decentralisation of decision-making away from the centres down to an appropriate level. Which level is judged to be appropriate depends on the specific question. But, generally, it is expected that a considerable part of the authority for decision-making that traditionally used to be with the central office of the *leshoz* will eventually be handed over to the level of the forest range. Thus, forest rangers are expected to become key figures for the implementation of the forest policy in the field.

During the interviews, local informants and representatives of the *Ail-Okmots* often expressed a general mistrust in SFS and voiced their concern that a considerable part of the funds generated locally at the level of the forest range vanishes within the apparatus of the SFS. A director of an *Ail-Okmot* clearly disapproved of what he described as a very high number of administrative levels of the SFS above the forest range and of the power and influence of the *leshoz*, the Regional Forest Administration and the SFS. He continued by stressing that it was important to give the forest rangers more decision-making power, in particular as the forest ranges are supposed to be financially self-sufficient. He expected the local population to observe and follow the work of the forest rangers with interest and the rangers to become accountable towards local communities, even though formally, they remain with SFS. Against the background of the planned decentralisation of more decision-making power to the local level, also other representatives of *Ail-Okmots* and other local informants expressed their hopes that in future decision-making powers and accountability of forest rangers and the *leshozes* towards local communities will be improved.

Such rather positive expectations contrast with the point made especially by *Ak Sakals* and other local residents that also in future a strong control from outside the forest ranges, similar to the control now executed by the central office of the *leshoz*, was needed. They feared that otherwise there was too much danger of the foresters to make informal deals. These informants believed that only an external State body that is independent from local politics could ensure the safeguard of public interests in forests. The idea of relying solely upon possible stronger social control of the forester's activities and closer informal ties between the *Ail-Okmot* and foresters did not seem to satisfy them. Given their experience with corruption on all levels of the State administration, they expressed their worries that decentralisation of decision-making power could primarily lead to a "decentralisation of corruption" unless the empowered decision makers were fully accountable to local communities regarding the use of the locally generated benefits and to the State as the legal owner of the forest.

7.6 Role of *leshozes* and *Ail-Okmots* – working in parallel versus promoting rural development together

The situation regarding the ownership of forests and non-forested land varies, as described in Section 6.4, considerably between the research sites and, more generally, within the entire WWF-belt. There are places, such as the territories of the *Leshozes* Arstanbap-Ata, Achy and Ortok, where the *leshoz* controls all the land, non-forested as well as forested. In such places, the responsibility of the *Ail-Okmot* is limited to the area of existing settlements. A local *Ak Sakal* described this situation as follows: "The *Ail-Okmot* was left with the local population and nothing more, while the *leshoz* was left with the forest and all the land, but without

people”. A forest ranger made the effect in terms of power even more explicit by saying: “The *Ail-Okmot* has authority, but all the wealth is controlled by the *leshoz*”.

The information gained during the interviews suggests that, generally, there is a low level of trust amongst local residents in the *leshozes* as well as the *Ail-Okmots*. This reflects the low level of trust in State bodies and institutions of social control in Kyrgyzstan in general, as reported in studies such as World Bank (2002b) or Sapsford (2006). Representatives of a women’s council in one of the villages in Arstanbap-Ata *Leshoz* said that they had the impression that neither the *Ail-Okmot* nor the *leshoz* really took responsibility for the forest, and that nobody was interested in the fate of local women, although both bodies were, as they understood it, supposed to deal with such issues. Local informants believed that both institutions could make more efforts to reduce poverty, for example by supporting local households in the field of processing of forest products, as it was suggested by the head of a village and a member of a local women’s group. During these interviews, representatives of the chosen stakeholder groups quite often accused the *leshozes* of indifference towards local people’s well being. While this clearly indicates that a lot of people are not satisfied with the *leshozes*, one should bear in mind that during the Soviet era the *leshozes* provided everything necessary for life. Thus, memories of this “golden past” and an element of remaining dependency on the *leshozes* might linger on in such statements.

The interviews with representatives of the *Ail-Okmots* made clear that *Ail-Okmots* take an interest in forest management and in questions concerning land use. They explained that this interest was mainly motivated by the *Ail-Okmot*’s responsibility for the well-being of the local population, for social questions and for poverty reduction. *Ail-Okmots* on all the research sites are reported to demand from the *leshozes* that they help poor families and allocate them forest use rights. People whose application for farm land or a forest plots has been turned down by the *leshoz* often lodge a complaint against the *leshoz* with either the Regional Forest Administration or the *Ail-Okmot*. This may result in a demand or pressure from within the SFS or the *Ail-Okmot* on the *leshoz* to reconsider its decision. In this way, the *Ail-Okmot* has sometimes an informal say in the allocation of natural resources controlled by the *leshoz*. However, the *Ail-Okmots* have no formal power and leverage, since the *leshozes* are not subordinated to the civil administration. The fact that people dare to challenge a decision made by a State organisation can be taken as an indicator for a forming civil society.

In 2002 in Achy and in Arstanbap-Ata the respective *Ail-Okmot*, with the support of the local population, forced the *leshozes* to allocate a certain number walnut trees to every interested household for the walnut harvest. In the case of Achy, this led to a more balanced distribution of harvest rights. There was a similar effect in Arstanbap-Ata, where the *leshoz* originally intended to involve fewer households in the walnut harvest. Their plan was to assign harvest rights for small, clearly delimited areas to a few households (3-4 households) together which would have rendered the control of the harvest relatively easy for the *leshoz*. But after the intervention of the *Ail-Okmot*, more households than the *leshoz* had planned had to be involved in the harvest. A forest ranger concerned said that the new harvest organisation largely imposed by the *Ail-Okmot* was one of the main reasons for the failure of the *leshoz* to meet the planned harvest targets that year. The new organisation meant that more households than the *leshoz* could effectively control and tax were involved in harvesting operations. This example illustrates how interests of *leshozes* and *Ail-Okmots* sometimes differ. Moreover, it is another sign that, increasingly, people demand their rights from the authorities and do not hesitate to exert pressure on the latter to reach their goals.

Despite such differences, many foresters and representatives of the *Ail-Okmot* agreed that both institutions could work alongside one another as long as their responsibilities were clearly defined and did not overlap. Many foresters pointed to what they saw as a good collaboration, particularly in the field of assistance to poor households. However, some foresters consider initiatives taken by the *Ail-Okmots* affecting forest management as interference in internal affairs of the *leshoz*. A forest ranger critically stated that, from his point of view, efforts by the *Ail-Okmot* and the *Akimiat* (district administration) to take influence on *leshoz* decisions were often just undertaken for the sake of improving the reputation of the civil administration amongst local people. The same forest ranger also expected all the credits for his and his colleagues' efforts to provide firewood to poor households for free to go to the *Ail-Okmot*.

Regarding future organisation, some informants, including representatives of *leshozes* and *Ail-Okmots*, strongly advocated the case for the unification of these two State bodies. They explained that they had the impression that the concurrence between the two intuitions leads to too much frictional losses and therefore negatively affects natural resource management.

From the perspective of sustainable forest management, understood as a holistic concept, it is interesting to note that foresters on all levels often refer to a clear separation of responsibilities between the *leshoz* and the *Ail-Okmot* as a precondition for a good collaboration. Despite some declarations of responsibility for the local population made by foresters one gets the impression that most of them do not consider social questions regarding land and forest use to be an integral part of forest management. It is rather seen as something with which the *Ail-Okmot* should deal, leaving the foresters more capacity to focus on technical forest management, in the sense of "they are responsible for social questions, we are responsible for forest conservation and forest management" (a forest ranger from Uzgen *Leshoz*). This results in the *Ail-Okmot* and other local institutions, such as the head of villages, becoming the local social conscience, whereas SFS exposes its broadside to criticism.

7.7 Discussion on appropriate institutional arrangements for the management of the walnut-fruit forests

In this Section, the results of the study in terms of access rights and roles of different stakeholders in forest management are discussed in the light of the concepts introduced in Chapters 2 and findings from the literature. This discussion revolves around the devolution of property rights in the WFFs and the question concerning appropriate institutional arrangements for the management of forests in countries in transition.

The Section identifies, as stipulated by the research objective 2, important opportunities and constraints at the governance level for the enhancement of sustainable forest management. Beyond that, it also explores ways for the implementation of multipurpose forest management involving local people in the future and does thus contribute to the research objective 5.

7.7.1 Convergence and divergence of interests in the participation of local people in forest management

Fieldwork showed that there is a broad agreement amongst all stakeholders interviewed that local people have a role to play in forest management. They also found that participation of local people in forest management is in fact an economic necessity under the current circumstances of transition. Under the surface of this broad agreement, there are however a

variety of different interests in the participation of local people. This is illustrated by the a *leshoz* engineer saying that if somebody was able to make a good contribution to *leshoz* work, the *leshoz* would allocate him a CFM lease (see Section 7.3). Apparently, this engineer sees CFM primarily as a means to fulfil *leshoz* work. As the author observed during fieldwork and Fisher (2003a, p. 6) confirms, there is a tendency that *leshozes* see CFM primarily as a means of meeting *leshoz* work plan requirements. The area available for and the number of CFM leases is often defined in function of the amount of labour the *leshoz* requires to meet the targets of its annual plans for planting, seedling production and other forestry activities. Areas beyond this are then by preference allocated to local people as seasonal leases (Fisher 2003a, p. 6). In contrast to the CFM lease for which people pay in-kind by providing labour, a seasonal lease provides the *leshoz* with income. While this is an economically rational behaviour by *leshoz* staff, it limits the number of CFM leases in the *leshozes* resulting in a small proportion of the total population having a CFM lease. This contributes to the equity problems concerning the distribution of forest resources amongst local people. This example illustrates that a convergence of interests held by local people and representatives of the State is not always given in Southern Kyrgyzstan. Such a convergence is however considered to be critical for the success of devolution in forest management (Edmunds *et al.* 2003a).

7.7.2 Security and extent of property rights transferred to local people

The higher level of satisfaction with their amongst CFM tenants in comparison to holders of non-CFM long term contracts emphasises the significance of clear property rights for devolved forest management (Edmunds *et al.* 2003a). The term “clear rights” refers to clarity in terms of the extent of the rights (what products *et cetera*), of the duration of the contract, to the degree of formalisation of the contract (e.g. oral *versus* written) and to the availability of a recognised basis on which the rights can be claimed. The absolute length of the contract duration²⁶ also influences the judgment of the leaseholders on their contract. Of course, there are also individual differences in these judgments. The results suggest that for some CFM tenants²⁷ having a CFM lease and the prospect of an extension on 49 years was enough to develop a feeling of ownership for the forest plot. Others are more sceptical and see an extension of the contract as a condition for them to really develop such a feeling for the leased plot.

Schlager (1992) argues that secure alienation rights combined with rights to exclusion, i.e. full ownership of a resource, are necessary for long-term investments to be made by the rights holders. However, the findings from this study suggest, that for most of the interviewed tenants, being a proprietor, i.e. having rights of access, withdrawal, management and exclusion, is sufficient to develop a feeling of ownership for their plot. Amongst these rights, the right of exclusion is particular critical in the case of Kyrgyzstan. It provides the holder with the security that she/he will be benefiting from her/his management arrangements made on the forest plot. Also in other contexts, proprietors have been found to have sufficient rights to make decisions on long-term investments and harvesting from a resource (Agrawal & Ostrom 2001b). Obviously, in forestry, property rights need to be transferred for fairly long periods of time to stimulate long-term investments.

²⁶ Duration CFM: 5 years probationary period + possible extension on 49 years; non-CFM long term lease: varying durations from annual renewal of the contract to 5-10 years.

²⁷ All CFM tenants interviewed were in their five-year probationary contract period when fieldwork for this study was conducted.

7.7.3 Different property rights regimes for different products

The pattern that use rights are territorially defined for walnut, hay, agricultural crops and firewood whereas there is open access for all other NTFPs can most plausibly be explained with the commercial or subsistence value of the first four products for local people's livelihoods. The fact that most of the interviewed leaseholders do not mind other people collecting NTFPs other than walnut on the leaseholders' plot points to a broad understanding amongst local people about this system. Accordingly, most tenants apply the right to exclude other people from harvesting products on one's leased plot in the sense of this system. In the case of CFM contracts, the exclusion right does, strictly speaking, anyway only extend to products that are itemised in the contract.

This consensus-based system of private access for the products that are most significant for local people's livelihoods and of open access for the other products could however change if demand and with it competition for a product that now attracts little interest increased. In this case, there would be a need to clarify the use rights and respective claims on the basis of the existing contracts and legislation.

7.7.4 Access to forest resources and equity

Accounts, from all four research sites, of inequitable and socially unjust allocation of property rights to forests, of patronage and elite capturing in the allocation process (see Section 7.3) indicate that equity, fairness and transparent decision-making are key concerns of local stakeholders concerning access to forest resources. The importance of having good personal connections with the *leshoz*, be it as a former employee or due to one's material wealth, is confirmed by the findings from Scherrer (2004, p. 49 *et seqq.*) who interviewed people involved in decision-making over the allocation of CFM leases in two *leshozes*²⁸ in the WFF-belt. Inequitable lease allocations clearly jeopardise the goal of any participatory approach to forest management to improve the well-being of local people. Patronage, especially in favour of former *leshoz* employees, in the allocation of leases in the walnut-fruit forests of Kyrgyzstan has been described by other authors as well (e.g. Buttoud 2001a, p. 70; Fisher 2003a, p. 19). Patronage is one form of the phenomenon of elite capturing that is a major constraint for a successful implementation of CFM in many countries (c.f. for examples from Nepal Malla (2001) or Iversen *et al.* (2006)).

These problems point to the need for clear policies regulating access to forest resources and observance of the existing rules and regulations when deciding on the devolution of property rights, as the good governance principle "rule of law" stipulates. These policies should clearly define the entitlement of different interested parties (e.g. resident population, outsiders, private companies) and specify the criteria of eligibility for forest use and control rights. The principle of transparency can be taken to mean that information about the process of decision-making including the criteria applied are made available to the parties interested and that reasons for the decisions made are given. These considerations, and the suggestion made by informants that the communities should have a stake in the definition of the criteria for the allocation of forest plots, raise issues of community participation in the decision-making process concerning forests, representativeness and accountability of the *leshozes* and the SFS. These issues will be discussed in Section 7.7.6 below.

In the case of seasonal and non-CFM long term leases, the author did not find any such specific rules and regulations for decision-making. It thus can be concluded that the *leshozes*

²⁸ One of the two *leshozes* in which Scherrer conducted her work is a research site of the study at hand.

and notably their directors have considerable discretionary power in these decisions. In the case of the Kyrgyz model of CFM however, the CFM Regulations include provisions regarding the decision-making on CFM leases. With the CFM approach, also a number of checks and balances to ensure a transparent, equal and equitable distribution of leases, vested in newly established institutions (CFM board, CFM commissions, see Section 6.4.1), was introduced. Concerning the CFM Regulations, Fisher (Fisher 2003a, p. 23) notes a certain ambiguity in Paragraph 1.4.5 that requires equality in the allocation of plots. It can be interpreted in different ways: either that everyone is entitled to get a forest plot subject to the formulated conditions, or, alternatively, that candidates for a limited number of plots should have equal opportunities. He therefore suggests clarifying his point in a revision of the regulations.

The results of this study demonstrate that despite the availability of such regulations, local people still report problems in the allocation of CFM leases. This points to weaknesses in the implementation of the rules and in the functioning of the checks and balances of the CFM system. This is confirmed by the findings from Scherrer (2004, p. III *et seqq.*) who found in two *leshozes* that the CFM board and the two CFM commissions did not function as intended and did not ensure equity in the allocation of CFM leases. The same author also noted that people involved in decision-making at field level as well as potential candidates for CFM leases had only a limited understanding of the CFM Regulations and of the roles and functions of the CFM commissions and the CFM board. These findings call for a review and possible adaptations of the CFM approach. More fundamentally, these results question the prospects of success of establishing new institutions for participatory forest management and vesting checks and balances for transparent decision-making and equity in the allocation of forest leases in them. Whilst raising such questions it is important to remember that the complex social and political process of developing a new approach to forest management needs sufficient time and scope to collect first experiences.

To address the problems of elite capturing and patronage and to ensure that poor local households can benefit from forest use rather than being excluded from the access to forests, local informants and external experts (e.g. Fisher 2003a, p. 26) alike suggest a positive discrimination in the allocation of leases in favour of the poorest. Such a “pro-poor discrimination” in the allocation of seasonal or long-term forest leases is clearly not compatible with the often-voiced demand for an even distribution of all natural resources amongst local households, as it implies that poorer households get bigger shares of natural resources than wealthier households. On the other hand, it takes the finiteness of forests and other land resources and the need for a clear policy concerning the access to these resources into account. Given that the SFS has, as a part of the State administration, committed itself to the national poverty reduction strategy one should think that there would be a basis for the application of such a pro-poor discrimination in the process of lease allocation.

7.7.5 Property rights regimes and form of participatory forest management: individual leasehold *versus* community- or group-based approaches

On all four research sites as well as in other *leshozes* of the WFFs, the allocation of individual leases for determined forest plots is the predominant form for the participation of local people in forest management. The leaseholders become proprietors of the forest plot. As described in Section 7.1, the allocation of long-term leases has considerably increased the feelings of responsibility held by the tenants for their plots and thus contributed to improvements of the protection of the leased forest plots. Hence, the fears of some foresters voiced in the early years of independence that the involvement of local people in forest

management would lead to further degradation and eventually to the destruction of the WFFs have not materialised (Messerli & Juldashv 2000, p. 72). This is, seen from a perspective of forest conservation, certainly a positive development. On the other hand, granting individual forest leases risks to lead to a creeping *de facto* privatisation of use and control rights over, at least, parts of the forest. The consequence of this is that the current distribution of long-term forest use and control rights that is often criticised as inequitable risks to become cemented for the future. Given the rather limited forested areas in some densely populated valleys, local informants seriously doubt whether there is enough forests to allocate a lease to all local households. Under such conditions, the calls for forest access for everybody are difficult to satisfy under a regime of individual property rights via leases. Thus, in practice, only a part of the total population gets involved in forest management. The system of individual leases also leads to a parceling out of the leased parts of the forest. Parceling forests can constrain the production and provision of some forest products and environmental services (McKean 2000).

The most radical change in terms of tenure would certainly be the *de iure* privatisation of forests. Some local people supported this idea, whilst others expressed their reservations against such a radical reform, in particularly on grounds of fears of increased inequity. Even if such a change was politically possible, it really is doubtful that small fragmented private plots would be a sound basis for sustainable management of forests in the future.

In theory, a community-based approach and, with it, a regime of common property rights would ideally allow addressing some of the drawbacks of the leasehold approach. During the interviews, many representatives spontaneously brought up the idea of organising forest management in the future on the basis of the *Ail-Okmots*. This aspect is further discussed in Section 7.7.6. A community-based approach could potentially prevent a *de facto* privatisation and the parcelation of the forest, address some of the equity issues including intergenerational equity. Ideally, it would also allow community members to develop their own rules for collective action and a solution to the problem posed by a limited forested area. In reality however, there is widespread resistance against collective action in forest management amongst local people, as the arguments put forward by local informants in favour of individual leases as opposed to group leases (see Section 7.4.4) clearly show.

The negative experience from decades of work in collective organisations during the Soviet era provides a plausible explanation for the resistance against community- and group-based forest management in the WFF-belt. Following this experience, local people “are acutely aware of the unequal contribution made by individuals of a group” (Carter *et al.* 2003, p. 8). Messerli (2000) also documented resistance amongst local women against collective work in four *leshozes* in the WFF-belt. Strong preferences for an individual approach are one of the main reasons why an individual leasehold approach had been chosen for the start of CFM in Kyrgyzstan. In Tajikistan, an attempt to promote collective forest management was largely ineffective, while individual forestry turned out to be more successful. This is also explained by negative feelings and recollections associated with “collective” management and the positive prospects of individual benefits and undivided property rights of an individual approach (FAO 2007b, p. 14). FAO (2007b, p. 13) concludes that the negative perception of collective forest management during the Soviet period has adversely affected the adoption of community-based forest management throughout the former Soviet republics.

The results of this study and the evidence from the literature point to limited social capital available for community-based forestry in Southern Kyrgyzstan as well as in other former Soviet republics. The findings from an analysis of common grazing in Kyrgyzstan and land

and agrarian reforms in Uzbekistan conducted by Mearns (1996) make clear that a lack of social capital is a general constraint in natural resource management in many countries in transition. Mearns found that relationships amongst relevant stakeholders were still dominated by power and control and not by trust and reciprocity. Such a lack of social capital seriously limits the capacities of communities to overcome internal collective-action problems such as cheating on community rules and shirking. For some of the informants of this study as well as local women interviewed by Messerli (2000) fear of these problems were the main reasons for their negative attitude towards collective action. Mechanisms to overcome such problems are however a precondition for the success of common property regimes (McKean 2000). Therefore, it is concluded that, generally speaking, low social capital for collective action and, with it, limited trust in the community as a body to devise and impose rules for forest management, constrain the application of community-based approaches to forest management and of common-property regimes for forests in many post-Soviet countries. In this context, it is interesting to remember that devolution in forestry in formally still socialist countries such as China or Vietnam frequently takes the form of an individual and not a community-based approach (see Section 2.3.1.2).

Despite these considerations regarding social capital, it seems nevertheless rather surprising that the idea of community- or group-based forest management, especially given the problems with individual leases, such as inequitable allocation of leases, and often-voiced concerns of local villagers that influential outsiders could get in control of large tracts of forests (see Section 7.3). Given the negative experience that many local people made with forced group work, it seems important to stress that there are many different forms to organise community- or group-based forest management, and that such schemes can involve different intensities of collaboration amongst the involved members of the community.

Having noted and discussed widespread reservations against community-based work, it is important to remember that in the interviews conducted for this study, some informants clearly gave a preference to group-based over individual forest leases. Most of the arguments brought forward in favour of group leases stress the potential of collaboration to reduce transaction costs of forest management. To the arguments in favour of group leases mentioned by the informants, one could add that such arrangements reduce the risks of negative social effects of a potential *de iure* privatisation of forest resources. If the State decides to transfer certain rights and responsibilities to groups, this might, in the long run, lead to an increased stake of local communities in forestry with these groups acting as *nuclei* for the formation of broader-based forest user groups. Fieldwork for this study has revealed that there are, in practice, examples of people collaborating in forest management on a voluntary basis. Other examples of group-based arrangements are described by Fisher (1999a, p. 11) who notes the signing of two CFM group leases in Uzgen, each involving four families. One of these groups formed on the basis of friendship rather than kinship. Its members simply like working together. In Ortok, a large area of contiguous CFM leases has been arranged, allowing for labour- and cost-sharing. Tenants have fenced the entire area, rather than individual plots, and protection tasks are being shared (Fisher 1999a, p. 12).

Spontaneously emerging cases of informal or formal collaboration between different households in forest management might, with the time, become *nuclei* for an increasing number of group-based forest management initiatives. Given the conditions prevailing in post-Soviet Kyrgyzstan, outsider-driven attempts to convince local stakeholders of the advantages of community-based forest management bear little prospects for success. In this context, successful local, voluntary initiatives to collaborate might have more convincing power.

7.7.6 Institutional framework – issues of accountability, power and decision-making in forestry and roles of the *leshozes* and the *Ail-Okmots*

For the discussion of the local institutional framework and the roles of the *leshoz* and the *Ail-Okmots*, the two dominant local institutions that have a stake in forest management, it is useful to remember the historic development of these institutions and their responsibilities. During the Soviet era, the *leshoz* not only guaranteed forest protection and management, but also social welfare, as explained in Section 5.2.3. Support to the village councils, the predecessors of today's *Ail-Okmots*, was largely provided at the discretion of the powerful directors of the local collective organisation(s) (*leshoz*, *sovhoz*, *kolhoz*) (Matsuzato 2001). After independence the set of responsibilities changed fundamentally. From 1996 onwards, the *Ail-Okmots* became responsible for the social domain (e.g. primary education, healthcare), but often without being allocated adequate resources (Matsuzato 2001). The *leshozes*, on the other hand, continued to be responsible for forest conservation and management.

The results from the semi-structured interviews conducted with representatives of different stakeholder groups suggest that most foresters consider forest management predominately as a technical discipline not concerning social questions. At the same time, some foresters said to feel responsible for the local population, and many foresters referred to what they described as a good collaboration with the *Ail-Okmots* in assisting poor households. Thus, a somewhat contradictory picture of formal and informal responsibilities held and felt by representatives of the *leshoz* and the *Ail-Okmot* emerges.

In times when local people heavily depend on natural resources, as in present-day Kyrgyzstan, it is evident that there is a strong social component to forestry, as the comprehensive concept of sustainable forest management suggests. Decisions over natural resources undoubtedly heavily affect local people's livelihoods and well-being. Thus, an understanding that reduces forestry to its technical aspects does not reflect the current reality in the field and is therefore not appropriate under the circumstances prevailing in the WFF-belt of Southern Kyrgyzstan. If one, however, accepts that there is a social side to forestry, a clear separation of responsibilities becomes difficult. In the interviews, foresters and representatives of *Ail-Okmots* alike frequently asked for such a clear separation as a precondition for a good collaboration between their institutions. The fact that many foresters perceive initiatives taken by the *Ail-Okmots* regarding natural resources as an interference in *leshoz* matters stresses this problem.

The point made in the paragraph above ultimately raises questions concerning the effectiveness and efficiency of the current institutional arrangement involving two parallel local structures in the form of the *Ail-Okmots* and the *leshozes*. The information garnered from fieldwork includes besides positive accounts of a good collaboration between the two institutions also evidences of conflicts between them. This points to a high risk of frictional losses of energy and of damaging institutional competition and tensions that is inherent to the current system of local governance and to difficulties in avoiding considerable overlap of responsibilities of the *Ail-Okmot* and the *leshoz* in practice, regardless of what might look like a clear separation of responsibilities on paper. From the results presented in Section 7.6 it appears that the issue of a fruitful collaboration between the SFS and the civil administration remains very much on many people's minds. KIRFOR and its partners actually make efforts to explore possible approaches for an increased collaboration between the *Ail-Okmots* and the SFS (Krylova-Mueller 2006). Linked to these issues, the informants also stressed the need for a more effective institutional arrangement for the benefit of the

local population and for the conservation of natural resources. More concretely, some informants, including foresters and representatives of the *Ail-Okmots*, clearly spoke in favour of merging the *leshozes* and *Ail-Okmots* to one State body with responsibilities for social development as well as natural resource management.

Key governance aspects raised by local informants during the interviews included transparency in decision-making and in the use of locally generated funds within the SFS and accountability of the *leshozes*. The *leshoz* and its forest ranges are, as the local administrative arms of the SFS, in the current set-up upwardly accountable to the SFS, but not downwardly accountable to the local population. While some of the *leshozes* might have good relations with the local communities and administration, they do not represent the local population. The planned administrative decentralisation of an increasing number of responsibilities to lower levels including the forest ranges does not change this situation. The *Ail-Okmots*, on the other hand, are downwardly accountable as their head is locally elected. Therefore, the *Ail-Okmots* do represent their constituents, i.e. the local population. A high downward accountability of local governments is increasingly seen as a key point for the success of community-based natural resource management (Mansuri & Rao 2004b; Blaikie 2006) and democratic decentralisation, together with discretionary powers for the local authorities to decide over significant matters (Ribot *et al.* 2006).

This analysis leads to various institutional options that are conceivable for the ownership and decentralised management of the WFFs in the long-term future. These are presented and discussed here in the sense of visions on the long run with a purpose to stimulate discussions on appropriate institutional arrangements for the WFFs.

An option to increase the accountability of the *leshozes* to local communities would be to give the local population, either directly or via the *Ail-Okmots*, a say in the recruitment process of *leshoz* directors who are currently appointed by the head of SFS. Interestingly, at the time of the Kyrgyz revolution in March 2005, there were in some places local groups calling for an election of the *leshoz* director (Akenshaev 2005). This can be seen as a sign of an awakening civil society.

More radical options include the transfer of the *leshoz* and of either full ownership or extensive use and control rights excluding the right of alienation, i.e. all rights of a proprietor, for *goslesfund*-land to the *Ail-Okmots*. Such a transfer would, of course, have to include the necessary decision-making power for forest management. The *Ail-Okmot* would employ forestry personnel responsible for the management of the municipal forests. At the same time, the regional and the national parts of SFS would become a supervisory agency responsible for monitoring the compliance of the forest management implemented by the *Ail-Okmots* with the relevant legal regulations. In this way, the central Government would retain its supervisory power as a means to safeguard the public interests in the conservation of the Republic's forests, but hand over the operational forest management to the municipalities which are directly accountable to the local communities. Under such an arrangement, the *Ail-Okmots* would also have to decide on the involvement of local people in forest management, i.e. mechanisms for the devolution of property rights for forests to local people. Asanbaeva (2006) cautions that the *Ail-Okmots* might have a short-time perspective until the next local elections, which would be incompatible with the need for long term thinking and investments in forest management. This clearly emphasises the need for an overriding regulatory framework and an external State body independent from local politics to safeguard public interests in forests, which was also clearly stated by a number of the interviewed informants.

These options bear the promise of making local forest management more democratic. They build on the democratic legitimisation of the *Ail-Okmot* through the election of its head that creates downward accountability. In comparison to the current situation, this would give the local population a bigger leverage in decisions concerning natural resource management and possibly even a direct stake in the decisions over the devolution of property rights for forest resources. This can potentially help to address some of the current equity problems in forest management. However, it seems advisable not to raise expectations too high, as democratic or democratically legitimised decisions regarding natural resource management are not necessarily socially just and equitable.

Proposals for such radical changes in forest governance would surely face stiff opposition from circles interested in institutional maintenance and in keeping a strong central Government. The big question indeed is whether and, if yes, under what conditions, the central government would be willing to allocate property rights and possibly even full ownership for the commercially interesting walnut-fruit forests to local government bodies. International experience shows that central government are often reluctant to do so (Ribot *et al.* 2006). This tendency might be particularly strong in countries in transition given their long tradition of strong central control. However, interviews and discussions conducted with people within and outside the SFS by the author showed that forward-looking people already discuss and consider such ideas.

8. Local knowledge and innovation in forest management

This Chapter describes, based on the interviews conducted with forest leaseholders and observations on their forest plots, the knowledge available with the informants and their innovations. It pays particular attention to specific knowledge on walnut, applied ecological knowledge and to the sources of knowledge. On the basis of the conducted interviews and the presented data, factors influencing knowledge and innovation are identified. Information on the complementary roles of foresters and local people is provided. The chapter provides replies to the research questions under the objectives 3 and 5 of this study. It ends with a discussion on the available knowledge and options for its mobilisation for the sustainable management of the walnut-fruit forests.

8.1 Satisfaction with the current state of the plot and problems as perceived by the tenants

The majority of the interviewed leaseholders (~80% for all sites, see Table 29) said to be happy with their plot, its condition and production. The general level of satisfaction is high amongst informants from Arstanbap-Ata, Ortok and Uzgen. In Achy however, only half of the informants from which information on this point is available, said to be happy with the plot and its production.

Table 29: Percentages of households who are happy or unhappy with their plot and its production in terms of quality and quantity of products. Source: semi-structured interviews on forest use practices. Source: semi-structured interviews on local knowledge related to forest management.

	Arstanbap- Ata n = 18	Achy n = 16	Ortok n = 19	Uzgen n = 19	All sites n = 72
Happy	88.9%	50.0%	84.2%	89.5%	79.2%
Unhappy	11.1%	50.0%	15.8%	10.5%	20.8%

In terms of lease types, the general level of satisfaction is on a high 87% with CFM tenants, compared to 73% with non-CFM long-term tenants. The data also shows that about three-quarters of poor (75%) and intermediate households (76%) and 85% of the wealthy informants are happy with the plot and its general condition.

Despite the generally high level of satisfaction with their leased plots, more than half of the interviewed leaseholders (~60% of informants from all sites, see Table 30) said, when prompted, that they faced problems, risks or difficulties on their leased forest plots. The extreme cases were Achy with roughly three-quarters (77%) of the interviewed leaseholders saying that they have problems and, on the other hand, Uzgen, where only 37% of the informants said to face problems on their plots. This suggests that the leaseholders see room for improvements of the plots despite widespread satisfaction with the conditions of their plots.

Table 30: Availability of a problematic issue concerning the current state of the leased forest plot or the plot in general (percentage of households). Source: semi-structured interviews on local knowledge related to forest management.

	Arstanbap-Ata n = 18	Achy n = 17	Ortok n = 19	Uzgen n = 19	All sites n = 73
No problem	33.3%	23.5%	36.8%	63.2%	39.7%
Problem available	66.7%	76.5%	63.2%	36.8%	60.3%

About three-fourths of the non-CFM long-term tenants (77%), but only half of the interviewed CFM tenants (50%) said to have a problem on their plots. This seems to be consistent with a higher level of satisfaction of their plots amongst CFM than amongst non-CFM long-term tenants. Despite the above-mentioned higher level of satisfaction amongst wealthy than amongst intermediate and poor households, a higher proportion of rich households (69%) than of interviewed poor and intermediate households (55%) told the author to have a problem on their leased forest plot.

The problems the informants referred to are of different nature, as it can be seen from the list of categorised problems presented in Table 31. They include silvicultural and agroforestry problems, as well as less technical, more social or political difficulties which the informants had on their leased plot or which specifically related to their leases. This underlines how interwoven different domains are in the WFFs.

Table 31: Categories of problems of the informants on their forest plots and their frequencies. Source: semi-structured interviews on local knowledge related to forest management.

Area of problem	Arstanbap-Ata	Achy	Ortok	Uzgen	Total all sites
Current state, composition of the forest stand or with the quality of the forest products (e.g. walnut stand too dense, no well-developed crowns, low quality and/or quantity of walnut, unsatisfactory sanitary state of the stand, diseases)	3	7	5	14	29
Lease agreement with the <i>leshoz</i> (e.g. high taxes to be paid to the <i>leshoz</i> , no private ownership or guaranteed long-term lease, restrictions on forest use imposed by the <i>leshoz</i>)	3	3	4	4	14
Land-use (e.g. grazing on the plot despite fence, browsing damage, decreasing volume and/or quality of hay, conflict with people rearing livestock, no shepherd)	4	6		1	11
Weather conditions (e.g. yield fluctuation due to late frost, snow damage on regeneration of woody species)	1	4	1	1	7
Lie of the plot (e.g. plot far away from the village, difficult access by road)	1	2	2		5
Responsibilities of the State (e.g. lack of support or interest from the State and the <i>leshoz</i>)	2	1			3
Tillage on the leased forest plot (e.g. soil erosion on the tillage plot, Colorado beetle on the potatoes)		3			3
Divers problems (e.g. unreliable water supply on the plot, risk of other people felling trees, stealing firewood from the plot, unfavourable soil conditions for walnut, lack of finances to purchase barbed wire for fencing)	2	1		1	4

The interviewed tenants mentioned most frequently problems related to the current state, the composition and the production of the stands on the leased plot. The single most frequently mentioned problem falls also in this category, namely a high density of walnut stands and, related to it, relatively small crowns providing only limited yields. This issue seems to be particularly a concern to tenants in Uzgen.

Informants on all sites are concerned with issues regarding the lease agreement and the contract conditions. Non-CFM long-term tenants in Arstanbap-Ata and Achy complain mainly about the high level of taxes and about the fact that the *leshoz* does not pay the

tenants for the work they do on their plots. CFM tenants in Ortok and Uzgen, on the other hand, deplore the lack of private ownership and guaranteed long-term access to their plots and restrictions imposed by the *leshoz* on the use of their plots. The ban on grafting wild apples or the interdiction to building a house on the forest plots are examples of such restrictions. One tenant of a very dense walnut stand in Uzgen, suggested that it would be fairer if the *leshoz* used the actual yield of a walnut stand as a criterion when deciding on the size of the plot to be given to a CFM tenant instead of the number of walnut trees. He argued, from his own experience, that the walnut yield was primarily a function of the size of the crowns of the trees on the plot and less of the actual number of trees. These issues reflect the sometimes difficult relationships between local people and the *leshozes*, as presented in Section 7.5.

The third area of concern is unregulated livestock grazing in the forest in general and in freshly established plantations in particular. This applies especially to Arstanbap-Ata and Achy, the two sites with the highest level of human pressure on forest resources. On both sites, some tenants were forced by *leshoz* officials to give in to demands for larger grazing areas or by general social pressure to open their plantation plots, although the seedlings had not yet passed the critical height and were thus still prone to damage. Another tenant from Achy explicitly mentioned social conflicts with people rearing livestock and demanding bigger areas for grazing, whilst another tenant from neighbouring Arstanbap-Ata complained about the lack of shepherds and thus unregulated grazing being widely practised in the area. These sources of discontent and conflict are all indications of unresolved problems to do with conflicting land uses.

Not surprisingly, given the importance of walnut as cash income and the yield fluctuations, some tenants also mentioned harsh weather conditions and particularly late frosts in spring causing damage to the walnut blossom as problems on their plots. Other tenants are not happy with the location of the plot they got allocated, saying in most cases, that it lie too far away from their home to ensure effective forest protection and take firewood down from the plot to the village. Only a few tenants complained about the lack of interest in the forest in general and, more specifically, about the lack of support for forestry work from the side of the *leshoz*.

Thus, whilst generally there is a relatively high level of satisfaction amongst leaseholders with the conditions of their leased forest plots, the tenants are nonetheless confronted with a range of problems. These include in particular issues concerning the state and productivity of the forest stands, conflicts arising from incompatible, overlaying land use practices and issues related to the lease conditions. These and the other, above-mentioned problems have to be addressed by the stakeholders concerned in order to reduce the level of local conflicts.

8.2 Leaseholder knowledge and innovation

As stated earlier, the term “**local knowledge**” in this study includes knowledge and skills held by members of local communities regarding the use of trees and forest resources and their capabilities for forest use/management. The term “**innovation**” is used here to refer to elements that are new to a system. In this study, mainly novel ideas for future forest management expressed by the tenants or experiments which are undertaken by them to explore new forest management options are taken as indicators for innovation.

8.2.1 Visions for the long-term development of the forest plots

The majority of tenants had at least one idea on how their forest plots should look like in 30 to 50 years time. One informant spontaneously replied: “After its transformation the plot should look like paradise”. The descriptions of the leaseholders of the future state of their plots are shown in Table 32. These responses show that a majority of the informants as at least some visions and aspirations for the long-term future of their forest plots.

Table 32: Elements used to describe the state of the forest plots hoped for in 30 to 50 years time. Source: semi-structured interviews on local knowledge related to forest management.

	Arstanbap-Ata	Achy	Ortok	Uzgen	Total
Production	20	16	14	13	63
Increased productivity in general	2	2	9	7	20
Increased number and/or coverage of useful, beneficial species	9	7	2	2	20
Intensified agricultural production providing more agricultural crops than today	2				2
Increased production of firewood, hay or flowers	3				3
Open areas afforested, existing gaps in the stand filled	1	6	2	3	12
Productive orchard composed of grafted apple trees or a mix of species including apple and walnut	3	1	1	1	6
Stand characteristics	7	4	13	8	32
Regenerated stand with regeneration continuously growing up	4	1	3	2	10
Clean stand	1		7	2	10
Walnut trees ideally distributed in the stand	1	3	1	1	6
Mixed stand	1		2	1	4
Improved sanitary state of the stand				2	2
Other	2	3			5
Improved infrastructure (road access, small house, place to pitch a tent on the plot)	2	1			3
Forest plot in private ownership		1			1
Larger forest plot		1			1

The wish for the stand on the forest plot to have a better productivity in future, being in good conditions and/or providing increased yield and the wish for an increased number and coverage of beneficial woody species came top. The latter was particularly popular with informants from Arstanbap-Ata and Achy, which are the two sites with higher human pressure on forest resources than the other two sites. The proportion of leaseholders from Achy was particularly high amongst the informants wishing to have more walnut trees on their plots. Achy has considerably less walnut stands than the other sites (see Section 4.4.3). Tenants from this site account also for half of the informants wishing to see non-forested parts of their plots reforested or current gaps in the stand filled with trees, mostly walnut, in the long term. Not surprisingly, walnut was the most popular choice whenever informants mentioned specific species. However, four leaseholders referred to mixed stands as their long-term goal, in which all naturally available species were available.

Regarding more structural characteristics of the stand in the future, the idea of a regenerated and/or clean stand appealed particularly to the informants. Tenants from Ortok most frequently described the ideal of a clean forest stand without any dry bushes and standing or lying deadwood. Linking aspects of production and stand structure, six informants explained their ideas for an improved spatial distribution of the walnut trees on the plot that they

wanted to see realised in the long run. They envisaged walnut stands in which trees would stand at a distance from one another that allowed all the trees to develop a large crown.

Only five leaseholders responded simply that in future, their forest plot should be in the same state as it was at the time of the interview. One of them said, that he was aware of the possibilities to take influence on the development of the crowns of the walnut trees by thinning, but that he thought that the stand was also nice as it presented itself at the time of the interview. Three informants from Achy said not to have any long-term vision for the development of their plots.

8.2.2 Innovations implemented and ideas for the future

Ideas and intentions for the use and management of the leased forest plots in future comprise new techniques, methods, practices, components to be added to the existing production system and new products to be harvested. At the time of the interview, some of these ideas and intentions were already put into practice. These are henceforth referred to as “new practices”. Other ideas were just under consideration by the informants, but not yet being implemented. Only items that the tenants considered voluntarily were considered.

A large majority of tenants from all sites have new ideas for the use or management of their forest plots in the immediate future, as the results presented in Table 33 show.

Table 33: Percentage of households with and without new ideas for future forest use/management. Source: semi-structured interviews on local knowledge related to forest management.

	Arstanbap-Ata n = 19	Achy n = 24	Ortok n = 19	Uzgen n = 21	All sites n = 83
Households with at least 1 idea	89.5%	87.5%	94.7%	95.2%	93.6%
Households without ideas	10.5%	12.5%	5.3%	4.8%	8.4%

But, despite the wide distribution of such ideas, less than half of all leaseholders who have such ideas had actually already started putting them into practice on their plot at the time of the interview, as Table 34 shows.

Table 34: Percentage of the households with new ideas for forest use/management that put them already into practice on their forest plots. Source: semi-structured interviews on local knowledge related to forest management.

	Arstanbap-Ata n = 17	Achy n = 21	Ortok n = 18	Uzgen n = 20	All sites n = 76
Households practising at least 1 new idea (“new practice”)	52.9%	47.6%	33.3%	50.0%	46.1%
Households not yet practising new idea(s)	47.1%	52.4%	66.7%	50.0%	53.9%

The number of ideas and new practices range from a minimum of one up to a maximum of seven new practices or ideas for future forest management per household. On average, informants from Arstanbap-Ata (Mean = 3.3, SD = 2.2), Ortok (Mean = 3.2, SD = 1.8) and Uzgen (Mean = 3.4, SD = 2.0) brought a comparable number of new practices and ideas forward during the interviews, which was significantly higher than the average number of ideas held by leaseholders in Achy (Mean = 2.0, SD = 1.6) (t-test Arstanbap-Ata – Achy: $P = 0.034$, $t = -2.191$; Ortok – Achy: $P = 0.030$, $t = 2.243$; Uzgen – Achy: $P = 0.016$, $t = 2.503$). No significant difference could be found in terms of numbers of ideas and new practices between different types of lease (CFM, non-CFM long term, seasonal), and different wealth classes.

The ideas and intentions for future uses and management of the leased forest plots and new practices mentioned by the local informants in the interviews are listed in the synoptic Tables 35 and 36 below. Table 35 contains all items regarding the regeneration, establishment and enrichment of forest stands. Not surprisingly, this is a field where tenants have most ideas. In particular, these ideas concern the enrichment of stands and of the plot as a whole. Table 36 includes a range of ideas and new practices ranging from the field of silviculture to new products and product processing.

Table 35: Ideas and intentions for future forest use/management I, concerning regeneration, establishment and enrichment of forest stands held by the informants. The number how many times a given idea was mentioned by the informants is indicated in the Table. The numbers in brackets indicate cases in which people already practised the given activity (“new practice”). Source: semi-structured interviews on local knowledge related to forest management.

	Arstanbap-Ata	Achy	Ortok	Uzgen	Total all sites
Regeneration, establishment and enrichment of stands					
- Production of seedlings for planting and of rootstocks for grafting	3			2	5
- Grow seedlings in a small nursery.	(2)				(2)
- Use/transplant naturally regenerated seedlings for plantation.		1		2	3
- Use of naturally regenerated seedlings as rootstocks for grafting.				(1)	(1)
- Use of naturally regenerated seedlings as rootstocks for grafting.				2	2
- Regeneration of over aged stands and orchards					
- Fell unproductive walnut trees to make space for natural/artificial regeneration of woody species			3		3
- Cut dry Sogdiana plum back on rootstock to make it re-sprout.	2				2
- Replace dry bushes and over aged trees by way of plantation.	(2)				(2)
- Replace dry bushes and over aged trees by way of plantation.	2	1	4	1	8
- Replace unproductive orchard trees with better varieties.	1			(1)	(1)
- Replace unproductive orchard trees with better varieties.	1				1
- Enrichment of forest stands and afforestation of open areas					
- Enrichment planting/sowing of species already available on the plot to raise percentage of economically interesting species.	16	28	10	11	65
- Enrichment planting to bring in new species to the plot	(2)	(10)	(2)	(3)	(17)
- Enrichment planting to bring in new species to the plot	8	9	6	1	24
- Enrichment planting to bring in new species to the plot	(2)				(2)
- Enrichment planting/sowing to bring in new varieties of walnut and dog rose			2	4	6
- Change the planting prescriptions of the <i>leshoz</i>			1	1	2
- Complementary planting to replace dead seedlings	1				1
- Grafting to turn wild apple stands into orchards and diversify the production of the plot	15	3	4	2	24
- Grafting to turn wild apple stands into orchards and diversify the production of the plot	(9)				(9)
- Protecting, tending natural/artificial regeneration					
- Remove disturbing ground vegetation, shrubs and branches; loosen soil around planted seedlings to keep soil humidity high.	2	2	1	5	10
- Make natural regeneration/planted seedlings visible with sticks to protect them from damage during haymaking.	(1)	(1)		(2)	(4)
- Make natural regeneration/planted seedlings visible with sticks to protect them from damage during haymaking.	2				2
- Protect planted seedlings with thorny branches from browsing damage.	(2)				(2)
- Protect regeneration by letting cattle graze on a rope				1	1
- Protect regeneration by letting cattle graze on a rope	1				1
- Sow walnut close to existing bushes providing protection from livestock.	(1)				(1)
- Sow walnut close to existing bushes providing protection from livestock.		1			1
- Sow walnut close to existing bushes providing protection from livestock.		(1)			(1)

A small number of tenants in Arstanbap-Ata and Uzgen intended growing their own seedlings, an activity which two tenants in Arstanbap-Ata have already started. A few tenants, chiefly from Uzgen, suggested using naturally regenerated seedlings from the wild for their plantations or to be used as rootstocks for grafting later. Tenants in Ortok and Arstanbap-Ata particularly often mentioned measures aiming at the regeneration of over aged forest stands and orchards.

By far the most frequently mentioned group of ideas concern the improvement of the existing forest stands on the leased plots or the afforestation of open areas on the plots respectively. The most popular response was the enrichment by economically interesting species that are already present on the plot, but should cover an enlarged area of the plot in future. On the species level, the most popular, obvious choice for this was walnut, followed by wild apples, dog roses, hawthorn and Sogdiana plum. In the case of planting wild apples, the motivation was, in some cases, to have rootstocks for grafting in future. Such enrichments seem to be a particular popular option for forest management amongst tenants in Achy, which is the site with the smallest percentage of walnut stands. Some tenants in Uzgen and Ortok thought of enriching their plots with improved varieties of walnut and dog rose, such as early fruiting walnut varieties or varieties known for providing good quality fruit. Most of these tenants have heard of such improved varieties during workshops organised by the Orech-Les or the CFM project. Other equally popular options for enriching one's leased forest plot were the introduction of new, mostly fruit bearing species and the grafting of cultivated varieties of fruit trees on wild rootstocks. The latter option was particularly frequently mentioned in Arstanbap-Ata, a place with a longstanding horticultural tradition, where some informants have already put this idea into practice. Both options are mainly seen as a means to diversify the production of the leased forest plots. These are activities leading to a gradual domestication of the forest plots. One tenant, for example, clearly said, that he intended to turn a stand of wild apple trees into an orchard by grafting. The significance and the implications of this tendency towards an increased domestication of the WFFs will be discussed in Section 9.11.2.

As far as the planting techniques are concerned, tenants in Ortok and Uzgen raised the issue of adapting existing planting prescriptions. These prescriptions are issued by the SFS and specify the minimum number of seedlings to be planted per planting terrace or hectare respectively. The informants suggested that in future, the prescriptions should be defined in terms of the purpose of the plantation (e.g. fruit, timber production, soil protection). They also suggested decreasing the prescribed minimal number of seedlings per planting terrace, arguing that the same effect could be achieved more economically with fewer seedlings.

Both planted seedlings as well as natural regeneration of woody species are prone to be damaged or to suffer from strong competition. Being aware of this, tenants from all sites said that they wanted to help natural or artificial regeneration by cutting disturbing ground vegetation or branches and loosen the soil around planted seedlings to keep the soil humidity high. A few tenants planed to protect seedlings from grazing damage by livestock or from being cut during the mowing of hay. This was already practised on some plots. The least laborious form of protection is achieved by sowing walnut close to existing bushes which eventually provide protection from grazing livestock.

Amongst further silvicultural measures, which are listed in the first part of Table 36 below, the idea of cleaning the forest from dead and dry bushes and trees, and from rotten wood was particularly popular with the interviewed tenants, especially in Ortok and Uzgen. There are multiple motivations for this kind of intervention, such as getting a stand that is "nicer to look at", making walnut harvest easier, getting firewood, putting fallen timber to use which otherwise only rots in the forest, or improving the quantity and quality of hay which can be made on the plot. Selective thinning of densely spaced walnut stands was another quite frequently mentioned idea, especially in Uzgen. Several informants on both sites had their plots in dense walnut plantations, in which, as judged by the author, such interventions were overdue. Uzgen *Leshoz* has conducted some thinning in recent years. A tenant from Ortok said, that he observed the silvicultural trials of the applied research project Orech-Les with

great interest. If these experimental interventions were to be successful, he would suggest conducting similar thinning on his plot to the *leshoz*.

Table 36: Ideas and intentions for future forest use/management II, concerning silviculture in general, agroforestry, tillage, soil protection, infrastructure and new products and processing of products. The number how many times a given idea was mentioned by the informants is indicated in the Table. The numbers in brackets indicate cases in which people already practise the given activity (“new practice”). The entry “x” stands for unknown numbers. Source: semi-structured interviews on local knowledge related to forest management.

	Arstanbap-Ata	Achy	Ortok	Uzgen	Total all sites
Further silvicultural interventions					
- Cleaning the forest plot from dry bushes and trees	1	4 (2)	11	13 (1)	29 (3)
- Selective thinning of densely spaced walnut stands (Russian <i>komplexni rubki</i> , complex fellings).	2	3	5	12	22
- Sanitary fellings	1	2 (1)			3 (1)
- Use chemicals to purge the forest plot from diseases.			1	1	2
- Reduction of number of trees per planting terrace in young plantations.			1		1
Agroforestry s.l.					
- Cut lower branches from trees to diminish shade and favour the ground vegetation (hay) and the agricultural fields.	2				2
- Remove dog roses from haymaking area, transplant them to the boarder to strengthen the living fence	1				1
- Put beehives on the plot			1		1
Tillage					
- Establish/increase tillage plot to cultivate arable crops to diversify the production	3		2		5
- Turn the forest plot into a garden where various crops are cultivated		1			1
Soil protection					
- Plant poplar and willows to stabilise mud- and landslides	3 (1)				3 (1)
Infrastructure					
- Mark the boundary of the plot (fencing, living fences, alleys).	5 (1)	5	3	2	15 (1)
- Construction of a shed/hut/small house on the plot.	2	1	1	3	7
- Improvement of access to the plot (repair road, build bridge)	1		1	3	5
- Install/improve irrigation system.	2	1			3
- Install a placard informing on species occurring on the plot.			1		1
New products and processing of products					
- Use of the forest plot to accommodate guests, tourists.	1		1		2
- Sale of newly processed products (e.g. new type of walnut jam)			1		1
- Sale/giving away of natural regenerated seedlings (walnut, wild apples, Sogdiana plum) dug up on the plot				1	1
- Harvest NTFPs not used so far (e.g. hawthorn, wild apples, mushrooms, medicinal herbs), provided that market demand develops.	x	x	x	x	x

The diversification, optimisation and increase of the production of the leased forest plot lie behind the ideas concerning agroforestry and tillage. It might not be by chance that the tenants, planning to start growing arable crops or to increase their tillage plot on the leased forest plot, are either from Arstanbap-Ata and Ortok. These two sites are higher in terms of their altitude, their terrain is hillier and, therefore, land for farming is generally more limited than in most of the places in Achy and Uzgen.

The most frequently stated idea regarding infrastructure was marking the leased plots' boundaries, for which the motivation is twofold: i) having a clear and obvious demarcation of the plot's boundaries, and ii) keeping livestock out of the plot. Some tenants consider

improving the general infrastructure by building a hut or a small house or improving access to the forest plot. Besides fencing as a means to keep livestock out, generally little reference was made to the issue of livestock grazing in the forest. This seems a bit surprising to the observer, given that a considerable number of leaseholders mentioned uncontrolled grazing as one of their problems on their plots (see Section 8.1).

As the last part of Table 36 above shows, some tenants are thinking about the use of additional products, and about innovation in processing and marketing. Whether it comes to the implementation of these ideas or not depends heavily on market opportunities. Many tenants said that they would consider gathering additional products if there was a market demand, i.e. an economic incentive for changing their forest use patterns.

To sum up, one should state that a very high proportion of interviewed leaseholders has ideas for future forest uses. The interviewed leaseholders showed a great adaptive and innovative capacity. This underlines the potential for innovation in future forest use held by local people. However, less than half of the interviewed households have already begun putting their innovative ideas into practice. This points to some obstacles and constraints for the implementation of innovation. Factors affecting local innovation will be explored in Section 8.6 below.

8.2.3 Research questions of leaseholders

When discussing their ideas for future forest management, some tenants asked open questions that they thought about or wanted to investigate in future, either on their own or in collaboration with others.

Such research questions raised during the interviews include:

1. Optimal management of Southern slopes? What is the production potential on such slopes? What are the ecological and the production limits? Best method to establish walnuts and other tree species (sowing or planting)? Best method for the preparation of the soil? Effect of the ground vegetation on regeneration: competition or helpful as it protects regeneration from heat and drought?
2. Minimal number of seedlings to be planted per area unit to get a sufficient planting result?
3. Optimal planting method which allows the trees to form their crown and thus ensures the best nut production?
4. Will walnut trees still be able to react and improve their crowns after a thinning in a dense stand which average diameter of ~ 40 cm?
5. How to treat coppice stands of walnut? How many stems to leave? Best timing for an intervention?
6. Viable alternatives to fencing the leased plot for the protection of natural and artificial regeneration? Taking into account that the tenant is not permanently on the plot, and that livestock cannot be kept out of the forest with respect to other villagers (risk of conflict).

Such questions represent promising starting points for participatory technology development by tenants in collaboration with representatives of the *leshozes* and with researchers, i.e. for applied research that is highly relevant to local farmers. Some of these (e.g. questions 4 and 5 in the list above) and more similar questions are in fact already being investigated in the framework of the applied research project Orech-Les.

8.2.4 Experiments

For the purpose of this study, the term “**experiment**” refers to trials conducted by a member of a tenant’s household in order to change either the way a particular task is executed or to try introducing a novel element to the leased plot. A distinction is made between experiments that were already being conducted at the time of the interview and ideas for experiments.

Looking at all sites together, 20% of the informants (see Table 37) claimed to have conducted an experiment on their leased forest plot at the time of the interview. A slightly bigger proportion of all leaseholders, namely 24%, were planning to conduct an experiment. Taken together as leaseholders that experimented *or* planned to undertake a trial at the time of the interview, they represented about 30% of all informants. These percentages of experimenting leaseholders vary considerably between the research sites. At the time of the interview, no leaseholders in Ortok, and only two informants in Uzgen claimed to have already conducted a trial, whereas a third of the leaseholders in Achy and about 37% of the interviewed leaseholders in Arstanbap-Ata were experimenting. On the latter two sites, local people have been involved in forest management as leaseholders for a longer time than in Ortok or Uzgen and, thus, have had a longer association with their plots and more time to innovate.

Table 37: Percentages of informants i) conducting an experiment, ii) planning to do so and iii) conducting *or* planning to conduct an experiment on their leased forest plot. Source: semi-structured interviews on local knowledge related to forest management.

	All sites n = 83	Arstanbap-Ata n = 19	Achy n = 24	Ortok n = 19	Uzgen n = 21
i) Percentage of informants conducting an experiment					
Conducting an experiment	20.0%	36.8%	33.3%	0%	9.5%
Not conducting any experiment	80.0%	63.2%	66.7%	100%	90.5%
ii) Percentage of informants planning to do so					
Planning an experiment	23.8%	26.3%	33.3%	26.3%	9.5%
Not planning any experiment	76.2%	73.7%	66.7%	73.7%	90.5%
iii) Percentage of informants conducting <i>or</i> planning to conduct an experiment on their leased forest plot					
Conducting or planning an experiment	29.6%	40.0%	33.3%	26.3%	19.0%
Not conducting or planning any experiment	70.4%	60.0%	66.7%	73.7%	81.0%

Most of the experiments already being conducted or under consideration by the interviewed leaseholders have to do with the propagation techniques for walnut and other woody species and with the introduction of promising new species or varieties to the plot (see Table 38). The idea of regenerating woody species by sowing seems to be particularly appealing as it promises regeneration for limited efforts in terms of time and material expenses.

Table 38: Nature of the conducted and planned experiments. Source: semi-structured interviews on local knowledge related to forest management.

Area of experiment	Arstanbap-Ata	Achy	Ortok	Uzgen	Total all sites
Sowing (e.g. changing timing or technique of sowing, sowing selected seeds)	2	2	2	3	9
New species or varieties (e.g. trial with early fruiting walnut varieties, new poplar hybrid, introduce sea buckthorn (<i>Hippophae rhamnoides</i> L.) to the plot, plant drought-tolerant wild plum species on southerly exposed slopes to be used for grafting cherry varieties when firmly established)	2	1	1	1	5
Grafting - various grafting trials with different species	3				3
Experiments to find ways to stimulate yield of walnut and apple trees (e.g. ram reinforcing bar in stem of walnut tree, cut triangular shapes in barks of walnut trees, injure superficial roots of walnut and apple trees, enrich the soil with cattle dung to improve quality of walnuts)		3	1		4
Improved production of hay and medicinal herbs (e.g. sowing seeds of a grass species harvested on good haymaking plots to improve the quantity and quality of hay made on the plot, trial to get very promising chamomile variety established on the plot)	3				3
Protection of regeneration (e.g. sow walnut and almond close to thorny shrubs, plant Sogdiana plums close to walnut seedlings as protecting companions providing shade for the walnut)		2			2
Planting technique – experiments to develop a new planting method	1				1

A few leaseholders from Achy and Ortok go beyond selecting and regenerating promising species and varieties by experimenting to find methods stimulating the yield of walnut and apple trees. A leaseholder in Achy who had rammed a reinforcing bar in the stem of a big walnut tree told the author that previous results of this experiment were encouraging. Nevertheless, he intended to observe the walnut yield of the treated tree for a few more years before applying this method to other trees. The same tenant also planned to cut triangular shapes in the barks of walnut trees to stimulate walnut yields, explaining that an elder had told him about this method. Similarly, a tenant from Ortok said that he wanted to injure the superficial roots of walnut and apple trees with an iron to stimulate fruit production. These treatments sound rather rough and unusual. Considering such methods does however make sense to a farmer looking for means to maximise the rent he gets from his leased forest plot. These examples serve as illustrations that actions undertaken based on local knowledge are not automatically ecologically sound (Antweiler 1995).

Leaseholders who are experimenting or plan to conduct an experiment have an average age of 52 years (SD = 13.2). This is significantly older than leaseholders who do not experiment or plan to do so and who are, on average, 43 years old (SD = 13.7; P t-test 0.009, $t = -2.682$). At the time of the interviews, the lease contract of the first group had also been significantly longer running (Mean = 5.1, SD = 3.427) than the contracts of the second group of informants (Mean = 4.0, SD = 5.099; P Mann-Whitney Test = 0.037, $Z = -2.081$). This suggests that both the age of the leaseholder and the duration of his or her attachment to the plot have an influence on whether a leaseholder experiments or plans to do so. It seems plausible that a tenant develops more and more ideas for her or his plot the more she or he observes it and thus gets familiar with it. When the interview was conducted, the non-CFM leases of the respondents in Arstanbap-Ata and Achy had, on average, been running for a longer time than the CFM-contracts of the informants in Ortok and Uzgen. Thus, the factor

„duration of the lease until the interview“ might also, at least partly, account for the fact that the proportion of tenants experimenting or having concrete ideas for experiments is lower amongst CFM tenants (22.5%) than amongst long-term non-CFM tenants (42.9%), and that it is also lower on the sites with CFM leases, i.e. in Ortok and Uzgen than on the other two sites (see Table 37 above).

The fact that a bit less than a third of all interviewed leaseholders conduct experiments or at least plan to do so is another indicator for the innovation potential of the leaseholders. The result of the statistical analysis showing that the likelihood that a tenant experiments grows with the duration of her or his association with the plot (and her or his age) suggests that innovation amongst local tenants can be expected to grow in the years to come. Additional factors affecting local innovation are presented in more detail in Section 8.6 below.

8.3 Specific knowledge on walnut

8.3.1 Knowledge on yields of individual trees

For any silvicultural intervention in walnut stands aiming at increased productivity it is important to know how to recognise trees providing big yields and/or high quality walnuts. Therefore, the leaseholders were asked a series of questions concerning quantitative and qualitative aspects of the walnut harvest during the interviews. An increased productivity of the walnut plot ultimately contributes to higher income and livelihood security.

A huge majority of respondents (87%, $n = 74$) claimed to know the trees on their plots that provide good yields. Only two informants told the author that there were no significant differences between individual walnut trees on their plots in terms of yield. Most of the tenants know about the yields of individual trees from collecting walnut on the plots and observing the trees over at least a couple of years. A few tenants explained that over the years they also had learned which trees were easy to harvest. Three informants spontaneously mentioned in this context, that one could not expect a good walnut harvest in places where, the year before, people had batted the walnuts down using sticks. They explained that this practice would damage buds and branches of the tree.

8.3.2 Knowledge on different “sorts” of walnut

All leaseholders interviewed, except one, claimed to have different “sorts” of walnut on their forest plots. This knowledge is of high relevance for the marketing of walnuts. Here, the general term “sort” is used to refer to a group of walnut that can be differentiated from another group, regardless whether the groups being compared are botanically different varieties or not. The criteria that the informants used to describe and distinguish these different sorts of walnut are shown in Table 39. While most of these criteria relate to properties of the nuts, a few relating more to characteristics of the walnut trees are also listed. The described traits normally apply to all nuts of a given tree.

Table 39: Criteria used by local informants to describe different sorts of walnuts and walnut trees occurring on their forest plots (counts). Source: semi-structured interviews on local knowledge related to forest management.

	Number of times mentioned
Walnut properties	
Size of the walnut (small – middle – big)	38
Thickness of the shell (thin – thick)	25
Cracking properties (easy – hard to crack)	21
Easiness to take kernel out of the shell (easy – difficult)	8
Colour of the kernel (black – white)	7
Form of the nut (e.g. round – egg-shaped – rather pointy)	2
Tree properties	
Time of blossom and ripening (early – late in the year)	7
Frost sensitivity	1
Improved – wild varieties	1
Easy-difficult to shake and to harvest	1

The size of the walnuts is the most obvious and the most often-mentioned criteria for people to distinguish different sorts. Two informants from Ortok observed that walnuts are, on average, smaller if a tree yields a lot of them and bigger if there are fewer walnuts, thus linking the size of walnut and the overall production of a tree. Furthermore, the thickness of the shell and cracking properties, are interrelated, as nuts with a thin shell are generally easier to crack than thick-shelled nuts. Tenants from both Uzgen and Ortok consistently observed variations of the thickness of the shell from year to year. Others observed a correlation of ecological factors, such as the exposure or the relief, with the thickness of the shell.

There are walnuts whose kernels are easier to take out of the shell than others. A respondent from Achy explained that the nuts that could be cracked by hand and whose kernel could be taken out as a whole were called “paradise nuts”. Trees with nuts of this quality are, however, said to be rather rare. The before-mentioned informant said that he had only one such tree on his plot. Another tenant from Achy estimated that only one in 100 trees would have nuts that one could easily crack by hand.

As to the colour of the kernel, the opposite term-pair “white” *versus* “black” walnut was most often used. Some tenants observed individual differences in terms of the kernel colour between trees. In one case, the informant explained that trees growing in small valleys and depressions on his plot were likely to have walnuts with white kernels. Other tenants, however, explained such colour differences with the prevailing weather conditions, saying that a lot of rain would lead to many black kernels. A lot of sun, on the other hand, would favour the formation of white kernels. Besides the size, the shape of the nuts can also vary considerably as Figure 19 illustrates.



Figure 19: Different forms of walnuts harvested in the WFF-belt. Picture by courtesy of Davlet Mamadjanov, Jalal-Abad, Kyrgyzstan.

People mentioning properties of trees rather than of walnut most often referred to trees blossoming and fruiting earlier or later than other trees on the plot. One tenant stated to have heard of differences amongst walnut varieties in terms of their sensitivity to frost damage. This might be related to the timing of the blossom in spring, as early blossoming varieties are more likely to be damaged by late frost than later blossoming varieties.

All of the above-mentioned criteria and different qualities of walnut are relevant for the marketing of walnut. Bigger walnuts normally reach higher prices than smaller walnuts. Thus, many people sort their walnuts into different classes of size before selling them. An informant from Ortok told the author that he would systematically sort out small walnuts and black kernels for oil production or self-consumption respectively. The valuation of the thickness of the shell is slightly more complex than that of the size. A thin shell is an advantage for people cracking the nuts after the harvest and selling walnut kernels, as the proportion of the kernel to the shell in terms of weight is favourable in thin-shelled walnuts. Furthermore, such walnuts are normally easy to crack. People marketing entire walnuts by weight, on the other hand, are more interested in having a large proportion of thick-shelled, heavy walnuts in their lots. Walnuts with kernels that are easy to get out of the shell are also considered to be an advantage, as intact kernels and halves of kernels sell for considerably higher prices on the market than quarters or even smaller kernel fragments. The colour of the kernel is also decisive for the market price. White kernels command considerably higher prices than darker ones. Thus, a tenant who knows about all these and other quality criteria and the current preferences of the market, can use this knowledge to his advantage by cleverly sorting and marketing the collected walnuts.

Interestingly, people use specific terms to refer to nuts with particular qualities. For example, nuts which have a soft shell are referred to as „канырт“ (kanyrt, Kyrgyz for “soft”), such with a thin shell as “торгоймо“ or “тизме жангак” (torgoimo, tizme zhangak, Kyrgyz for “thin-shelled”). Both are easy to crack. Nuts whose kernels are difficult to get out of the shell are called „чукума“ (chukuma, Kyrgyz for “hard”). The existence of such specific terms used to categorise walnuts into different qualities is another indicator that, in general, the interviewed leaseholders are very aware of different qualities of walnut.

The leaseholders’ knowledge and observations on different “sorts” of walnut on their plots and elsewhere constitutes an important potential for i) well-targeted, effective silvicultural interventions improving the productivity of the forest plots, and ii) the selection of walnut varieties with particular traits. Local people, researchers and foresters can team up to combine their specific knowledge and expertise in an effort of “participatory technology development” (PTD) to improve locally available walnut varieties and thus increase the market value of their walnuts and improve their income opportunities.

8.3.3 Indicators for the quality and quantity of walnut yields

Knowing which particular trees on one’s plot provides good yields, both quantitatively and qualitatively, is certainly helpful. There might, however, be situations in which local people or foresters have to assess the production potential of a walnut stand that they do not know and at a time when the trees do not bear walnuts. Under such circumstances, it would be useful to know some indicators for good yields and/or good walnut qualities. Vegetative, i.e. asexual indicators are of particular interest, as most of them can be recognised all year round and irrespective of actual flowers or walnuts.

From a total of 76 household representatives, 47 (62%) said to know such vegetative indicators for good walnut yields and/or quality. A smaller group of 29 people (38%) knew no such indicators. Two thirds of the informants knowing such an indicator mentioned just one spontaneously. One third of them could list two to three such indicators. Nine of the 29 respondents, who did not know any indicator, said that they only could make a first estimation of the yield once the walnut trees were in bloom in spring. The indicators for good yields and particular walnut qualities mentioned by the informants are listed in Table 40. Most of these are features of the trees. There is, however, also a category comprising ecological site conditions that are considered to have an influence on the quantity and quality of the yield.

Table 40: Categories of indicators for good (walnut) yields or good qualities. Source: semi-structured interviews on local knowledge related to forest management.

	Number of times mentioned
Physical appearance of a (walnut) tree	37
Physical appearance of the crown (size, form)	25
Arborisation, characteristics of the branches	8
Characteristics of the stem and bark	4
Ecological site conditions	11
Exposure	3
Soil properties incl. humidity	4
Relief	3
Microclimate	1
Appearance of the leaves	8
Time leaves remain on the tree in autumn	4
Leaf colour	3
Shape of walnut leaves	1
Age, maturity of a tree	6
Wood properties	2

The most frequently mentioned indicator for good yields, mostly of walnut, but also of other species such as apple or Sogdiana plum, was a large, well-developed crown. Some tenants explicitly stated a low density of the forest stand as a precondition for the freestanding walnut trees to form such large crown. By contrast, a little, short crown was described as an indicator of low yields. Walnut trees with little crowns are often referred to as “palm tree” or as “poplar”. An informant from Achy said that he would prefer one freestanding walnut tree with a large crown to ten tightly packed trees. The characteristics of the branches of a tree, are, of course, directly related to the size and form of the crown. Most of the tenants referring to features of the branch system, said that the bigger the branches and the more branches, particularly side-branches, a tree had, the better the yield. Two informants use the number of branches a tree has or the diameter of the branches as indicator for the size of the walnuts. Features of the stem and, especially, of the bark are also used as indicators, both for the general production potential of a walnut tree as well as for specific properties of the nuts. A leaseholder from Ortok, for example, observed that trees with a thick bark, usually have nuts that are easy to crack and from which the kernel can easily be extracted. A smooth bark, on the other hand, would point to walnuts that are thick-shelled and hard to crack.

Some tenants use also information regarding the ecological conditions on a given site to assess the production potential of a tree or a stand. Generally, southerly exposed slopes and other factors that might engender water stress are considered as pointers to low yields, smaller nuts or thicker nutshells. A northerly exposure, a place in a small depression or valley with deeper soil and other features of more favourable ecological conditions, on the other hand, indicate good walnut quality and higher yields. Interestingly, no informant made a connection between the lie and exposure of a walnut stand and its liability to frost damage.

From observing the timing of the fall of leaves and the colours of the foliage some respondents gain information on the varieties of apple and walnut trees and walnut qualities. A late fall of the leaves is associated with late ripening varieties, hard nutshells, medium yields, and good nuts that are hard to shake down from the tree. An early fall of the leaves, on the other hand, indicates early ripening varieties, thin nutshells, and nuts that are easy to shake down. One tenant uses the time of the fall of leaves in autumn even as an indicator for the expected walnut yield in the following year. Yellowish leaves point to early ripening walnuts, whereas greenish leaves are taken to be an indicator for late ripening walnuts. An

informant from Uzgen takes the colour of the leaves in spring as an indicator for the expected yield: the greener the leaves the better the harvest will be. An elderly informant from Ortok mentioned features of the shape of walnut leaves as an indicator: He observed that the fewer leaflets the pinnate leaves of a walnut tree had, and the bigger the terminal leaflet, the better was the productivity and the quality of the walnuts.

Two informants from Arstanbap-Ata established a connection between the hardness of the walnut shell and of the wood. A tree with hard nuts would also have hard wood, whereas thinner nutshells were associated with softer wood. Similarly, the branches and crotches of trees with soft, thin nutshells, would break easily, while trees with hard nutshells also had more resistant branches and crotches.



Figure 20: Walnut harvest in Uzgen

All this indicates that some of the leaseholders are very attentively observing nature and derive their own rules from their observations. However, a series of questions arises from some of these examples of local knowledge concerning the validity of such rules, their wider applicability and their consistency with scientific knowledge. All this knowledge is potentially very valuable, as it would allow people to judge properties of an individual tree using particular key characteristics as indicators. Possible fields of application again include silvicultural decision-making or the selection of promising walnut varieties. Again, this is an interesting field for PTD activities. It is therefore recommended that local people, researchers and foresters look actively for such information on vegetative indicators for good yields and/or good walnut qualities. The indicators found should subsequently be tested scientifically with the help of researchers, and, if confirmed, be promoted for wider use.

8.4 Silvicultural knowledge

Silvicultural knowledge is essentially applied ecological knowledge used to influence the development of a forest stand in a desired direction to achieve specific goals, be it, for

example, the production of certain forest products and/or the continuation of the provision of environmental services. Silvicultural practice can be defined as consisting “of the various treatments applied to forests to maintain and enhance their utility for any purpose” (Smith *et al.* 1997, p. 3). Silvicultural goals are usually long-term goals, which, of course, is primarily due to the slow growth of woody species and the corresponding long production periods in forest ecosystems.

Most of the tenants have, as presented in Sections 8.2.1 and 8.2.2, some visions for the long-term development of their plots and some mid- and long-term silvicultural ideas for the development of their plots. But discussions with the tenants on their plots revealed that most of them have difficulties imagining the development of a tree and of a forest stand in the long run, for instance, over 20 or 30 years time and deriving from this silvicultural interventions necessary to achieve their vision for their plot. There were several situations in which a silvicultural intervention was, from the author’s perspective, clearly urgent or even long-time overdue. The tenants of the respective plots, who knew how productive walnut trees look like, did however not see any necessity for any intervention. The few tenants with clear silvicultural ideas and a strategy to achieve their silvicultural goals all had relevant working experience in forestry. Thus, imaginative, prospective silvicultural thinking and an understanding for the long-term dynamics of a forest ecosystem are still rather rare amongst local people interviewed and confined to people with relevant work experience.

Most of the informants clearly stated in the interviews conducted on their plots that it is better to have a few productive trees than many “palm”-like unproductive trees with small crowns. As we have seen in Section 8.3 local people have considerable knowledge about the properties of productive walnut trees. At the same time however, many respondents expressed a certain reluctance to cut trees which might still provide some fruit, albeit certainly not much. This points to a widespread ambivalence amongst the interviewed leaseholders, when it comes to felling unproductive trees in favour of a few more promising individuals.

The high value of walnut as a source of cash income at a time of general need and a reluctance to renounce on a guaranteed, but small benefit for the prospect of a substantially increased benefit in future, i.e. an attitude to take no risks may be part of the explanation for this ambivalence. Further factors include a certain lack of experience in active silvicultural management and its benefits. Furthermore, the interviews with representatives of key stakeholder groups showed that most of the interviewed non-foresters considered felling a tree as an essentially “bad act”. Informal discussions with local people on all sites indicate that such a protective view is widespread amongst the local population. This might also, at least partly, explain the reluctance of some people towards any silvicultural intervention. The experience of a very conservative forest policy being practised over decades (see Section 6.3.5) has certainly only strengthened such, often strong feelings.

During the interviews on the forest plots, it turned out that regeneration was another silvicultural issue for quite a number of informants (c.f. also Table 35). The interesting point about regeneration is that it was, in nearly if not even all cases, approached from a production perspective, i.e. regeneration was mentioned as a means to replace old, no longer productive apple, walnut or other trees. Surely, the purpose of regeneration precisely is to ensure a continuous provision of the services rendered by a forest. Alternatively, the issue could, however, also be approached from a more abstract, structural perspective by noting that there was not enough regeneration available on a given plot to ensure the continuous, sustainable regeneration of the stand. But, no tenant mentioned such a lack of regeneration

as a problem. This is particularly noticeable, since many specialists harbour such concerns about a widespread lack of regeneration in the WFFs (Venglovsky 1998). Lacking regeneration eventually will lead to an even bigger proportion of over aged forest stands than today and to a drop of the productivity of many forest stands thus jeopardising the benefits gained from the forest. The fact that the lack of regeneration as such was not brought up as a problem, can be taken as another indication that most of the informants have not yet developed an understanding of the development of a forest ecosystem over a longer period of time, but think of their forest plot primarily in terms of production.

8.5 Sources of knowledge

8.5.1 Sources of knowledge and assistance for forestry work

Most of the informants gave their own life experience as the main source of forest related knowledge (see Figure 21 below). Six respondents referred to their childhood and youth in villages close to or even within the forest. Three informants mentioned the forestry work which they participated in during the Soviet era, when schoolchildren were sent to do practical work as part of their training. As the second most frequently mentioned source of knowledge follows the respondent's own working experience in the *leshoz*, mostly as worker. Then follow relatives of the respondents, especially their grandparents and fathers. But sometimes, the knowledge is also passed on from the children, for instance from a son working in the *leshoz*, to their parents. Equally important are *leshoz* staff members as source of knowledge. Experienced non-foresters (including: experienced elders, other CFM tenants, a biology teacher) were mentioned five times (group "other people" in Figure 21). Four trained foresters gave their professional education as the main source. The category "others" include books on the subject and T.V. programmes on forest and orchard management.

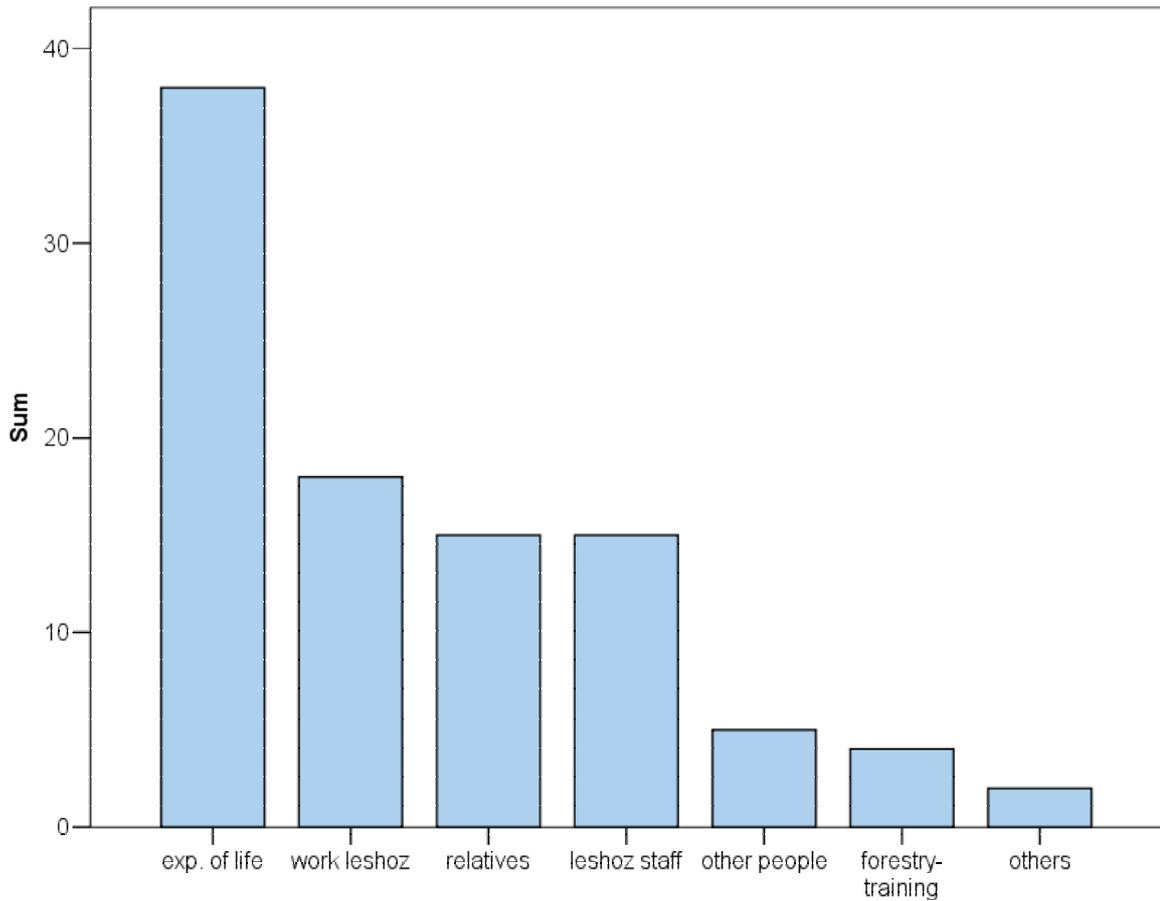


Figure 21: Counts of different categories of sources of forestry-relevant knowledge (multiple responses possible). Source: semi-structured interviews on local knowledge related to forest management.

A little more than three fourths of the informants (78%) said to receive guidance on how to conduct forestry activities either from the *leshoz* or from people outside the *leshoz*. About the same percentage of respondents (75%) also said they received other assistance to their planting activities or other forestry work. In most cases this assistance takes the form of seedlings and additional material needed for planting which are provided by the *leshoz*. A little less frequently, such assistance comes in form of advice and information regarding forests and forestry, mostly from *leshoz* staff members. Additional sources of advice and information that were spontaneously mentioned by the respondents include the CFM (mentioned three times) and the Orech-Les project (mentioned once).

8.5.2 Partners for discussion and exchange concerning forestry issues

Most of the respondents (92% of $n = 79$) said they discussed forestry activities on their plot and aspects of forest use and management with other people. Only six respondents (8%) claimed not to discuss such questions with other people at all. From the different categories of potential partners for such discussions, members of the *leshoz* staff are the most important followed by members of the informants' households (see Figure 22).

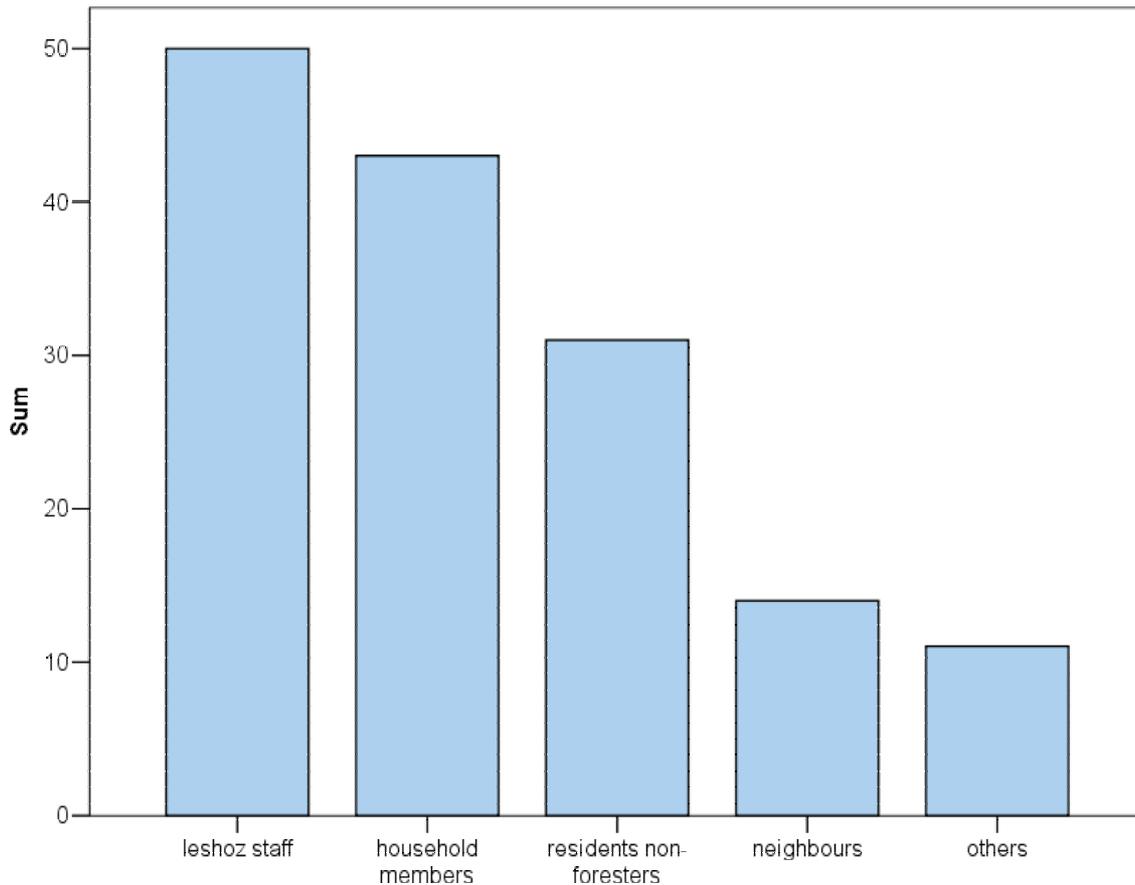


Figure 22: Counts of different categories of partners to discuss forestry questions (multiple responses possible). Source: semi-structured interviews on local knowledge related to forest management.

From the different employees of the *leshoz*, the informants most frequently mentioned forest guards and the foremen of working brigades as partners for such discussions (ten times), mainly due to their practical experience. Forest rangers followed next (five times). Their professional background, sometimes even including a university degree, is recognised as a valuable source of knowledge by many informants. Little reference was made to higher staff members, such as chief foresters or even the director. Personal relationships, of course, also play an important role. Two respondents told the author they discussed forestry questions in particular with their friends working in the *leshoz*.

Resident non-foresters are also frequent discussion partners. This suggests that non-foresters also hold a lot of relevant knowledge. Twenty times, informants spontaneously specified, that they discussed forestry issues and exchanged experience with other CFM tenants. Experiences elders were mentioned four, resident friends three times. Two respondents said to turn to experienced residents with relevant working experience. The respondents' neighbours also play a role in some cases. The last, diverse category of "other partners" includes as partners for exchange: participants of CFM workshops from other *leshozes* (four times), staff of the Orech-Les and the CFM project (four times), and experienced elderly relatives or acquaintances living further away (three times).

These results emphasise that generally there is quite some ongoing exchange on forestry and agroforestry issues in local communities, not only between non-foresters and foresters, but also amongst non-professional fellow residents. This not only suggests that, generally, local

people have relevant knowledge, but also that people know where to locate specific knowledge.

8.6 Factors influencing local knowledge and promoting or hampering innovation by local people

8.6.1 Factors positively influencing local knowledge and promoting innovation

The results of the interviews and of the statistical data analysis presented in this chapter so far and the complementary information gained from interviews with foresters and non-foresters alike suggest that the following factors influence the availability of local knowledge and the occurrence of innovation:

- Work experience of the respondent;
People with work experience in the *leshoz* mostly feel more comfortable about forestry work than people without any forest related work experience.
- Professional background;
Trained foresters or professionals of related fields, such as horticulture, obviously have a considerable edge on their fellow residents without forestry or similar backgrounds in terms of knowledge. Amongst the non-foresters, especially teachers stood out as particularly interested, knowledgeable and innovative.
- Age;
Most of the experienced and particularly knowledgeable leaseholders were above 40 years old. Tenants who experiment or considered to do so were found to be significantly older than their counterparts who do think about experiments (see Section 8.2.4). Local informants again and again referred to the experience of elderly people in questions regarding forest management.
- Duration of the association with the leased forest plot, growing experience;
The observations from the field and the results concerning experiments clearly suggests that people are more likely to experiment and to change things on their plot the longer they have been attached to their forest plot.
- Local particularities;
Some areas or land-uses are more developed on one site than on others, which is reflected in the knowledge and the specific interests of people on this site. The example of the particularly well-developed horticultural tradition in Arstanbap-Ata and the prominence of the issue of grafting amongst informants from this site, illustrates this.
- Personal factors;
The knowledge somebody builds up over time, and particularly her or his innovativeness, depends undoubtedly strongly on the nature of a person and her or his interests.

A combination of these factors seems to make the circumstances for innovation to occur particularly favourable. Thus, the observations of the author from the field suggest that innovation in forest management is most likely to occur with people who i) have long-term experience in forestry or agroforestry, ii) a long-standing interest in these fields, iii) are emotionally attached to their leased forest plots, iv) curious by nature and v) have had the chance of observing the plot for a comparatively long period of time.

The question whether the lease type (CFM *versus* non-CFM lease) had an influence on local knowledge and innovation cannot clearly be answered, since non-CFM tenants had, at the

time of the interview, been considerable longer associated with their plots than CFM tenants. However, one can expect the CFM tenants to get more interested and attached to their plots with the time and, thus, to become more innovative.

8.6.2 Factors hampering innovation

As the data presented in Section 8.2.2 shows, only few of the ideas and plans brought forward had already been put into practice at the time of the interview. Also, a considerable percentage of the interviewed tenants had no long-term vision at all. There are multiple reasons for this. On the basis of the results presented in this chapter and the interviews conducted in the field that following factors and circumstances that hamper the development and the implementation of new ideas for the use and management of the forest plot can be identified:

- Uncertainties regarding the continuation of the lease, be it a CFM (Ortok, Uzgen) or another long-term lease (Arstanbap-Ata, Achy). In the case of CFM leases, the five-year probationary period is the important horizon for the tenants. One tenant said: “I work five years for the *leshoz* in order to be sure to get the CFM lease extended, if this successfully happens, then I start thinking about working for my proper interests on the plot”;
- Unclear lease arrangements and uncertainties regarding the precise user rights of the tenants;
- Where CFM has been based on planting activities, the work demanded of tenants has left them little time or willingness to consider other forest management activities. Furthermore, in such cases the work has been mostly conducted somewhere else, i.e. it is not seen as an investment in one’s own CFM plot and has helped little to strengthen ties between the tenants and their plots;
- Missing, unreliable, or unstable market demand for a range of NTFPs such as rose hips, hawthorn fruits, or dried apples;
- Limited access to the forest plots by lorry and similar transport problems account for postponement of needed interventions to a later date in case of rather remote plots. Under the current, harsh economic circumstances only profitable silvicultural interventions that provide an immediate financial benefit for the *leshoz* are carried out;
- Lack of knowledge amongst the tenants for using particular products such as, for instance, medicinal herbs.

For some activities, approval or action of the *leshoz* is needed (e.g. selective thinning). The researcher found that most of the people considering such an activity had not yet discussed forest management details with the forest rangers or other *leshoz* staff. Reasons for this include:

- Expectancy of the tenants to be contacted by the forest ranger as soon as, according to the *leshoz* plan, something has to be done on the leased forest plot;
- Tenants think that the rangers have no scope for taking up suggestions from them due to the rigid plans the rangers have to fulfil;
- Fear of the tenants that what they would like to do could be prohibited.

Many of these problems can be addressed by improved communication, in particular between the leaseholders and the forest rangers. These difficulties can also be taken as an indicator that both sides, the leaseholders as well as the foresters, have not yet fully grown into their new roles as partner of the SFS in forest management (tenant) and advisor (forester).

8.7 Roles of local people and the SFS in forest management – sharing knowledge and responsibilities

During the interviews with representatives of different stakeholder groups, the state of relevant knowledge held by local people, their future roles as well as the future roles of foresters in the management of the WFFs were discussed.

Local informants judged the relevant knowledge held by local people and the capacity of non-foresters for independent decision-making in forest management differently. Representatives of the civil society were quite positive about this point, referring to the relevant experience of life of people who grew up in the WFFs. Some foresters, however, expressed their doubts concerning the ability of local non-professionals to ensure sustainable forest management. Some of them explained that they still had to provide at least some of the leaseholders with quite detailed instructions as to what to do on their forest plots. Generally speaking, local people who are getting involved in forest management face an important role change. When working in the *leshozes* during the Soviet era, most of them were simply recipients of orders. Now, in an emerging more participatory system, they are becoming partners of the SFS in forest management.

Concerning the future roles and responsibilities of foresters, two key responsibilities and areas of activity for professional foresters came up during the interviews: i) the control or monitoring of forest use, and ii) the provision of advice to people involved in forestry. Interestingly, non-foresters put considerable more emphasis on the advisory role of foresters, whilst acknowledging that, also in future, forestry staff will have a role to play in monitoring rather than controlling resource use. For representatives of the forest sector, on the other hand, the aspect of control seemed slightly more important than their advisory role. They spontaneously mentioned more activities related to controlling natural resource use than advisory activities. Foresters as well as non-foresters pointed out that the gaps in the knowledge available with local people emphasised the need for foresters to play an advisory role in future.

There was also broad agreement amongst the informants that there is a need for competent, professionally trained foresters. The informants saw the experience and the technical knowledge available within the SFS as a huge potential for advising and assisting local people to use their forest plots sustainably. The value and relevance of the professional training of foresters is widely acknowledged. Already today, as seen in Section 8.5, many informants consult foresters when they have particular questions in the field of forest management. Thus, foresters are already advising people. However, the increasing demand for advisory services entails a significant role change for the forestry personnel concerned, given that in the Soviet past the focus of their role was on commanding and controlling. Local researchers, many of which focused on fundamental research during the Soviet era, are in a way confronted with a similar role change. Increasingly, practitioners ask them for advice.

8.8 Discussion on the potential of local knowledge to contribute to sustainable forest management

In the following, the results of this study concerning local knowledge that is relevant for the management of the WFFs are discussed. In a first step, the potential of available local knowledge to contribute to sustainable forest management and constraints related to local knowledge are identified. Subsequently, the consequences of the observed patterns of local

knowledge for the new roles of local people and foresters in future forest management are discussed.

8.8.1 Potential and limitations of the local knowledge available

Generally, the considerable differences in the availability of some knowledge between the informants, e.g. a relatively small proportion of leaseholders had ideas for experiments (Section 8.2.4) whereas all informants with the exception of one knew different sorts of walnut (Section 8.3.2), confirms also for the WFFs of Southern Kyrgyzstan that only part of the local knowledge is collectively shared by most or all members of the communities (Antweiler 1995). Given the emerging heterogeneous picture of available local knowledge amongst the interviewed leaseholders, it is useful to distinguish between different sub-categories of local knowledge, namely technical skills, knowledge about the presence and use options for forest resources and ecological understanding (Wiersum 2000).

Fieldwork has demonstrated that most of the interviewed forest tenants have at least some ideas how they wish their plots to be in the long-term future. Some even have more complex visions for the development of their plots in the long run. Such ideas and visions constitute a valuable basis for participatory forest management. The leaseholders and the foresters should jointly make an effort to make sure that this potential can be used (see also the last subsection of this discussion on the integration of local knowledge in formal forestry planning). While noting that only about half of the interviewed tenants had actually started implementing some of their ideas, it is generally encouraging that people have started to give the future of their plots some thought.

The results presented in the previous sections suggests that technical forestry skills are widely available amongst local people, many of whom have made their own working experience in forestry during the Soviet period. Representatives of different stakeholder groups including foresters, representatives of the municipalities, of women's groups and local elders confirmed this assessment.

Also widely available amongst the interviewed leaseholders on all sites is relevant knowledge about the use options of economically interesting forest products in general and particularly for the marketing of walnut and other fruit, such as the knowledge on different sorts and qualities, as shown in Section 8.3. It appears that the stable market demand for walnut at an attractive price level acts as *stimulus* for the generation, spread and application of the local knowledge about different qualities and sorts of walnut and about the production potential of walnut trees. The availability of such knowledge is a precondition for the success of any silvicultural intervention. If a tenant convinced the *leshoz* to conduct thinning on his plot, this knowledge would be needed during the marking in order to decide which trees to favour and which to fell. It would also be useful for identifying and selecting promising varieties, be it of walnut or other species, for the production of planting material.

While most of the interviewed local forest leaseholders have the technical skills needed to conduct at least basic forestry work, this situation concerning ecological understanding is more diverse. There clearly are informants who think in ecological terms, but their number is limited. The few tenants who remove disturbing ground vegetation from natural regeneration and planted seedlings and loosen the soil to keep the soil humidity high (see Table 35) might serve as examples of tenants that have and apply their ecological knowledge. Other examples are the leaseholders who link ecological site conditions with quantity and quality of walnut yield (see Table 40). The major constraint in terms of

silvicultural, i.e. applied ecological knowledge concerns the widespread lack of imagination and visioning capacity for the development of a forest stand and its dynamic over a longer period of time (Section 8.4).

The now limited silvicultural understanding is however likely to grow with increasing experience in forest management that the leaseholders build up over time. There are, in fact, signs of local people becoming increasingly interested in possibilities to influence the development of forest stands and in a more active silvicultural management of their leased plots. The widespread interest of leaseholders in Uzgen in thinning stands which they consider to be too dense (Section 8.2.2) and the fact that a few of them have, in collaboration with the *leshoz*, already initiated such interventions, is a clear example of this tendency. The interest that some tenants expressed towards the silvicultural trials undertaken by the applied research project Orech-Les on its experimental plots also points to a growing interest and awareness that “something can be done” about the state of a forest stand. This was confirmed by more recent observations in Ortok of CFM tenants becoming increasingly proactive and interested in silvicultural management of their plots (Samyn 2006). Growing experience of the tenants over the years might be one of the reasons for this development. Furthermore, many CFM leases in Ortok and Uzgen have been extended to a duration of 49 years in the meantime. This has effectively removed widespread insecurity amongst CFM tenants concerning the continuation of their lease contracts, which represented, at the time of the interviews, one of the main obstacles for local people to take the initiative and make suggestions for changes to the *leshoz*.

The difficulties of many local people to imagine the evolution of a forest stand in the long-run and to draw conclusions from such prospective thinking for the management of the stand in question highlight the value of demonstrative examples of concrete forest management interventions. People need concrete images of different management options and their consequences that they can compare and discuss. This is a first step in developing a better understanding of the ongoing ecological processes in a forest and of the possibilities to influence the development of a forest stand. Luckily, examples of conducted silvicultural interventions are now available throughout the WFF-belt in the form of the network of trial plots installed by the Orech-Les project. The state of the forest stands on these plots and the interventions conducted have been documented²⁹. The trial plots represent a series of typical forest stands and agroforestry systems. This should allow people to relate the images and information gained from these trial plots to their own leases plots. The visions and ideas that some forest leaseholders have already developed for the long-term development of their stands and the discussion of concrete examples of conducted silvicultural interventions in comparable stands can serve as a starting point for the silvicultural planning for the leased forest plots. The visions of the forest leaseholders can be further concretised, long-term silvicultural objectives fixed and a silvicultural strategy, i.e. a concept for the achievement of these goals can be developed.

In conclusion it can be said that there is considerable relevant knowledge available with the interviewed leaseholders and also a potential for innovation in forest management. The observed lack of silvicultural experience and knowledge amongst many leaseholders constitutes the most important gap in knowledge held by the interviewed forest tenants. At the moment, the available local knowledge does however only partly translate into practice,

²⁹ See documentation of the Orech-Les project available at: Orech-Les, c/o KIRFOR, U. Jamasheva 1, Sputnik, Jalal-Abad 714'611, Kyrgyzstan.

only some of the ideas and planned innovations by leaseholders are already being implemented. Thus, the potential of the available local knowledge, is not yet fully used. This is mainly due to a range of barriers, of which insecure access and unreliable or unstable market demand are key factors. This confirms that practice results from the interplay of the underlying knowledge and other factors that represent opportunities and constraints for resource use (Sinclair & Joshi 2000). Although, statistically speaking, the interviewed leaseholders do not represent the population at large in the walnut-fruit forests, the findings of this study give informed indications about the knowledge available amongst local people involved in forest management in a variety of locations in the walnut-fruit forest-belt, including places with low, medium and high human pressure.

The emerging picture of the knowledge held by local people on the four research sites and of the most important gaps considerably differentiates the observations reported in the literature of a widespread lack of traditional skills and expertise of managing the walnut-fruit forests (Müller & Venglovsky 1998; Marti 2000). Marti (2000, p. 62) found in Kara-Alma, a *leshoz* neighbouring that of Ortok with an ethnic Kyrgyz population, little traditional knowledge concerning the use of forest resources that people actively remembered or applied today. This can, in the case of the Kyrgyz traditionally living as nomadic herders, plausibly be explained with a society that has “little cultural and social links to forests and trees” (Marti 2000). For historical reasons it is generally difficult to decide whether knowledge actually can be termed “traditional knowledge” in today’s Kyrgyzstan.

The predominance of the *leshoz* during the Soviet era and work in the forestry sector that many informants mentioned as a source of their knowledge indicates that much of the skills found amongst leaseholders in this study originates in the science-based formal forest sector. Also the study at hand, did, in accordance with Marti (2000), not find abundant knowledge that clearly has traditional roots. However, some of the local knowledge identified, for example, some of the indicators used by local people to estimate the yield potential of walnut trees are clearly based on local observations and could constitute examples of traditional knowledge. Also, the knowledge available on grafting and the idea to graft cultivated varieties of fruit trees on wild rootstocks that was particularly popular with informants in Arstanbap-Ata might have traditional roots. The findings of the palynological research project undertaken in the WWFs (Beer & Tinner 2004; Kaiser 2006) and the legend of the establishment of the WWFs in Arstanbap-Ata through Arstanbap-Ata, the legendary founder of this village, and his aids consistently point to the fact that man might have played a major role in the formation of the walnut stands in the valley of Arstanbap-Ata. Thus, forestry activities such as planting and maybe also grafting, as widespread horticultural activities in Arstanbap-Ata would suggest, has a long tradition in this part of the WWFs.

8.8.2 Complementary knowledge held by local people and foresters and role changes

As noticed by many interview partners, the involvement of local people in forest management leads to a role change for both foresters as well as for local people themselves (Section 8.7). In terms of their collaboration, one notes that many informants from a range of stakeholder groups acknowledged the significance of the professional expertise held by trained foresters. The fact that many interviewed forest tenants seek advice from *leshoz* staff members (Section 8.5.2) also indicates that many people respect the knowledge and experience held by foresters. An increasing role in advising local people in resource use is an important opportunity for the foresters to apply their professional knowledge for the benefit of the people. Politically speaking, it offers also an opportunity for the foresters to retain or build up their credibility amongst their co-citizens and to practically demonstrate

the professional capacity and thus the need for a forestry service in whatever institutional form. Thus, an increased supportive role for the benefit of local people holds the promise of a high recognition of the work undertaken by foresters at the local level and of an adequate status amongst local people. Such incentives can facilitate the role change that, as a whole, could be a difficult exercise involving resistance from parts of the SFS that fear losing control power and with it also income opportunities (c.f. Section 2.3.2).

The differences in the assessment of the capacities of local people to become involved in forest management and the state of their knowledge between different interviewees is interesting to discuss. While non-forester interview partners were generally positive about the capacities of local leaseholders to manage forests, some, but not all of the interviewed foresters were more sceptical of the forestry abilities of local people. Their experience that they still have to explain some of their tenants in quite some detail when what to do on their plots is an important reason for this scepticism. During the research process, it was found that many tenants rather wait for the *leshoz* to take the initiative instead of being proactive. This supports the more critical judgment of foresters concerning the capacities of local people in forest management. One plausible reason for this rather passive attitude displayed by many tenants is the Soviet past and the clear roles in the hierarchical former Soviet command and control system. The “mentality revolution” (Góralczyk 2000) to change from passive reception of instructions received from above to individual decision-making and to the take up of responsibilities and risks is a long and ongoing process. The author of the study at hand postulates that at least two generations are needed for this change of mentality, as the first generation who was brought up and spent most of its working life under the Soviet system automatically passes on a lot of values and behavioural patterns acquired during the Soviet era to the next generation. This calls for some realism in the expectations concerning the timeframe needed for the ongoing fundamental societal change processes.

There might however also be a tendency of some foresters to withhold authority behind their critical judgements regarding the forestry capacities of local people. Surely, also in Kyrgyzstan knowledge is power. Growing knowledge of local tenants and with it capacities to manage their leased forests potentially reduces the scope for foresters for action that they enjoy and, if the accusations of corruption made during the stakeholder interviews are to be believed, some of them misuse by virtue of their professional and official authority. Internationally, scientific management is often used as a justification for a continued strong role of the central State in forest management (Shackleton *et al.* 2002; Ribot *et al.* 2006). Although, from the data gained for this thesis, it is not possible to say to which extent foresters in Kyrgyzstan currently apply, consciously or unconsciously, such a strategy to keep their authority and scope for decision-making, it is certainly useful to be aware of this possibility and the power dimension of knowledge.

A successful collaboration between local people and the professional foresters, i.e. a collaboration to which both parts contribute their specific knowledge and experience, requires a mutual acceptance of the value of the knowledge and experience held by the partners. The discussion above suggests that on the side of the leaseholders and other interviewed non-foresters this acceptance is largely available, but so far less widespread amongst foresters. While the scepticism voiced by some of the interviewed foresters might not be entirely free of personal interests it reflects some of the limitations of the local knowledge available with local people identified in this study.

8.8.3 Integration of knowledge held by forest tenants into formal forestry planning

The intake of local knowledge into forest management raises the question about the way it will flow into forest management practice and appropriate forest management tools. As analysed in Section 5.2.1, forestry during the Soviet era followed a strong top-down approach. Over the last decade, a new, more participatory and adaptive forest management planning system has been developed (Scheuber *et al.* 2000), with the support of KIRFOR, that includes a mechanism for CFM leaseholders and rangers to jointly discuss and decide management activities for the leased forest plots (Carter *et al.* 2003). The new planning procedures and the resulting plans allow generally more scope for local decision-making (Carter *et al.* 2003) and thus create favourable conditions for the uptake ideas and plans that foresters and CFM leaseholders develop jointly on the basis of their knowledge and experience. The new system also appears to be less complex than the previous planning system and does hence facilitate the participation of local people.

In practice however, these mechanisms had, at least until 2003, not really taken effect. Discussion on forestry planning with the interviewed leaseholders revealed that only a small proportion of CFM tenants and no tenants with other contracts had actually taken part in the planning concerning their forest plots. Fisher (2003a, p. 17) also found little evidence for the involvement of CFM tenants in the planning process in the *leshozes* of Uzgen, Ortok and Achy. The leaders of the national forestry planning team of SFS, whom the author met in the field, saw the reason for the non-participation of leaseholders with other contracts than CFM in the fact that only the CFM Regulations (in paragraph 1.4.7) entitled the tenants to participate in planning and inventory of her or his forest plot. The regulations on other types of leases do not include any provisions to that effect.

Surely, again it will take some time for working practices to change from a system of centralised planning and hierarchical implementation of forest management plans to the new system of participatory, bottom-up planning (Carter *et al.* 2001). From the discussion above it appears however that an effective mobilisation and use of the knowledge held by local people requires i) the creation of mechanisms that allows also non-CFM long-term leaseholders to take part in the planning process; and ii) a need to encourage the tenants actively to participation in planning. This again points to the crucial role of the SFS and its foresters in a future, more participatory management of the walnut-fruit forests.

9. Forest use practices and forest management by local people, and significance of forest resources for local people's livelihoods

This Chapter addresses the research questions under the objective 4 of this study. Drawing mainly on interviews with forest leaseholders, ranking and scoring exercises and observations on the leased forest plots, the chapter starts with a description of the vulnerability context for forest management including an analysis of the markets for forest products. It subsequently describes the motivations for local people to become involved in forest management and their forest use practices. Then, the variations in the significance of different sources of revenues available to local people are described and analysed. The results are discussed and recommendations for increased livelihood securities and poverty alleviation are derived.

9.1 Vulnerability context

The vulnerability context for local livelihoods in the WFF-belt comprises shocks of different nature, trends and the effect of seasons. For this study, markets have been associated with the vulnerability context in independent Kyrgyzstan, as the development of a market economy and the evolution of market prices are closely linked with the above-mentioned vulnerability factors.

9.1.1 Shocks, trends and seasons

Amongst the most crucial factors for the management of natural resources in the WFF-belt are the weather conditions. The occurrence of late frost at the time of the walnut-blossom is particular critical for the walnut yield. In fact, a heavy late frost can destroy the entire walnut harvest of a year and thus deprive local households with access to forest plots of the means which would have sufficed to cover for all the expenses during a year. Thus, such a late frost damaging the entire walnut harvest usually comes as a major shock for people depending on walnut for cash income.

Late frost is certainly the single most important cause of marked yield fluctuations of walnut between the years. Additionally, meteorological (e.g. great heat in summer) as well as biological factors (e.g. even under optimal conditions, walnut trees might not fruit every year) also affect walnut yield. Similar yield fluctuations also occur with other NTFPs, such as wild apples. The statistics shown in Figure 23 for walnut and in Figure 24 for wild apples of the collection and sale of walnut and wild apples by the *leshozes* of the Jalal-Abad *Oblast* since 1970 provides a good indication of these annual fluctuations of the harvest of these NTFPs. As a rule of thumb one can say, that, there are on average only one to two years with a good, two years with a medium and three years without any walnut harvest per decade. A good yield of wild apples occurs a bit more frequently than a good yield of walnut. But also in the case of wild apples, there are quite regularly years without any fruit at all.

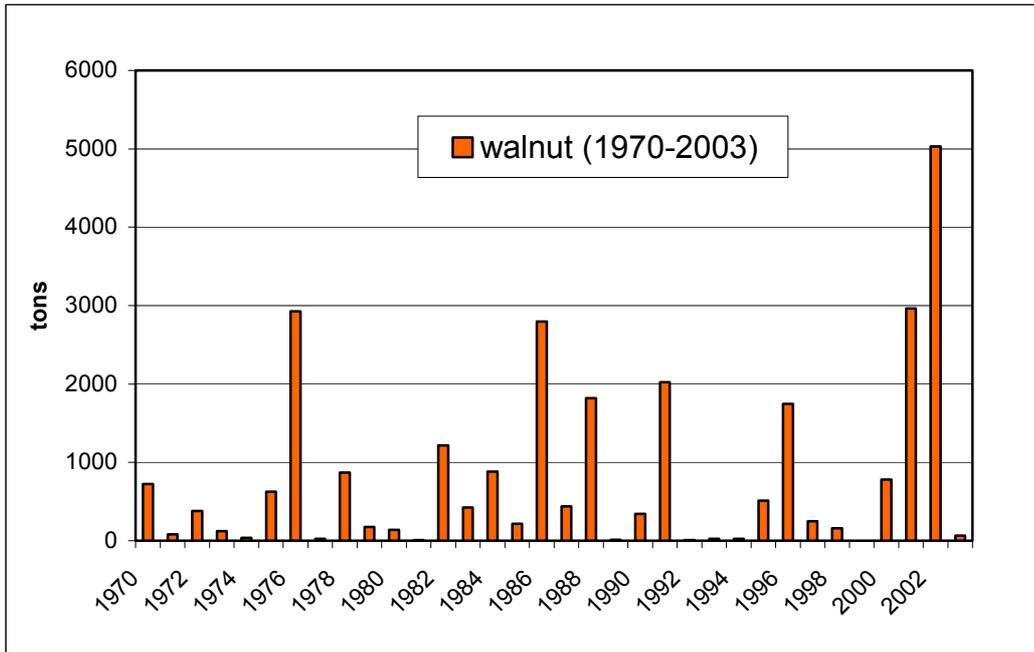


Figure 23: Harvest of walnut in the *leshozes* of the Jalal-Abad Oblast between 1970 and 2003. Source: statistics kept by the Regional Forest Administration of Jalal-Abad Oblast.

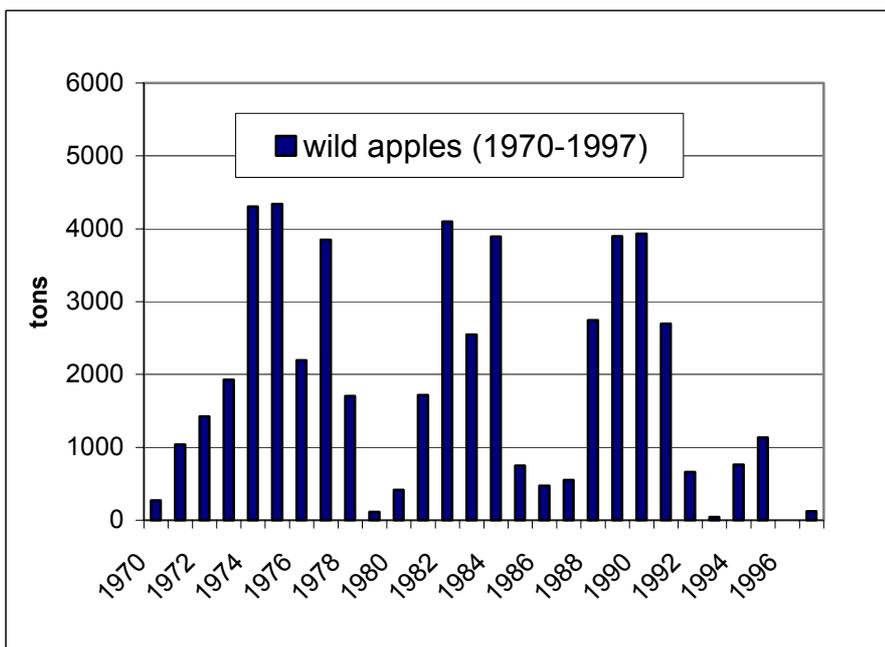


Figure 24: Harvest of wild apples in the *leshozes* of the Jalal-Abad Oblast between 1970 and 1997. Source: statistics kept by the Regional Forest Administration of Jalal-Abad Oblast.

Given their strong yield fluctuations, it appears that both walnut and wild apples are not reliable sources of revenues. This aspect and how local people cope with the sudden loss of a walnut harvest following a late frost will be further explored in Sections 9.8 and 9.7 of this thesis.

In autumn 2002, when some of the fieldwork for this study was conducted, there generally was a very good walnut harvest, also on the four research sites (c.f. Figure 23). The following year, 2003, during which fieldwork went on, there was virtually no walnut at all in the *leshozes* of the Jalal-Abad Oblast, as indicated in Figure 23, including those in

Arstanbap-Ata, Achy and Ortok. In Uzgen, there was only very little walnut in the lowest forest patches along the river Jazy. This was due to a late frost in early May 2003 that had damaged most of the walnut blossom in the entire WFF-belt. The comparison of the results from the year 2002 with a very good walnut harvest and from the year 2003 with no or only limited walnut yield provides a realistic picture of the fluctuations in walnut yield and in the significance of walnut for the local households. As both years happened to be opposite extreme cases, the reality of most other years can be expected to be in-between the situation described for 2002 and 2003.

9.1.2 A market is slowly emerging

The emerging market for forest and agricultural products in Southern Kyrgyzstan has a few interlinked features which greatly affect the assets and the livelihood strategies of local people, including: the still ongoing evolution of the market, unstable supply and demand for some products and the vulnerability of the market to external shocks. These and other factors lead to considerable fluctuations in market prices, observed during fieldwork on the regional markets of Jalal-Abad, Uzgen and Bazar-Korgon (see Section 3.6.3), for products upon which people living in the WFFs area depend for their livelihoods.

It took a while to overcome the shock of the collapse of the Soviet economy. In the meantime, free markets for many forest and agricultural products have evolved. The author observed during fieldwork that, in comparison with the late 1990s, demand for i) a wider range of forest products and ii) for bigger volumes of already traded products has emerged on regional markets. This general observation was confirmed by farmers on the research sites and by traders during fieldwork. At least in some places such as Arstanbap-Ata or Achy, processing plants for NTFPs have resumed their work, although they still process low volumes compared to the Soviet era. Despite all these positive developments, there is still not a market for all products for which there used to be a planned demand and secured distribution channels in Soviet times. Also, in some places demand for certain forest products is unstable. These tendencies can be illustrated at the example of rosehips and hawthorn fruit. From 1991 until the late 1990s, there was virtually no market for these two products. The interviews with local forest leaseholders in Uzgen revealed that more recently however, a demand for dried rosehips has evolved in Uzgen, the most easily accessible of all research sites. In some years, local people could also sell hawthorn fruit to buyers in the villages on this site. On the other sites however, demand for rosehips and hawthorn fruit is only occasional and fluctuates strongly from year to year. The availability of a market for a given product will be shown in this thesis to be an important determinant of forest use.

But also on the supply side, there are sometimes strong fluctuations which contribute to volatile market prices. Many producers are still at early stages of developing their coping strategies and have little means to diversify their production. Unfavourable weather conditions, also contributed to fluctuations in production and supply of agricultural products cultivated as cash crops in the WFF-belt.

Furthermore, markets for agricultural and forest products are also prone to damage inflicted by external shocks, such as imposed restrictions on trade with neighbouring Uzbekistan or geopolitical crises such as the wars in nearby Afghanistan starting in late autumn 2001 and in Iraq that began in March 2003. The uncertainties caused by these wars are thought to have delayed the arrival of important international walnut buyers. Thus, there was only a relatively small number of international traders interested in buying walnut in autumn 2001 and in spring 2003. This led to a reduced demand for walnut and lower prices than many

producers had hoped for. As the average monthly market prices for whole walnuts and walnut kernels on the wholesale market in Jalal-Abad displayed in Figure 25 below shows, the prices in autumn 2001 and winter 2001/02 rose much slower than in other years (c.f. for example with the steep rise of the prices after the walnut harvest in autumn 2004). After a fast initial rise in prices following the good walnut harvest in autumn 2002, the prices levelled out again or even fell in spring 2003 when the war in Iraq started. This is contrary to the usual steady rise in prices in spring (c.f. prices in spring 2002 or 2004) and negatively affected all those collectors who had speculated for higher prices in spring. Such external factors from the wider vulnerability context, in combination with the above-mentioned yield fluctuations, account for marked fluctuations in the market price for whole walnuts and walnut kernels over the study period.

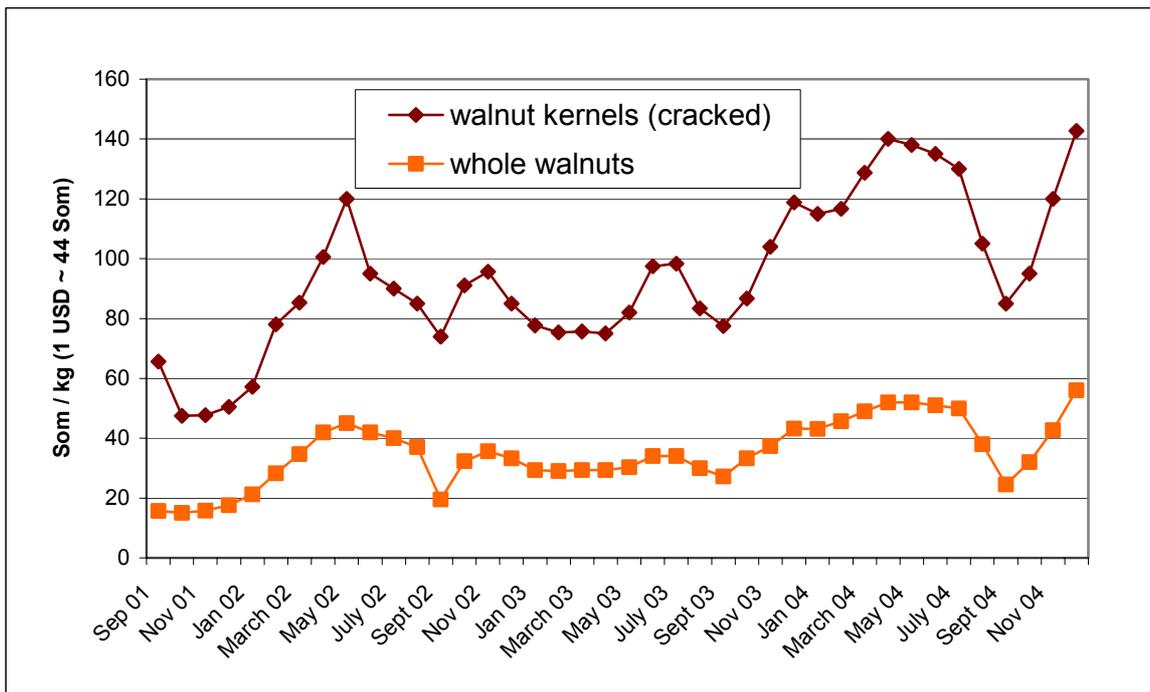


Figure 25: Average monthly market prices for walnut kernels and whole walnuts on the wholesale market in Jalal-Abad from September 2001 until December 2004. Source: market observation conducted by Nurlan Akenshaev and Kaspar Schmidt.

The average producer prices on the wholesale market of Jalal-Abad over the period September 2001 to December 2004 for the 19 products included in the market observation is shown in Table 41. These mean prices clearly show the high commercial value of walnut. The price difference between the prices fetched by walnut kernels and uncracked, whole walnut demonstrates the potential of generating added value by cracking the nuts carefully. For this processing step only labour, but no technology is required. Almond and pistachio fetch higher prices than walnut, but they are i) less widely available in the walnut-fruit forest belt (pistachio forests actually occur at lower altitudes than forests dominated by walnut (see Section 4.3.1)), and ii) their collection is generally more cumbersome than that of the bigger walnuts. The latter also applies to rose hips and to the fruits of hawthorn species which are all much smaller than walnut and have, at least partly, to be collected from prickly bushes. Wild apples, which are again easier to collect, have the disadvantage of fetching a much lower market price than walnut. All this explains the special role of walnut as a commercially highly attractive forest product.

Table 41: Average producer prices of 19 forest and agricultural products on the wholesale market of Jalal-Abad from September 2001 until December 2004. Source: market observation conducted by Nurlan Akenshaev and Kaspar Schmidt.

Product	Unit	Mean price [Som]	SD
Forest products s.l.			
Walnut kernel – high quality (entire halves)	kg	89.3	27.0
Walnut kernel – low quality (fragments <i>et cetera</i>)	kg	79.9	19.1
Honey	kg	47.8	9.2
Almond	kg	42.4	13.2
Pistachio	kg	42.1	15.2
Walnut	kg	32.7	11.4
Mushrooms fresh	kg	24.3	5.9
Rose hips dried	kg	23.8	9.6
Rose hips fresh	kg	7.9	4.5
Red hawthorn fruit	kg	4.4	2.8
Yellow hawthorn fruit	kg	3.6	1.3
Wild apples	kg	1.2	0.2
Agricultural and horticultural products			
Meat (sheep/mutton)	kg	99.1	12.4
Meat (beef)	kg	77.5	7.9
Cultivated apples	kg	15.1	8.3
Wheat	kg	5.6	1.5
Potato	kg	5.5	2.2
Maize	kg	4.9	1.2
Egg	piece	3.1	0.6

9.2 Motivations to apply for a forest lease, interest in forest leases

The analysis of the motivation of local people in applying for a forest lease provides a better understanding of the interests they take in their forest plot and of the role their forest plots play in the overall livelihood strategies of the interviewed households. The interviewed informants became forest tenants for the reasons shown in Table 42.

Table 42: Motivations of forest tenants to apply for a forest lease, given in decreasing order of their frequencies. The informants could give multiple motivations. Source: interviews on the households' forest lease agreements.

Motivations	No of times mentioned
Economic reasons , use of different products by members of the household to get cash income and products for subsistence	38
Securing the user rights and thus the benefit from exclusive use of products from the forest plot for one's own households	20
Tend the plot and grow trees for the benefit of the coming generations , or continue the work of the ancestors respectively	9
Somebody from outside the household, mostly the <i>leshoz</i> , suggested taking up a lease	8
Interest in forestry work , work satisfaction	7
Forest protection , make a contribution to the conservation of the forest and its ecosystem services	5
Heritage , leave a green memorial of one's own actions for generations to come	2

There are clear rational economic considerations behind many of these points. But, the third and the last two points, reflecting an ecological awareness, can be seen as something of

recognition of a civil society in which people share responsibility for one another, for future generations and for natural assets. In the following, the reasons within the above mentioned groups are presented in further detail.

The representatives of a dozen households simply said that they applied for a lease because of their economic interest in using products from the forest plot, without mentioning a particular product. Another four informants told the author that by applying for a lease they intended to open up an additional source of income for their households. In these cases, adding a piece of forest was part of a strategy of livelihood diversification and risk spreading. Twenty-two informants were more specific by referring to one or several products they were particularly interested in. To harvest walnut, possibly alongside other products, was the single most quoted motivation to get a forest plot. However, the informants spontaneously also mentioned other NTFPs, such as firewood (4 times), hay or wild apples (both twice). For seven households, the possibility to grow agricultural crops on the leased forest plot, to grow cultivated apple varieties or to rear livestock were important *stimuli* to get a forest lease. This highlights the economic advantages of having a forest plot. An informant from Uzgen said that his household depended on agricultural crops grown on the forest plot, since their other field was too small to sustain a living. This is an indication of the significance of the forested area not only for the collection of forest products, such as walnut or other NTFPs, but also for tillage and livestock rearing. In particular in higher, densely populated parts of the WFF-belt, where land for tillage is restricted, one can observe how the cultivation of agricultural crops within the forest has intensified since the beginning of the transition period.

The next group of motivations to get a forest plot, the ones concerned with user rights, are closely related to the economic reasons presented above. They represent strategies aiming at increased livelihood securities. In four cases, the experience of a conflict over user rights for forest products motivated the informants to apply for a lease. They thought that a lease backed-up by the *leshoz* would provide a clear regulation of access rights thus preventing similar conflicts in future. Eight households stressed that it was important for them to secure the benefits of having a forest plot in the long run. One of these households explicitly referred to the need to fix its claims legally. For four CFM tenants amongst these eight households, the perspective of a secured long-term access, over 50 years according to the CFM Regulations, was decisive. One of these households said that he “decided to take up a lease, because the plot becomes like a private property. It is easier to work if you know that the plot is your own”.

Another group of reasons, stated by informants from five households, has to do with attempts to secure a forest plot before everybody else does it and the fear that one might lose out. These are cases in which limited natural capital results in competition for scarce resources. These respondents said that they were afraid that eventually it could turn out that not enough forested area was available to grant a lease to all local households. A tenant from Achy told the author that the *leshoz* offered him a lease contract with rather unfavourable conditions. He nevertheless accepted it, being afraid that the *leshoz* might give the plot to somebody else if he did not accept it under the offered terms. Three CFM tenants from Uzgen pointed out that their motivation was to “get a forest plot before everything was distributed” or to get a lease for a particular plot before somebody else occupied it respectively. In one of these cases, the forest plot in question is located next to the household’s small house used in summer and its arable fields. Using this forest plot was therefore very convenient for this family and allowed it to complement its resource base. In the case of informants from two households in Arstanbap-Ata, getting a forest lease was

strongly motivated by the possibility to use the land for tillage, as they have no arable fields. This, again, underlines the significance of the forest as a reserve of land for tillage in places with limited arable areas.

Related to the concern of securing the household's user rights is the wish to be able to hand over a forest plot to the next generation. Seven informants explained their interest in getting a forest plot with the work and the benefit it would provide for their own children. Family bonds motivated another tenant to lease the plot which his ancestors had used and owned previously in the pre-Soviet time. In this case, the CFM lease allowed him to reclaim and legally fix user rights traditionally held by his ancestors. Since the collectivisation in the 1930s the plot has formally been under State ownership. But, the family has been using this particular plot throughout the Soviet era. Being a forest ranger, the informant is well aware of the fact that the *leshoz* and thus the State, remains the legal owner of the plot. With a CFM lease for the plot, he has however gained a higher level of ownership of the plot. He clearly stated that he considered it to be primarily his family's plot, for historical reasons, whatever the legal situation might be. This example also highlights the often very complex situation of overlaying claims for certain pieces of land in the WFF-belt. Different stakeholders, such as local people or State bodies, hold such claims on different grounds. Furthermore, it underlines the significance of family and clan bonds in Kyrgyzstan's society in general and particularly related to land issues. A further reason, quoted by two informants, has to do with one's heritage and land: Two informants called Kurumbai and Talant said that they took up the lease also because they wanted to plant tree on the plot and tend them so that future generations would refer to these particular forest stands "as a gift of Kurumbai" or call the place "Taland's forest".

A general interest in forestry work was amongst the reasons given for their application by seven informants. The reasons behind this interest are manifold: One informant had previously been working in the *leshoz* and thus had a certain understanding of forestry work. Two other informants said that they considered a nice forest plot as something beautiful and that therefore forestry work had an aesthetic quality appealing to them.

Five households were motivated to apply for a lease by reasons related to forest protection. In one case in Arstanbap-Ata the informant and his neighbours share an interest in conserving the forest above their houses in order to prevent erosion potentially damaging their properties.

All these reasons presented explain why the informants actively tried themselves to get hold of a forest lease. Sometimes, however, the initiative came from outside the household. In four cases (three non-CFM long term, one CFM lease), a *leshoz* employee suggested the informants taking up a lease. One tenant in Arstanbap-Ata was simply appointed by the *leshoz*. For one CFM tenant in Ortok, the information provided by the *leshoz* on the then new lease system of CFM was the decisive factor in taking out a lease. In the case of two CFM tenants the recommendation of other villagers already in possession of a CFM lease, motivated them to apply. One of them said: "Everybody in the village takes up such a lease, so I decided to take one as well". So, at least sometimes, there seems to be a certain social dynamic to get a lease. This might also be connected to the feeling that, in some places, there is only little forest left for distribution as discussed above. The fact that there were households which applied for a lease only when the *leshoz* or other people suggested them doing so might seem surprising at first sight, especially given the great number of households explaining their interest with economic reasons or reasons related to user rights. However, the experience from Uzgen and Ortok, where the CFM approach was pioneered,

shows that at the beginning many people were cautious and hesitated to apply for a lease, not knowing whether they would be able to fulfil the contractual duties and whether the “deal” really was favourable for them. It was only after a couple of years that such initial, widespread reluctance turned into a general interest in receiving a CFM lease. More specifically, it seems that two successive years with a good walnut harvest (2001 and 2002) and the benefits gained by those leaseholders who took the risk of taking a lease at an early stage washed away initial scepticism.

Looking at the informants and their backgrounds there are several noteworthy tendencies. The immediate economic use of a forest lease was a very important, albeit statistically not significant motivation for poor families to apply for a lease. Rich households, on the other hand, were particularly concerned with securing user rights for forest resources when they applied for a lease (statistically not significant). There is a statistically significant connection ($P = 0.05$) between human pressure on forest resources or the sites respectively and the distribution of the reasons subsumed in the second group (“securing user rights”). The analysis showed that informants living under conditions of low human pressure on forests, i.e. in Ortok, referred more often to economic reasons as their motivation to apply for a lease than informants living in places with higher human pressure on forests, i.e. people from Achy or Arstanbap-Ata. The latter, on the other hand, put reasons connected to forest user rights forward more often than informants from Ortok.

To sum up, one can say that most of the motivations are primarily economic aiming at a more diversified livelihood system promising increased livelihood security. In particular CFM leases are regarded as providing comparatively high levels of security, close to the security of private property. Leases are also used as a means to make sure that one gets hold of a forest plot in times of increased competition for scarce natural resources, i.e. as a strategy to secure livelihood options which might no longer be available in the near future. However, there are also other factors than rational economic thinking that motivates local people to apply for a lease. For instance, their concerns for conserving the natural capital available or social or historical factors, sometimes even related to the significance of family values in society.

9.3 Use of products from the forest plot: frequencies and purpose of use

A range of different products are harvested on and collected from the leased forest plots by the tenants. These products include both uncultivated forest products and cultivated agricultural crops. Which product is available from which plots, depends, of course, on the nature of the forest plot, the characteristics of the forest stands on the plot and the resources available. Table 43 below gives an overview on the products and groups of products used by the households included in this study and their frequencies of use. The frequencies of use give an indication of how widely a given product is used in the WFF-belt. The results of the ranking exercises, presented in Section 9.7 below give further indications on the significance of different products for the livelihood of local people.

Whilst the focus of this Section is on concrete, tangible products, it should be noted here, that informants from five households spontaneously mentioned “soil protection against erosion” i.e. an ecosystem service as a product *s.l.*. Once of these informants also underlined the importance of “fresh air” and “recreation”. This points to a high awareness amongst at least these informants about the environmental and social services provided by forests and about the crucial importance of natural capital for local livelihoods.

The entries in Table 43 for the product “wild apples” for example mean that 54 of the total 84 households with which a detailed interview on their forest use practices was conducted collect wild apples from their leased forest plot. This corresponds to 64% of the households interviewed. Additionally, they might collect wild apples also from other parts of the forest beyond the limits of their leased plot (c.f. Table 28 in Section 7.2). The entries for the purpose of use indicate that wild apples are both collected for subsistence as well as for sale.

Table 43: Products and groups of products used from the leased forest plot by members of the households interviewed for this study, frequency of use, and number of households using the given product for auto consumption (subsistence), selling or other purposes. Table sorted in decreasing order of the frequencies of use of the products (column 2). Percentages for the different purposes are only given for products that are used by at least eight households. Data available from 84 interviewed households (n). Source: semi-structured interviews on forest use practices.

Product or group of products	No of households using the product		Purpose (multiple entries possible)		
			Auto consumption (subsistence)	Selling, barter for other goods	Other purposes
	Counts	%	Counts	Counts	Counts
Walnut (<i>Juglans regia</i>)	84	100%	57	83	3
Firewood	83	99%	83	11	0
Mushroom	57	68%	52	16	0
Wild apples (<i>Malus</i> spp.)	54	64%	33	34	1
Hay	42	50%	40	3	0
Rosehips	37	44%	27	23	5
Sogdiana plum (<i>Prunus sogdiana</i>)	29	35%	28	5	0
Medicinal herbs	27	32%	19	10	0
Agricultural crops	26	31%	24	12	0
Red hawthorn fruit (<i>Crataegus</i> spp.)	24	29%	15	13	0
Yellow hawthorn fruit (<i>Crataegus pontica</i>)	22	26%	20	9	0
Seeds of woody species	21	25%	0	4	17
Branches	13	16%	13	0	0
Berberis fruit (<i>Berberis</i> spp.)	12	14%	8	6	0
Cultivated fruit	11	13%	7	7	0
Berries	10	12%	9	2	1
Herbs, species + wild garlic	9	11%	9	1	0
Grazing for livestock	8	10%	8	1	0
Hawthorn flowers (<i>Crataegus</i> spp.)	6	7%	6	1	0
Vegetables	5	6%	5	1	0
Green walnut* (<i>Juglans regia</i>)	3	4%	2	3	0
Almond (<i>Prunus amygdalus</i>)	3	4%	2	2	0
Fruit of Mahaleb cherry (<i>Prunus mahaleb</i> L.)	3	4%	3	0	0
Seedlings of woody species	2	2%	0	1	1
Wild honey	2	2%	2	0	0
Game	1	1%	1	1	0
Poplar logs (<i>Populus</i> spp.) for poles and as construction timber	1	1%	1	1	0
Honey	1	1%	1	1	0
Wood for carving	1	1%	0	1	0
<i>Polygonum</i> spp. **	1	1%	1	0	0
Cultivated flowers	1	1%	1	0	0

* Green walnut = green, still soft walnuts which are collected early in the year and used for jam making; the kind of walnut used to make pickled walnut in British cuisine.

** *Polygonum* spp. is a plant used for tanning.

The frequencies of use of the listed products and groups of products show that virtually all interviewed households collect walnut on their plot and use firewood from the forest. About

half to two thirds of the households engage in the collection of mushrooms, wild apples or rosehips and make hay on their forest plots. The next group of products, which are used by a minority of the interviewed households, includes the collection of NTFPs, such as Sogdiana plum, medicinal herbs, fruit of hawthorn species, and the seeds of various woody species for nurseries and tree growing. Agricultural crops, such as sunflower, potato, or maize, fall into this group of products being grown or collected on the leased forests plots by less than 50% of the interviewed households as well. This is, of course, due to the fact that the nature of the leased forest plots differs. Some households have forest plots entirely covered by dense forest stands, whereas others have plots with considerable openings that allow them to cultivate agricultural crops on their plots. Relatively few households use all the remaining products and groups of products towards the end of the table. Amongst them, the product “grazing for livestock” is somewhat special. It is, in contrast to all the other products and groups of products in the list, rather a land use practise than a product *s.s.*. Despite that, it was deliberately kept in the table to reflect the view of the informants who considered livestock rearing as being part of their activities on their forest plot and on surrounding forested areas.



Figure 26: A tenant and his son bring collected walnuts to the village (Uzgen)

Products which many households collect for sale or barter include wild apples, rosehips, and cultivated fruits, such as cultivated varieties of apple, pear (*Pyrus* spp.) or stone fruit. These are products for which there is a generally stable market demand. Firewood, hay and a range of NTFPs that are of limited commercial interest (mushroom, Sogdiana plum, fruit of yellow hawthorn, berries, herbs and spices) are primarily collected for subsistence use. Only a few households collect these products also for sale.

Under the category “other purposes” figure households which collect the products either to support other people, for example to fulfil ones social obligations, or because they are obliged to collect a certain product according to their CFM contracts. Three households collect walnut, and one collects wild apples to give it to other people as a gift. One

household leaves a part of the berries on its leased plot for the pupils of the local school as an in-kind gift. All households that are recorded to use “rosehips” (5) and “seeds” (17) for “other purposes” collect these products to comply with their CFM contracts (c.f. the relatively high importance given to the product “seeds” in the product ranking presented in Section 9.4). One household also gives seedlings of woody species to other people for free. Giving collected products to other people as gifts or allowing them to collect certain products themselves on the leased plot is related to social networks of which local households are part. Such networks are, as described in Section 4.4.4, an important component of social capital in Southern Kyrgyzstan.

More specific information on firewood and grazing in the forest is given in the following sections.

9.3.1 Firewood

Since Kyrgyzstan’s independence firewood has replaced coal as the main fuel for households in rural areas, which is another indicator for the fundamental changes in local livelihood systems triggered by the breakdown of the Soviet Union. All interviewed households use firewood for heating and cooking. In Arstanbap-Ata and Achy, i.e. on the more densely populated research sites, there is a widespread feeling that firewood is getting more and more scarce. Some informants pointed out that every year they had to travel further to cut enough firewood for the winter season. When walking away from the villages on these sites, one gets the impression that most of the forest stands in vicinity of the villages have been completely depleted of firewood. In Arstanbap-Ata, the author also observed on one occasion that people dug up the rootstocks of dead bushes for firewood. This can be taken as an indicator that the collection of a sufficient amount of firewood is getting more and more difficult and more labour intensive. These changes in fuel provision are an illustrative example of how the economic crisis and the resulting increased pressure on natural resources negatively impacts on natural capital (c.f. Figure 18 in Section 6.5.1).

About one third of the households, mostly from the lower, less forested areas of the research sites, in particular in Achy and Uzgen, use dried cattle dung as an additional source of energy. This has also an impact on agriculture, which could however not be assessed in the framework of this study. Of all interviewed households 15% also use electricity for heating, but only complementary to firewood, mostly during cold periods in wintertime. Only a small proportion, namely 10% of the interviewed households use coal besides firewood, mainly in Uzgen. Coal is locally available in Uzgen from a coalmine in the Jazy valley . This coal is sold for a relatively moderate price, which is, however, still a lot higher than coal prices used to be during the Soviet era.

Different species are used for firewood. When collecting firewood, local people take the properties of the species in question into account, in particular their fuel value and the effort it takes to sow and chop the wood of a species. The preferences of local informants for woody species for firewood are given in Table 44 below in the form of means of scores. The scores were gained from converting ranks as described in Section 3.7.2.

Table 44: Preferences of informants for woody species as firewood. Mean of scores, converted from initial ranks for the different species. Please note: The n given in the Table represents just the number of cases available for the particular species. It does not say anything about the frequency of use of this species. Source: ranking conducted during the semi-structured interviews on forest use practices.

	n	Mean scores*
Pistachio (<i>Pistacia vera</i>)	5	6.9
Maple (<i>Acer</i> spp.)	55	6.7
Sogdiana plum (<i>Prunus sogdiana</i>)	57	5.2
Hawthorn (<i>Crataegus</i> spp.)	43	5.0
Wild apple (<i>Malus</i> spp.)	41	4.2
Walnut (<i>Juglans regia</i>)	55	2.5

* The position of a species in the list and the difference of means between two species are more important than the absolute value of the mean. The absolute values can be explained by the conversion of ranks to scores, during which a total of 20 points per household is attributed to the ranked items (see Section 3.7.2 and conversion table in Appendix 2).

Local people prefer pistachio and maple for firewood. However, due to its limited availability and a high protection status, only very few households, mostly in the lower parts of Achy *leshoz*, use pistachio as firewood. Maple, on the other hand, is available in most parts of the WFF-belt. Its high fuel value makes it the most preferred widely available species for fuel. Sogdiana plum and hawthorn species are also considered to be good firewood species, followed by wild apple. Virtually all informants, on the other hand, considered walnut as bad firewood of low fuel value. It is occasionally also collected as firewood, but usually only if somebody comes across a dead branch of walnut by chance. These findings make clear that people have quite detailed knowledge on firewood and corresponding properties of different woody species. The low caloric value of walnut eases the protection of walnut, as long as qualitatively superior sources of energy are available.

9.3.2 Grazing for livestock

According to the informants, grazing takes place on 57 leased forest plots, i.e. on 68% of the plots of the 84 households that were interviewed in detail concerning their forest use practices. This can be grazing by the household's own livestock or by animals from other households. The fact, that only eight households said that they would deliberately graze their own livestock on the plot, suggests that in most cases livestock from other households grazes on the plot. However, the author's own observations suggest that the proportion of plots grazed, amongst others, by the tenant's own livestock might in reality be bigger. It is likely, that some informants were not very keen on disclosing to the research team, that the forest plot was also used for grazing, having the general grazing ban in forested areas in mind.

On most forest plots, grazing takes place in spring and autumn (38% of all grazed 57 plots), i.e. before and after the time during which livestock is usually kept on the high pastures, or in autumn only (23%), i.e. when the flocks get down from the high pastures again. In 13% of the grazed plots, grazing takes place from spring to autumn, in 11% all year round. In the latter two cases, mainly livestock kept in the villages and in lower forested areas for milk, graze on the plots. Forest plots in vicinity of settlements are particularly affected by grazing of livestock kept back in the villages during summer.

The representatives of half of all households told the author that they would somehow control and manage grazing on their leased plots. Measures to control or manage grazing include:

- Fencing the forest plot;
- Protecting individual trees from browsing damage;
- Tying up the grazing animal so that its radius is limited and grazing happens occasionally;
- Systematically chasing away livestock entering the plot.

About half of the people interviewed said they would not actively do anything about grazing on their plots and tolerate uncontrolled grazing. This is seen as an option in cases where livestock does not seem to harm the forest or where it is socially unacceptable to expel grazing animals out of consideration for the relationship with neighbours. The latter can be seen as an example of putting up with a reduction of natural capital in order not to risk a deterioration of social capital.

Several informants said that they would control the grazing of livestock on their leased plot only until the hay had been made. This points to a general tendency to control grazing only until the leaseholders have secured their direct benefits from the forest plots. After that, most informants seem to care less about grazing on their plots. Although many tenants are aware of the risks of browsing damages to the regeneration of woody species, few tenants consider this as a problem which needs to be addressed. There is therefore a considerably risk that the very real problem of long-term damages to forest stands inflicted by uncontrolled grazing is underestimated and largely ignored. This problem should be addressed by i) raising awareness for the problem of browsing damages and the long-term risk of a lack in regeneration, and ii) developing a system to manage and monitor different, partly conflicting land use practices. Relevant local knowledge for the latter is available in the form of experience and ideas held by local people on how to protect woody species from livestock (see Section 8.2.2).

9.4 Preferences of informants for products

The results of the ranking exercises conducted with local people give a better idea of their preferences for different forest products *s.l.*. The initial ranks were converted to scores for methodological reasons (see Section 3.7.2). Table 45 below shows the mean scores for a range of products. An analysis of the results of the ranking exercises from male and female informants from the same households ($n = 16$) did not reveal any significant differences between rankings made by male and female representatives of local households.

Table 45: Mean of scores of ranked products. Table sorted in decreasing order of mean scores, i.e. in decreasing order of preference of a given product by the informants. Means of scores for the ranked products were only calculated for products that are used by at least eight households. Only data from households whose representatives ranked at least 3 products are included. This reduced the number of households (n) whose scored ranks could be analysed by 6 in comparison to the data given in Table 43. Source: ranking conducted during the semi-structured interviews on forest use practices.

Product or group of products	Mean scores of all households using the product*
Walnut (<i>Juglans regia</i>)	6.1
Agricultural crops	5.0
Firewood	3.7
Grazing for livestock	3.4
Cultivated fruit	3.2
Hay	3.2
Rosehips (<i>Rosa</i> spp.)	2.8
Seeds	2.4
Wild apples (<i>Malus</i> spp.)	2.2
Branches	1.6
Sogdiana plum (<i>Prunus sogdiana</i>)	1.6
Berries	1.4
Mushrooms	1.2
Medicinal herbs	1.0
Herbs, species + wild garlic	0.9
Yellow hawthorn fruit (<i>Crateagus pontica</i>)	0.8
Red hawthorn fruit (<i>Crataegus</i> spp.)	0.8
Berberis fruit (<i>Berberis</i> spp.)	0.7

* The position of a product in the list and the difference of means between two products are more important than the absolute values of the mean. The latter can be explained by the conversion of ranks to scores, during which a total of 20 points per household is attributed to the ranked items (see Section 3.7.2 and conversion table in Appendix 2).

Most of the local informants put walnut in the first place considering it to be the most important, highly valued product. This is reflected by the highest mean of scores for walnut as shown in Table 45. The decision to rank walnut first was justified by 18 informants from 17 households with economic arguments. They said that walnut was a good source of cash income, that it could be sold for higher prices as other products such as wild apples and thus provided more revenues than all the other products available on the forest plot, or even that walnut has become a kind of currency in the WFF-belt. One informant ranking walnut first cautioned that its yield fluctuated heavily from year to year, and said that he therefore considered walnut to be a risky product. Representatives of six households explicitly justified their decision to rank walnut second or third with exactly this argument, whilst acknowledging the high market price for walnut and thus its potential to substantially contribute to their revenues - if available. One informant from Achy put it slightly differently by saying: "One should not rely on walnut, because it is an unreliable resource." This results show that local people are very well aware of the vulnerability of walnut to shocks such as late frost and the resulting risks of a high dependency on walnut as source of income.

The respondents took also practical reasons into account during the ranking. An informant in Uzgen, for instance, pointed out that walnut was easier to collect and to dry than rosehips.

The fact that all households ranked walnut either first, second or third, but not below, which subsequently translated into the highest scores of all products, is another indication that all informants greatly value walnut as a source of cash income and are aware of its role in supporting their livelihoods.

The next group of products (mean scores 3 to 5) interestingly comprises, besides firewood, only “agricultural products” *s.l.* (agricultural crops, grazing for livestock, cultivated fruit and hay), but no wild growing NTFPs. Informants ranking agricultural crops first or second explained their decision with the arguments, that agricultural crops were a reliable source, in particular in comparison to walnut, and provided their biggest revenues from the forest plot, or that they were essential for subsistence. High ranks for livestock grazing on in the forest was justified mostly with the economic significance of livestock for local households. An informant from Arstanbap-Ata specifically pointed out that livestock was a more reliable source of revenue than walnut. The dependence of livestock rearing on hay, was the dominant reason for the high preference given to his product. The high values of the scores for “grazing for livestock” and “hay” can be taken as a reminder of the significance of forested land for livestock rearing. The high ranks allocated to firewood were primarily explained with its paramount importance for local households both for cooking and for heating.

Rosehips, wild apples, and seeds from a range of woody species, form a next group of products on the scale of the importance of products as perceived by local informants. Dried rosehips are valued as a product with beneficial medicinal properties. Six households mentioned this when ranking rosehips, four of which placed it first or second. The possibility to sell rosehips, mostly dried, for what two informants from Uzgen and Ortok both described as “relatively high market prices” was reason enough for eight informants to rank rosehips first, second or third. Most the informants mentioning the existence of a market demand for dried rosehips were in fact from Uzgen. A closer look at the scores for rosehips for Uzgen ($n = 19$, Mean = 3.6, SD = 1.9) on the one hand, and for all the other sites taken together ($n = 17$, Mean = 1.9, SD = 1.6), on the other hand, revealed that informants in Uzgen tended to value rosehips significantly higher than informants from the other sites (P t-test = 0.005, $t = 3.029$). This clearly demonstrates the effect of the marketability of a given NTFP on the preference of local people for that specific product. Many households in Uzgen and also some in Ortok use, as an informant in Ortok put it, “rosehips as substitute for walnut in years without any walnut harvest”.

The fact that wild apples can be sold explains why at least a few households ranked this product first or second. At the same time, other households put it rather in the middle or at the bottom of their list of products for reasons such as irregular yields or relatively low producer prices. Wild apples can also be dried before selling. An informant in Uzgen argued however, that this option was economically unattractive for him, as drying wild apples is a rather labour intensive process. The availability of a certain market demand for both rosehips and wild apples seems to be the main reason for their rather high scores in comparison to other NTFPs. The surprisingly high mean score for the product “seeds” is, as indicated earlier, due to the fact that many CFM tenants in Uzgen are contractually obliged to provide the *leshoz* with seeds of specified species for the nurseries. These informants explained that, for them, it was an important product in view of securing their lease contracts in the long-term.

The least valued group of products includes a relatively heterogeneous range of different NTFPs, which are mostly used for auto consumption. Some of these products are

marketable. But, low producer prices (e.g. medicinal herbs) and/or a lack of a stable supply (e.g. mushrooms) make these products unattractive for most households. Mushrooms, for instance, are only collected and sold occasionally. Most of the households seemed to consider irregular yields of mushrooms and a relatively short collection period as reasons outweighing the advantage of relatively high producer prices.

These preferences show that local informants generally weight the possibility to sell a produce much higher than any nutritional, medicinal or other qualities of products used primarily for subsistence.

9.5 Reasons for non-use of available products

The reasons why some products that are available on the leased forest plots are not being collected provide also interesting insights into local livelihood systems. The different reasons given by the informants for the non-use of an available product are shown in Table 46 below.

Table 46: Reasons for the non-use of available products from the forest plot, categorised and ordered in decreasing order of their frequencies. Source: semi-structured interviews on forest use practices.

Argument Products concerned	X times mentioned	For Y products	By Z households
Market related	59	10	33
Berberis fruit (<i>Berberis</i> spp.), fruit of Mahaleb cherry (<i>Prunus mahaleb</i>), hawthorn flowers (<i>Crataegus</i> spp.), medicinal herbs, mushrooms, red hawthorn fruit (<i>Crataegus</i> spp.), rosehips (<i>Rosa</i> spp.), Sogdiana plum (<i>Prunus sogdiana</i>), wild apples (<i>Malus</i> spp.), yellow hawthorn fruit (<i>Crataegus pontica</i>)			
- Lack of market demand in general	34	7	22
- Lack of demand specifically from the <i>leshoz</i>	7	2	6
- Not aware of the possibility to sell product, lack of market information	1	1	1
- „Nobody tells me to collect such products“, „nobody tells me which medicinal herbs to collect“	8	4	5
- Low, unattractive, unprofitable price of sale	9	5	6
Household related, resource use strategies, internal reasons	34	10	16
Berberis fruit, berries, fruit of Mahaleb cherry, hawthorn flowers, medicinal herbs, mushrooms, red hawthorn fruit, rosehips, Sogdiana plum, wild apples, yellow hawthorn fruit			
- Lack of time to collect	22	10	10
- Lack of labour force within the household	6	6	2
- Collection of fruit of red hawthorn is too tiring	1	1	1
- CFM plot too far away from the village to collect wild apples, not worth the transport effort	1	1	1
- Household members gather medicinal herbs closer to the village	1	1	1
- Medicinal plants usually gathered outside the forest, from southerly exposed open areas, only few medicinal plants growing in the forest	3	1	3
Reasons related to properties of the forest plot and/or the product	21	4	19
Berries, red hawthorn fruit, Sogdiana plum, wild apples			
- Only a few bushes/trees on the plot, providing (too) little fruit	7	4	7
- Hardly any Sogdiana plums anymore because of disease of the tree	14	1	14
Knowledge related	12	1	12
Medicinal herbs			
- Lack of knowledge about medicinal plant species with the informant, lack of information on medicinal plant species (books <i>et cetera</i>)	11	1	11
- Lack of knowledge regarding application of medicinal plant species	1	1	1
Related to the needs of the household	8	5	7
Branches, medicinal herbs, Sogdiana plum, wild apples, wild currant			
- No need in the household for this product	3	3	2
- Household uses cultivated varieties (plum, apples) from the homegarden; Sogdiana plum cannot be stored for a long time	3	2	3
- Too much sugar needed to make jam of Sogdiana plum and wild currant because they are very sour, jam making becomes very expensive	2	2	2
User rights	7	2	7
Hay, mushrooms			
- Other people collect mushroom on the plot, have right to make hay on the plot	7	2	7

The most often cited explanation for the non-use of a given product was the total or temporarily absence of a market demand for it. Relatively low producer prices discourage local people from collecting some products. This emphasises the crucial roles of the market and price levels in the vulnerability context of local livelihood systems. The lack of demand for many NTFPs is, as many informants pointed out, directly related to the breakdown of most of the local processing facilities. Since a few years, new, often international market channels have gradually evolved again. Thus, new income opportunities are slowly emerging. Another market-related problem is the lack of market information in local communities. Forest leaseholders are quite often unaware of the demand for a certain product.

Some informants specifically said, that there was no demand, on the part of the *leshoz*, for a certain product. This shows that many people still expect the *leshoz* to take the lead and to give them instructions for the collection of NTFPs. Representatives of five households told the author that they did not collect medicinal plants or other products, because nobody told them to do so. This points to a rather passive, waiting attitude. Such a “dependency syndrome” highlights the problems some people face in finding their roles in the new system. Surely, more time and possibly external assistance is needed for these people to transcend to the new reality of a market economy.

The next group of reasons why certain products are not collected have more to do with the way a household organises its work and its resource use strategies. The most important reason in this category is a simple lack of time to collect a product. Related to that is a lack of labour force within the household. Both the lack of time and labour force to collect a product can also be seen in the context of the different market prices for the products in question. Many households said, that they had no time or lacked the labour force, because everybody was engaged in more essential or financially more profitable work. This demonstrates that local people are generally well aware of the input-return ratio and act in an economically rational way.

Sometimes, the harvest period for a product coincides with otherwise intensive periods of the year in terms of work. One informant from Ortok explained that during spring they were “simple too occupied with agricultural works to collect mushrooms”. But, there is also a linkage between the availability of different NTFPs. The author observed in Uzgen that local households usually concentrate their efforts fully on the walnut harvest in years with a good walnut harvest, and tend not to collect other products whose harvest falls into the same period, such as wild apples and rosehips. In autumn 2002, when there was a good walnut yield, there were still a lot of wild apples lying on the forest floor in Uzgen. Given that one kilogram of walnut could be sold for about 30 Som at the time, whereas one kilogram of wild apples reached only a selling price of 0.3 to 1 Som, it is hardly surprising that few people collected wild apples as long as there were still walnuts to be harvested.

A lack of knowledge regarding medicinal plant species or their application explains why, according to their representatives, a dozen of the households interviewed do not collect any medicinal herbs at all. It should be remembered here, that most of the informants were men. It is possible that female members of the interviewed households know medicinal plant species better than their male counterparts.

9.6 Work being executed by the tenants on regenerating their leased forest plots: planting and sowing

So far, the presented results have mainly focussed on work related to the collection and harvest of products from the forest plot. But, some leaseholders also conduct additional tasks on their plots. Planting woody species or protecting existing natural regeneration on their plots are examples of such tasks, which will be explored in this Section.

Of the total of 84 (100%) leaseholders interviewed in detail concerning their activities on the leased forest plot, 33 (39%) said that they would plant or sow woody species on their plots. Half of this group plants or sows in existing forest stands to regenerate them, the other half plants on open, i.e. non-forested land to increase the forested area. A range of woody species is planted or sown on the leased forest plots, as shown in Table 47 below. Walnut is by far the most popular choice, followed by wild apple and Sogdiana plum.

Table 47: Species artificially regenerated (planted, sown) by the leaseholders on their forest plots. Source: semi-structured interviews on local knowledge related to forest management.

Species	No of times mentioned
Walnut (<i>Juglans regia</i>)	29
Wild apples (<i>Malus</i> spp.)	11
Sogdiana plum (<i>Prunus sogdiana</i>)	8
Dog rose (<i>Rosa</i> spp.)	4
Elm (<i>Ulmus</i> spp.)	3
Cultivated apple varieties (<i>Malus domestica</i> Borkh.)	3
Cultivated pear varieties (<i>Pyrus</i> spp.)	3
Poplar (<i>Populus</i> spp.)	2
Oak (<i>Quercus</i> spp.), Hawthorn (<i>Crataegus</i> spp.), Almond (<i>Prunus amygdalus</i>), Mahaleb cherry (<i>Prunus mahaleb</i>), Apricot (<i>Prunus armeniaca</i> L.), Peach (<i>Prunus persica</i> (L.) Batsch), Birch (<i>Betula</i> spp.), Black locust (<i>Robinia pseudoacacia</i> L.)	each once

Table 48 shows that the commercial interest in walnut and fruits was the main driving force behind the efforts to regenerate woody species. In this Table, the purpose of planting or sowing woody species as explained by the interviewed leaseholders is given. The most commonly given motivation is to increase the production of useful produces on the leased forest plot. Whilst many informants just referred to an increased production of fruits including nuts in general, twelve respondents referred specifically to walnut. A few other respondents were less specific by simply saying that by planting or sowing they wanted to increase the area covered by trees on their plots. Economic interests are certainly an important source of motivation, but not the only one, as the other entries in Table 48 suggest.

Table 48: Purpose for planting/sowing woody species on the leased forest plot. Source: semi-structured interviews on local knowledge related to forest management.

Purpose of planting or sowing	Number of times mentioned
Increase production of products from the plot now and for the next generation	25
- Increase production of fruits and nuts in general	8
- ... of walnut (<i>Juglans regia</i>)	12
- ... of wild apples (<i>Malus</i> spp.)	2
- Plant wild apples (<i>Malus</i> spp.) as grafting stock for cultivated apple varieties in the future	1
- Increase production of poplar (<i>Populus</i> spp.) as construction wood	1
- Increase production of firewood	1
Increase the area covered by trees (forested) on the plot	3
Ensure regeneration of woody species	3
Ensure protective function of forest	3
Establish living fence (dog rose (<i>Rosa</i> spp.), elm (<i>Ulmus</i> spp.), Sogdiana plum (<i>Prunus sogdiana</i>)), living fence cheaper to maintain than artificial fence	3

About half of the 33 households that plant or sow woody species on their leases forest plots conduct this work in only sparsely stocked forest stands. The other half plants or sows primarily in open, un-forested parts of their plots. Only one respondent plants mostly in closed forest stands, as a means of making sure that the old-aged forest stands regenerate.

There is some interesting innovation and adaptation being practised by forest tenants in the field of regeneration. This includes a tenant digging out naturally regenerated walnut seedlings in nearby forest stands and replanting them on open land. Ecological knowledge is being put into practice, for instance by a respondent from Uzgen who plants walnut deliberately in small relief depressions and valleys, i.e. in places with particularly favourable soil conditions. Other tenants sow walnut under thorny bushes, which eventually protect the young seedlings from browsing livestock. While a young informant in Achy claimed to have discovered this himself by observing the distributional patterns of natural regeneration, other tenants explained that they got this advice from professional foresters.

About half of the interviewed households (40 out of 84 households) claimed to be protecting natural regeneration on their plots. Most of these households simply chase away browsing livestock from their forest plots or have their plots fenced and do not allow animals to graze freely within the fence (see also Section 9.3.2). Somewhat less than half of the households (38) told the author that they would not deliberately protect natural regeneration on their plots. A few said that no action was needed since livestock would graze only in open areas anyway where there was better fodder. This statement does however diverge from the repeated observations of freely grazing cattle and small livestock in forest stands during fieldwork and the consequent damage to young and old trees.

Whilst many local farmers seem to be willing to plant or otherwise regenerate woody species on their leases forest plots, some people were reluctant to do so or at least hesitated at first. This was particularly the case with plantations on non-forested *goslesfund* land used as tillage plot or serving other purposes. Two farmers pointed out that somebody who planted on open *goslesfund* land always risks that the *leshoz* does eventually not allow him or her to cut the tree again, since every tree on *goslesfund* land is protected. Thus, the benefit of planting a tree and getting walnut or fruit has to be balanced with the risk of losing control over the further development of the plot. The two farmers said that they would have planted

more trees on their partly forested, partly open plots if they had a guarantee that they could cut the trees again in case of need of a bigger area for tillage. But under the current conditions, they planted only a small area in order to be sure not to lose potentially needed open areas for tillage.

The situation described above is an illustrative example of a rigid former regime ensuring forest protection which negatively influences new models of land use that emerge under the current circumstances. Whilst the rules currently in force might protect existing forests, they do certainly not encourage people to plant trees on open *goslesfund* land. The future of a cultural landscape such as the WFFs does however depend on people planting trees, also “on farm”. It is therefore recommended to review the current rules regulating access and the rights of disposal over privately planted trees on *goslesfund* land. Particular attention should be paid to design a system that provides people with incentives to plant trees and thus to make a contribution to the conservation of the cultural landscape.

9.7 Varying importance of forest resources as a source of revenues

9.7.1 Variation of the importance of forest resources from year to year

The figures in this Section show the results of the participatory scoring exercises conducted with the interviewed informants (see Section 3.6.2), graphically illustrated using box plots. The box plots shown on the X-axis represent, as indicated by the legend of the figures, the different sources of in-kind and cash revenues available within the informants' livelihood systems. The values on the Y-axis show the number of pebbles that the informants allocated to these sources of revenues. In total, the respondents had 20 pebbles to allocate. A box plot provides an excellent visual summary of many important aspects of a distribution (Dytham 2003, p. 46). The box stretches from the lower hinge (defined as the 25th percentile) to the upper hinge (the 75th percentile) and therefore contains the middle half of the scores in the distribution. The median is shown as a black line in the box. Outliers extending between 1.5 and 3 box lengths and extreme cases extending more than 3 box lengths from the edge of the box are marked with a circle or an asterisk respectively (Pallant 2005, p. 71).

The leased forest plot figures amongst the three top sources of in-kind and cash revenues of all interviewed households taken together in the calendar year 2002, as indicated by the clustered box plots shown on the left in Figure 27. In the participatory scoring exercises for the year 2002, the forest plot attained similar values as tillage and livestock rearing. The remaining three sources, namely the general forest, off-farm activities and social benefits provided by the State, accounted in most households only for a minor part of the revenues. The picture for the calendar year 2003, shown on the right in Figure 27, looks different. In 2003, the relative importance of the leased forest plot as a source of revenues fell to a significantly lower level and was about equal with the values attributed to the general forest and social benefits. It appears that during the calendar year 2003, the interviewed households got most of their revenues from tillage and livestock rearing.

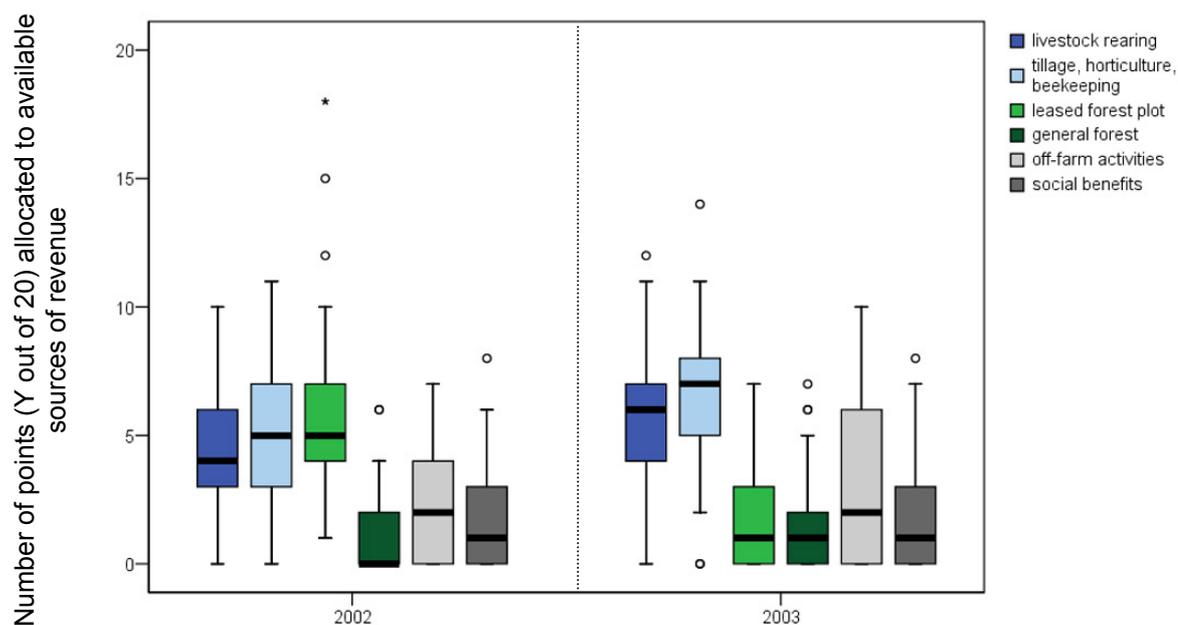


Figure 27: Importance of different sources of revenues available to the interviewed households for the calendar years 2002 and 2003. $n = 74$, only data from households from which data for 2002 and 2003 are available were included. Source of data: scoring exercise.

The main reason for this sharp drop of the significance of the leased forest plot as perceived by the respondents lies in the occurrence of a good walnut harvest in autumn of 2002 and a nearly complete lack of walnut on all sites in the following autumn of 2003.

Most informants said that life would differ significantly between a year with a good walnut harvest and a year without walnut. The most frequently given description of this difference was that life was “better and easier” following a good walnut harvest, and “very difficult” with “severely restricted options to sustain a family” when there was no walnut. Households of all wealth categories and on all sites pointed out that they usually had considerably lower or even no cash-incomes in years without walnut and thus very limited opportunities to buy goods or make investments. In a year following a good walnut harvest on the other hand, there would be enough means to satisfy the basic needs of the household and possibly even to make some investments into the farming system, off-farm activities or in other areas.

More concretely, a lot of informants said that following a good walnut harvest there would be many social events hosted by leaseholders in the villages. Such social gatherings demand considerable expenses, both by the host and the guests. These expenses are an investment into social capital or, more concretely, into networks and groups based on the principle of reciprocity and exchange. People would also wear better, nicer clothes, and buy cattle and some even cars, thus people would also be able to invest in their physical, and natural livelihood assets. Generally, people would be able to improve their material situation and well-being, and also to purchase better quality goods. The head of a poor family pointed out that following a good walnut harvest he could afford buying “cigarettes with filters”. One rich informant and one from a household of the intermediate wealth group said that after a year of good walnut harvest they would purchase “flour of the first quality” instead of lower-quality flour. People from poor households and a few informants from intermediate households said that following a good walnut harvest they typically had less worries of how to bring and feed the family through winter. Thus, a good walnut harvest provides, even to poor households, a certain level of livelihood security and of well-being to which everyone in society should aspire.

Such differences apply not only to the available or lack of walnut respectively, but also to high or low yields of the most important agricultural crops. Walnut is, however, somewhat special in so far as i) the bulk of harvest is sold and only little is used for auto-consumption, and ii) the economic input-output relation is very favourable. Relatively little input in terms of labour and other production means is needed, and walnut can usually be sold for relatively high market prices.

9.7.2 Identification of further factors influencing the importance of forest resources for local people

On the basis of the results of the participatory scoring exercises, a series of general linear models (GLM) has been calculated in SPSS to identify other factors than the year or the weather (late frost) respectively which have an influence on the importance of forest products produced and/or collected from the forest for local households (c.f. list of independent factors in Section 3.5) From these, four models that seem plausible and explain a relatively high proportion of the variance in the dependent variable was selected for presentation in Table 49 below. All four models are full-factorial models including four explaining variables (wealth categories, ethnic group, forest tenure and human pressure on forests) and their interactions. The most important characteristics of the model and the significant factors are listed in Table 49³⁰.

³⁰ The model as a whole and each term (explaining variables, interactions between the explaining variables) in the model is tested for its ability to account for variation in the dependent variable. The eta-squared statistic given in the last column of Table 49 describes the proportion of total variability attributable to a factor, or, in other words, “reports the ‘practical’ significance of each term”. Larger values of partial eta-squared, up to a maximum of 1, indicate a greater amount of variation accounted for by the respective factor. Partial eta-squared is defined as the “the ratio of the variation (sum of squares) accounted for by the term, to the sum of the variation accounted for by the term and the variation left to error” (SPSS 2003).

Table 49: Key characteristics of the selected general linear models (GLM) and factors showing a statistically significant influence in the GLM-models on the importance of leased forest plots and all forest resources taken together (leased forest plot + general forest) as source of revenue during the calendar years 2002 and 2003. Source of data: scoring exercises.

Explaining (independent) variables used:

- Human pressure on forests (site characteristic);
- Wealth category (household characteristic);
- Forest tenure (type of forest lease) (household characteristic);
- Ethnic group (household characteristic).

Model	Dependent variable	Significant terms	Type III Sum of Squares	Sig.	Partial Eta Squared	
1	Leased forest plot 2002 n = 95	Scores leased forest plot 2002,	Corrected Model	345.453*	.002	.389
			Intercept	2706.273	.000	.833
			Human pressure	188.099	.000	.258
			Forest tenure	84.519	.004	.135
			Wealth category	79.300	.006	.128
			* R Squared Corrected Model = .389 (Adjusted R Squared = .235)			
2	Leased forest plot + general forest 2002 n = 95	Sum of scores leased forest plot + general forest 2002,	Corrected Model	398.096*	.001	.415
			Intercept	3610.686	.000	.866
			Human pressure	186.069	.000	.249
			Wealth category	107.287	.001	.161
			Forest tenure	59.532	.023	.096
			* R Squared Corrected Model = .415 (Adjusted R Squared = .267)			
3	Leased forest plot 2003 n = 77	Scores leased forest plot 2003,	Corrected Model	111.526*	.003	.450
			Intercept	129.055	.000	.486
			Forest tenure	21.858	.013	.138
			Pressure	19.048	.022	.123
			* R Squared Corrected Model = .450 (Adjusted R Squared = .279)			
4	Leased forest plot + general forest 2003 n = 77	Sum of scores leased forest plot + general forest 2003,	Corrected Model	109.885*	.122	.318
			Intercept	568.266	.000	.707
			Wealth category	48.362	.004	.171
					* R Squared corrected model = .318 (Adjusted R Squared = .107)	

According to the first of the above-presented models, the factors “human pressure on forests”, “wealth category” and “forest tenure” influence the importance of products harvested from the leased forest plot during the calendar year 2002 significantly. The same factors have a significant influence on the importance of products harvested from the leased forest plot and the general forest taken together in 2002, as calculated in the second model. Amongst these three significant independent factors, “human pressure on forests” accounts for the biggest amount of variation of the dependent variable (c.f. values of “partial eta squared” in Table 49).

The picture for 2003, the year with hardly any walnut at all in Arstanbap-Ata, Achy and Ortok and only very little walrus in Uzgen, looks slightly different. The factors “forest tenure” and “human pressure on forests” have significant influence on the importance of products taken from the leased forest plot in 2003. If one adds the scores attributed to products of the leased forest plot and products harvested from the general forest by the

informants, as it was done for the fourth model in Table 49, then only the factor “wealth category” comes up as significant.

All significant factors used in the GLM models are categorical variables. The variable “wealth category” for example, contains the categories “considered poor”, “considered medium” (= intermediate) and “considered rich”. The question now is whether there are significant differences between households of these different categories, i.e. between for example rich and poor households, or, statistically speaking, between cases of these different factor levels. To determine significant differences between different factor levels, post-hoc range tests and pair wise multiple comparisons were conducted in SPSS. Two different tests were conducted, the Tukey's honestly significant difference (Tukey HSD) and the Tamhane's T2 test. Equal variance is assumed for the first one, but not for the second one. Statistically significant differences between different factor levels are shown in Table 50.

Table 50: Levels of variables (factors) which are statistically significant different from one another. Results of post-hoc tests (Tamhane, Tukey) of the GLM models. Source of data: scoring exercises.

Model	Variable (factor)	Difference between variable (factor) levels (Mean given in brackets)	Sig.	Test*
Leased forest plot 2002	- Human pressure on forests	- Low pressure (7.23) – high pressure (4.44)	.001	Tamhane
	- Wealth category	- Poor households (6.53) – rich households (4.69)	.210	Tukey
Leased forest plot + general forest 2002	- Human pressure on forests	- Low pressure (8.73) – medium pressure (6.07)	.001	Tamhane
		- Low pressure (8.73) – high pressure (5.30)	.000	Tamhane
	- Wealth category	- Poor households (7.53) – rich households (5.29)	.023	Tamhane
Leased forest plot 2003	- Forest tenure	- Seasonal (0.87) – CFM (2.31)	.022	Tamhane
	- Human pressure on forests	- Medium pressure (2.83) – low pressure (1.04)	.002	Tamhane
		- Medium pressure (2.83) – high pressure (1.50)	.040	Tamhane
Leased forest plot + general forest 2003	- Wealth category	- Poor households (4.84) – rich households (2.36)	.007	Tamhane
		- Poor households (4.84) – medium households (2.70)	.024	Tamhane

* Tukey HSD and Tamhane's T2 tests were conducted and their results compared. If the two compared levels were significantly different in both tests, the significance of the Tamhane-test is given, which does not assume equal variance in contrast to the Tukey test.

Both in the years 2002 and 2003, there are significant differences between different levels of the variables “wealth category” and “human pressure on forests”. The values for both the leased forest plot and also the leased forest plot and the general forest taken together are generally lower for the year 2003 than for the year 2002. This can plausibly be explained by the nearly total lack of walnut in Arstanbap-Ata, Achy and Ortok and the very limited walnut yield in Uzgen, as discussed above.

The significant difference in the importance of the products collected from the forest plot between seasonal and CFM tenants in 2003 can also be explained by the lack of walnut or

very limited harvest in Uzgen. In autumn 2003, most of the seasonal tenants of 2002 did not lease a forest plot. Thus, they did not get any revenue from a leased plot at all. Only a few seasonal tenants, most of them living in parts of the research site Uzgen where there was at least some walnut, took up a lease and collected walnut. These tenants got modest revenues from their leased plots. This explains why the mean value for seasonal tenants is below zero. Most of the CFM tenants, on the other hand, got at least some products other than walnut from their leased forest plot in 2003, which explains why, during the scoring exercise, they allocated a few pebbles to the leased plot despite the absence of walnut.

9.7.3 Varying importance of forest resources for households of different wealth groups

Concerning the wealth of the households, there is the general tendency, that poorer households receive a higher proportion of their revenues from the leased forest plot and from all forested land taken together than medium and households which are considered to be rich. This tendency is clearly visible in the Figure 28 below which represents the results for 2002 and 2003. However, according the tests conducted, in 2002 only the difference between poor and rich households was statistically significant. In 2003, poor households received a statistically significant greater proportion of their revenues from forested land (leased forest plot + general forest) than medium and rich households (see Table 50).

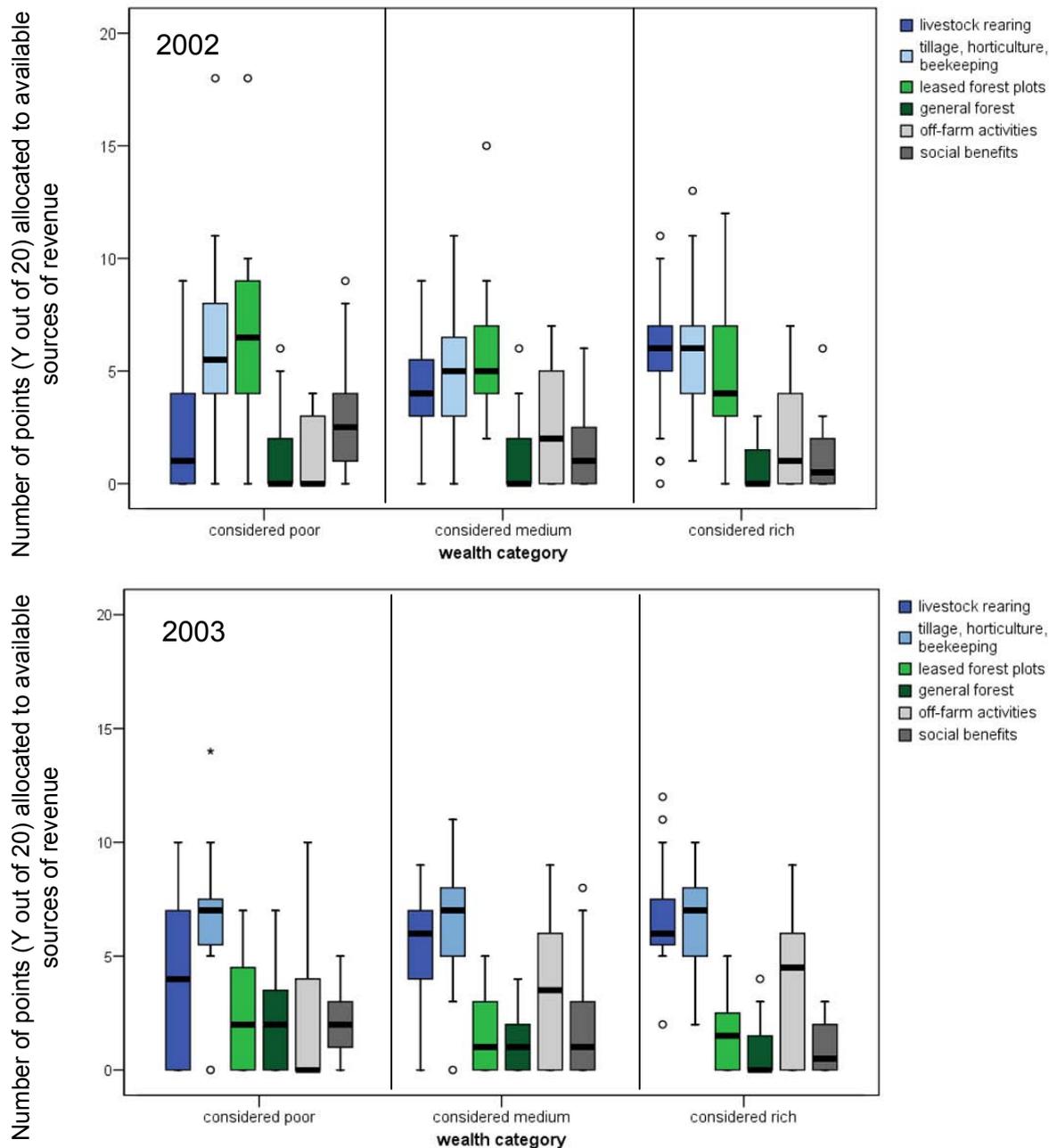


Figure 28: Importance of different sources of revenues for local households of different wealth categories for the years 2002 (above) and 2003 (below). n for 2002 = 95 households; “considered poor” = 30; “considered medium” = 31 and “considered rich” = 34 households. n for 2003 = 77 households; “considered poor” = 19; “considered medium” = 30 and “considered rich” = 28 households. Source of data: scoring exercises.

The results of the participatory scoring exercises suggest that in a year with a good walnut harvest, like 2002, products collected on the leased forest plot attain the same significance for poor households than products received from tillage *s.l.*. In such years, livestock rearing, on the other hand, seems to play a significantly lower role for poor households than for medium and rich households. Households of the latter two categories received roughly the same proportion of revenues from livestock rearing, tillage and products collected on their leased forest plots. The lack of walnut in 2003, led to a considerable drop of the relative importance of the leased forest plot as a source of revenue in all wealth categories. But even in a year without walnut, poor households get a considerable part of their revenues from forested land, about equal proportions from the leased forest plot and the general forest. This

explains why, as presented above, in 2003, products taken from either the leased plot or the general forest were significantly more important to poor than to medium and rich households.

Looking at the scores for the remaining sources of revenue, it appears that medium and, in particular, rich households managed, at least partly, to compensate the lack of revenue from products collected on the leased plot, mainly from walnut, in 2003 with revenues earned from off-farm activities (c.f. also Section 9.8). Only a few poor households interviewed seem to have managed to mobilise more revenues from off-farm activities in 2003 than in 2002, as the slightly bigger spread of their data suggests (see Section 9.8 for more details on compensating the lack of income from walnut). At least 50% of the poor households interviewed did not get any revenue from off-farm activities at all in 2003. So, poor people depend largely on natural resource use and have only limited capacities to adapt their livelihood strategies in order to cope with wide yield fluctuations of forest products and poor harvests of agricultural products. The implications of these findings are discussed in Section 9.10 below, where also recommendations for adaptations of the existing lease systems in favour of poor, forest dependent people are made.

The box plots presented in Figure 28 above nicely illustrate the rather big variation of the significance of forest (and other) resources for local people's livelihoods, in function of the year and the wealth category of the interviewed household. To get an indication of the overall significance of forest resources for local people's livelihoods in terms of the proportion of the local households' total revenues that they get from forest resources, i.e. from their leased forest plot and the general forest taken together, the mean scores shown in Table 51 were calculated. Given that in the scoring exercises (see Section 3.6.2) the informants had 20 pebbles representing 100% of their revenues to allocate to the different sources of revenue available to them, these mean scores could be converted into percentages (1 pebble = 1 score point = 5% of total revenues).

Table 51: Mean of scores allocated to forest resources (leased forest plots and general forest taken together) by households of different wealth groups and average forest-based revenues as percentage of total revenues. Source of data : scoring exercises.

Wealth categories	Scores for leased forest plot + general forest										
	2002					2003					
	n	Mean	SD	Stat. sig. diff.*	% of total revenues	n	Mean	SD	Stat. sig. diff.*	% of total revenues	
Considered poor	30	7.53	3.71	*	38%	19	4.84	3.00	*	*	24%
Considered medium	31	6.73	2.95		34%	30	2.70	1.51	*		14%
Considered rich	34	5.29	2.55	*	26%	28	2.36	1.19		*	12%
All households	95	6.47	3.19		32%	77	3.10	2.13			16%

* Statistically significant different means (Stat. sig. diff.) are marked with an asterisk; for test statistics see Table 50 in Section 9.7.2.

Figure 29 illustrates the average percentage of the total revenues that households of different wealth categories gained from their leased forest plots and the general forest in 2002 and 2003. According to this analysis and looking at the aggregated data for all households, forest-based revenues amount to 16% of total revenues in a year with no or hardly any walnut (2003) and to 32% of total revenues in a year with a good walnut harvest. A look at the data per wealth category for both years reveals that forest-based revenues constitute between 10% and 40% of the total revenues of the interviewed local households.

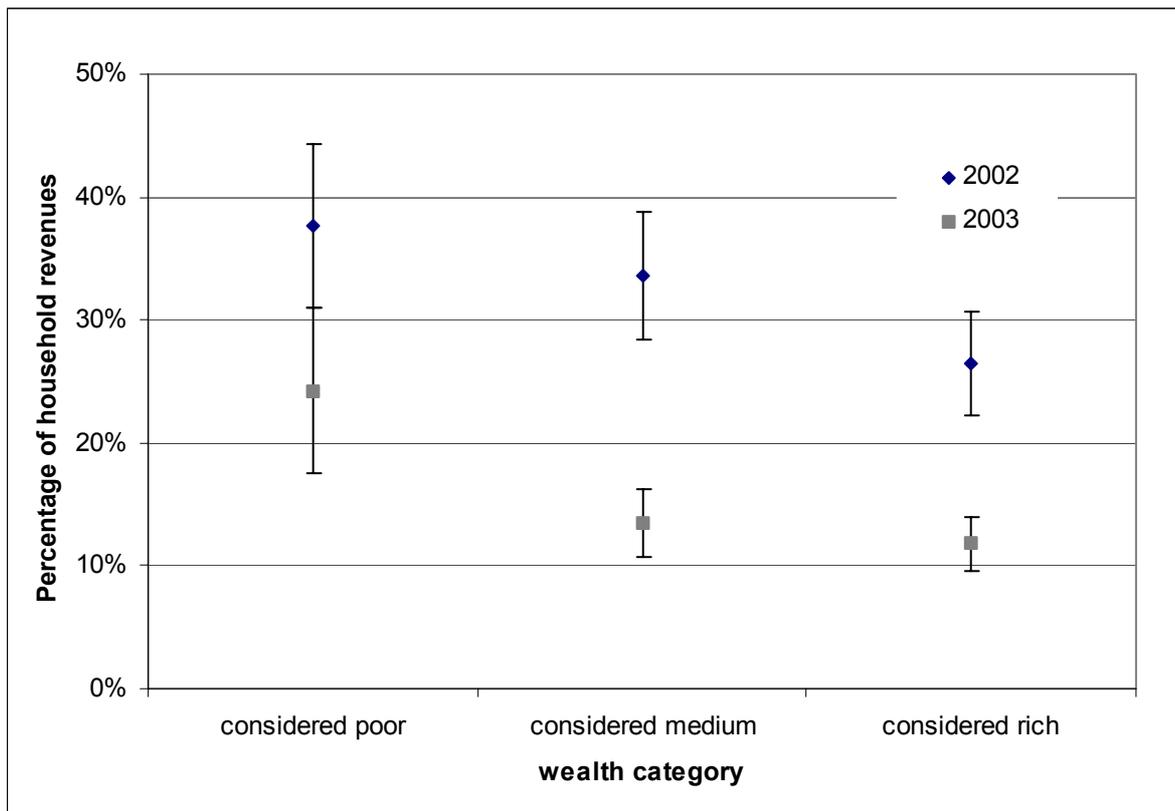


Figure 29: Mean percentage (and 95% confidence interval) of revenues gained from the leased forest plot and the general forest for the years 2002 and 2003 in households of different wealth categories. n for 2002 = 95 households; “considered poor” = 30; “considered medium” = 31 and “considered rich” = 34 households. n for 2003 = 77 households; “considered poor” = 19; “considered medium” = 30 and “considered rich” = 28 households. Source of data: scoring exercises; subsequent conversion of score points (20 points = 100%) into percentages.

This illustration of the mean values shows the same tendencies as the box plots displayed in Figure 28, namely markedly lower forest-based revenues in 2003 than in 2002 and a decrease of revenues gained from forest resources with increasing wealth of the households.

9.7.4 Varying importance of forest resources between sites with different levels of human pressure on forests

The factor “human pressure on forest resources” is a site characteristic, i.e. all households of the same sites have been given the same value. Thus, all households from Ortok belong to the category “low human pressure”, the households of Uzgen to the category “medium”, and the category “high” includes all households from Achy and Arstanbap-Ata.

In the data for the year 2002 shown in Figure 30, there appears a clear tendency concerning the importance of products taken from the leased forest plot in function of human pressure or the site respectively: Products from the leased forest plot were the most important source of revenue in Ortok the site with low human pressure in 2002. Their significance decreases with increasing human pressure on forest resources. However, statistically, only the difference between households in a situation with low pressure, i.e. in Ortok, and households in a situation with high human pressure, i.e. in Arstanbap-Ata and Achy, is significant. If one looks at the importance of products taken from the leased plot and the general forest taken together, then it appears that in a year with a good walnut harvest (2002) households in Ortok (“low pressure”) receive significantly more revenues from forested land than

households in Uzgen (“medium pressure”) and than households in Arstanbap-Ata or Achy (“high pressure”) (see also Table 50). For the year 2003, the values for products taken from the leased forest plots in a situation with medium anthropogenic pressure, i.e. in Uzgen, are significantly higher than for households in situations with low (Ortok) or high human pressure (Arstanbap-Ata, Achy) (see Figure 30). It appears that this is primarily due to the availability of at least some walnut in the lower parts of Uzgen. The results of a decreasing importance of forest products with increasing pressure on forest resources is consistent with what one would generally expect, namely more forest products to be harvested in areas with low than in areas with high pressure. This tendency can be taken as an indicator for higher competition for forest products and for more competition amongst different land uses (e.g. forest *versus* tillage) in areas with high human pressure.

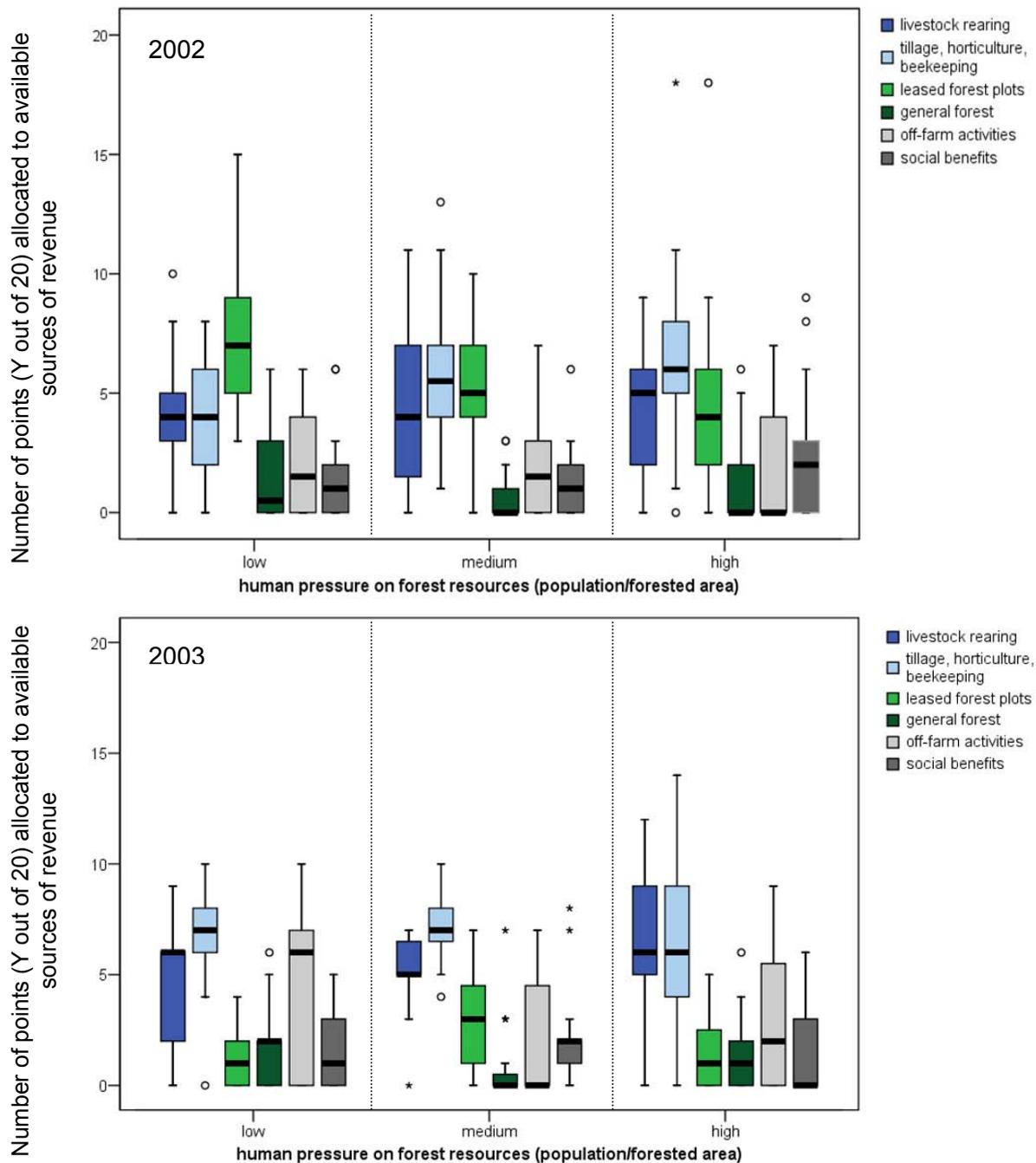


Figure 30: Importance of different sources of revenues for local households in function of the level of human pressure on forest resources for the years 2002 (above) and 2003 (below). n for 2002 = 95 households; “low” = 26; “medium” = 28 and “high” = 41 households. n for 2003 = 77 households; “low” = 25; “medium” = 24 and “high” = 28 households. Source of data: scoring exercises.

Looking at all the sources of revenues and changes in their scores between the two years, one discovers that the biggest changes between 2002 and 2003 occur in a situation with relatively abundant forest resources and a low population, i.e. in Ortok. There are two major changes: i) the drop of the relative importance of products taken from the leased forest plot, and ii) a clear increase of the relative significance of off-farm activities. In the other two categories, “medium” and “high”, only the first change can be observed, while the importance of all other sources of revenue than the leased forest plot remains about on the same level. This points to a relatively high dependency of the population of hilly areas with

relatively low human pressure on forest resources on forest products and in particular on walnut as a source of revenue. A plausible reason for the marked increase in the importance of off-farm activities in Ortok is the fact that there is only relatively little land for tillage available on this site in comparison to Uzgen and parts of Achy. Thus, the potential to compensate lacking revenues from forest products with increased tillage is limited, which might explain, why, in a year without walnut, the interviewed households from Ortok gained a higher proportion of their revenues from off-farm activities than households on the other sites (see Section 9.8 for more details on compensating the lack of income from walnut).

The analysis of the means of the scores allocated by the households to forest resources (leased forest plot and general forest taken together) in function of the level of human pressure on forest resources provides another useful indication of the varying importance of forest resources for local people's livelihoods. The mean scores and their conversion into percentages of the households' total revenues are shown in Table 52. The mean scores for 2003 which are all in the same order of magnitude do not statistically significant differ from one another (see also results of the calculated general linear models presented in Table 49 in Section 9.7.2).

Table 52: Mean scores allocated to forest resources (leased forest plots and general forest taken together) by households on sites with different levels of human pressure on forest resources and average forest-based revenues as percentage of total revenues. Source of data: scoring exercises.

Human pressure on forest resources	Scores for leased forest plot + general forest								
	2002			2003					
	n	Mean	SD	Stat. sig. diff.*	% of total revenues	n	Mean	SD	% of total revenues
Low pressure	30	8.73	2.52	* *	44%	19	2.76	1.74	14%
Medium pressure	31	6.07	2.29	*	30%	30	3.58	2.54	18%
High pressure	34	5.30	3.41	*	27%	28	3.00	2.07	15%
All households	95	6.47	3.19		32%	77	3.10	2.13	16%

* Statistically significant different means (Stat. sig. difference) are marked with an asterisk; for test statistics see Table 50 in Section 9.7.2.

Looking at the figures in Table 52 and the illustration of the forest-based revenues in terms of percentage of total revenues in Figure 31 one notes that the average percentage of revenues gained from forest resources varies between about 10% in a year with hardly any walnut (2003) and more than 40% of total revenues one a site with low human pressure on forests (Ortok) and in a year with a good walnut harvest (2002). On sites with medium (Uzgen) or high human pressure on forests (Arstanbap-Ata, Achy) the interviewed households still got between a fourth and a third of their revenues from forests resources in 2002, i.e. in a year with a good walnut harvest.

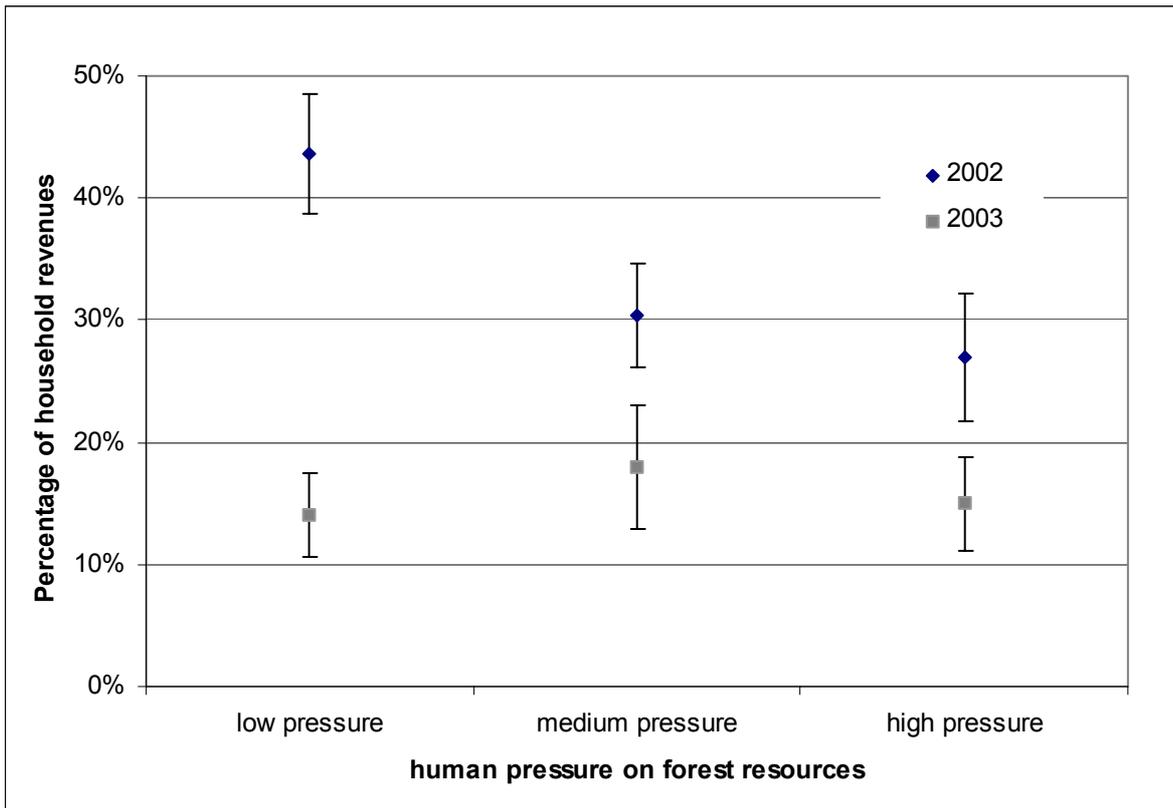


Figure 31: Mean percentage (and 95% confidence interval) of revenues gained from the leased forest plot and the general forest for the years 2002 and 2003 in households on sites with different levels of human pressure on forest resources. n for 2002 = 95 households; “considered poor” = 30; “considered medium” = 31 and “considered rich” = 34 households. n for 2003 = 77 households; “considered poor” = 19; “considered medium” = 30 and “considered rich” = 28 households. Source of data: scoring exercises; subsequent conversion of score points (20 points = 100%) into percentages.

9.8 Coping with annual fluctuations of yields of key products

This Section is about local people’s coping strategies and their adaptation to the shock of a nearly complete lack of walnut (Ortok, Achy, Arstanbap-Ata) or only very small walnut yields (Uzgen) in autumn 2003. Surprisingly the single most frequently statement of the informants was, that their households had not taken any specific action to compensate for the lack of revenues from walnut. On closer inspection one notes that in 75% of the cases an informant made such a statement, she or he was from a household considered to be rich. Only very few medium and even fewer poor households expressed such an indifference. Typical complementary statements from rich informants making this point were that “tillage and livestock rearing are more interesting sources of revenues than walnut for us”, or that they “had other sources of income than walnut”, or that they “got most of their revenues from tillage and salaried employment in the *leshoz*”. An informant from an intermediate household in Uzgen said that his father had warned him “not to lay all his hope on walnut” and that he therefore always put most of his efforts in tillage and livestock rearing.

A dozen informants emphasized that it was very difficult or even impossible to compensate for the high cash incomes gained from selling walnut after the good harvest in autumn 2002 with revenues from other sources. This underlines the special function of walnut in local household economy.

Those who deliberately adapted their livelihood strategies referred most frequently to the increased attention they paid to tillage. They enlarged their fields for agricultural crops and/or increased the proportion of crops for which there had been a high market demand and thus high prices last season, such as potato or sunflower. Informants from Uzgen suggested these strategies particularly often. It seems, however, that by far not all households were able to put more efforts into tillage. Some household intending to apply this strategy faced serious constraints, mostly related to access to suitable arable land or high costs for leasing additional arable land. Six households facing such constraints were from poor, two from medium households. Two other poor households got around the problem by cultivating arable crops on their leased forest plots. The case of these two farmers underlines the importance of forested areas as a reserve of land for tillage in times of need.

Gathering NTFPs other than walnut came second in the list of adaptations. By doing so, the respondents could at least partly compensate for the shortage of walnut. In most cases, the informants or their children respectively collected wild apples and sold them to the *leshozes* which subsequently resold the apples to a Chinese processing factory in Jalal-Abad. Other products gathered and marketed include firewood, mushroom, rosehips and hay. Respondents from Ortok applied the strategy of selling alternative NTFPs particularly frequently. This is not surprising, as NTFPs are likely to be in relative abundance in Ortok with its large forests. This applies in particular to firewood. Similarly placed forest stands in vicinity to the villages in Achy and Arstanbap-Ata are usually already cleared out of firewood. This might explain why five informants from Ortok, only two from Uzgen and none from Achy and Arstanbap-Ata said that they had sold firewood in 2003 to make some money from their forest plots.

Local respondents mentioned increased off-farm activities about as frequently as the use of alternative NTFPs. These include remunerated taxi and transport services provided by members of the households for other people, commercial activities, labour service offered to other people, and other trades members of the household might pursue to generate supplementary revenues. Respondents from Ortok and Arstanbap-Ata referred considerably more often to such activities than their counterparts from Uzgen or Achy. This might have to do with the fact that land for tillage is severely restricted in Ortok and Arstanbap-Ata. Households of the intermediate wealth group made most of these statements concerning off-farm activities as a means to compensate the lacking income from walnut. If one looks only at transport services, one notes however that this is an option which was particularly pursued by rich households.

Poor households on the other hand, tried mostly to sell their labour to other people. People in Ortok formed “working brigades” offering piecework to other people in Ortok in areas such as haymaking, cutting firewood or construction work. They took this decision when they realised that there would be no walnut harvest that year. Households from the intermediate wealth group, on the other hand, typically shifted their attention to additional commercial activities, requiring some start-up capital, or to work requesting some infrastructure, such as work on a mill. There were also half a dozen households which originally intended to make some revenues pursuing off-farm activities, but had to give up due to some constraints. Such constraints again affected mostly poor households.

Migration is another livelihood strategy to deal with small yields and revenues from natural resource based livelihood activities. Especially people from poor, vulnerable households might be forced to migrate to make a living. A poor respondent from Achy explained that he

had sent his two sons to look for work in town when he realised that there would be no walnut.

To sum up, one can say that, generally, rich households were much more relaxed about the lack of walnut in 2003; this is quite understandably so, as the absence of walnut does not represent a risk for their livelihoods. Many of them did not deliberately intensify their farming activities or take any other specific action, relying on the possibility to sell livestock should there be a need for cash. Other rich households paid more attention to livestock rearing. Households of the intermediate wealth group, on the other hand, seem still to be in the process of differentiating their livelihood systems. When they realised that there would be no walnut, they typically tried to make more income from tillage, off-farm activities and to make the best of other NTFPs. Many poor households tried to apply the same strategy, but – lacking many opportunities – faced considerably constraints doing so. Besides using NTFPs other than walnut, their limited means allowed them only to increase their input in tillage where additional land was available and had not to be leased for a high price, or to offer their own skills and labour to others.

9.9 Use of income gained from the forest plot

The use local people make of the products collected from their leased forest plot gives further information on the part the leased plot plays in their farming systems and their livelihood strategies. Table 53 shows the general tendencies and Table 54 the details of the use the informants usually make of the income gained from selling or bartering forest products. These two tables are linked over the entries in the column entitled “broad category of use”.

Table 53: Use of income, in broad categories, gained from selling products from the leased forest plot or bartering these products respectively by local households. For more details on what these broad categories comprise see Table 54. Results shown for all households together and for every wealth group individually. The percentages given are percentages of the total of statements made on the use of income gained from forest products. Source: semi-structured interviews on forest use practices.

Broad category of use	All wealth categories	Poor households	Intermediate households	Rich households
	% of counts	% of counts	% of counts	% of counts
Consumption	60%	69%	62%	51%
Economic activities	19%	19%	17%	20%
Social network (expenses for social events <i>et cetera</i>)	10%	9%	9%	11%
Infrastructure	8%	2%	11%	11%
Education of children	3%	1%	1%	7%
Total	100%	100%	100%	100%

The main tendency is that, according to the statements of the informants, the use of income gained from selling or bartering products from the leased forest plot for consumption purposes decreases markedly with increasing wealth of the local households. This leaves the intermediate and rich households with more means to make investments. Table 54 shows the details behind these broad tendencies.

Table 54: Use of income, in detail, gained from selling products from the leased forest plot or bartering these products respectively by local households. Results shown for all households together and for every wealth group individually. The percentages given are percentages of the total of statements made on the use of income gained from forest products. Source: semi-structured interviews on forest use practices.

Use of income made from the forest plot for...	Broad category of use	All wealth categories	Poor	Intermed.	Rich
			households	households	households
			% of counts		
Food (e.g. flour, tea, salt)	Consumption	25%	28%	25%	23%
Clothes	Consumption	18%	21%	21%	14%
Livestock	Economic activities	10%	12%	12%	7%
Social network (expenses for social events, gatherings, go and see relatives/friends, helping relatives)	Social network	10%	9%	9%	11%
Home entertainment products (T.V., tape deck, video player)	Consumption	9%	8%	10%	9%
Infrastructure (e.g. building/mending house, stable, buy furniture, rent/buy house/flat in town)	Infrastructure	8%	2%	11%	11%
Essential household goods (e.g. soap, medicines)	Consumption	7%	10%	5%	5%
Buying a car, coach or lorry	Economic activities	6%	3%	4%	12%
Education of children	Education	3%	1%	1%	7%
Farming, forest plot (e.g. buy farming tools, seedlings for forest plot, pay lease payment for agricultural land)	Economic activities	2%	3%	1%	0%
Pay back loans	Consumption	1%	2%	1%	0%
Off-farm activities (e.g. buy an oil-mill, invest in trading scrap metal)	Economic activities	1%	1%	0%	1%
Total		100%	100%	100%	100%

Altogether, buying essential goods such as food or clothes were most often mentioned. These two categories come also first and second in all three wealth groups. However, their relative importance decreases with increasing wealth, as indicated by decreasing percentages of counts from poor over medium to rich households. Livestock comes third overall and both in poor and medium households. Rich informants, on the other hand, did only six times (7% of the counts) mention that they would invest their income gained from products collected on the forest plot into livestock, i.e. in natural capital available within their farming systems. About equal percentages of informants of every wealth group said they would use forest-based income to fulfil social obligations and to buy home entertainment products. The first represents a change from financial to social capital. Home entertainment products are certainly not essential in terms of survival, but represent lifestyle choices.

The fact that also poor households mentioned expenses for social events rather frequently might be surprising at first sight, given their poor material situation (see Section 6.2). However, social gatherings are very important in rural Kyrgyzstan and serve to build and strengthen ties with one's relatives and fellow villagers. Usually, people take careful account of everybody's contribution to social events, and the host is expected to return contributions made, in accordance with the principle of social reciprocity. Thus, such events and the contributions made to such networks are important investments in social capital. They are very important for building and maintaining a social network providing mutual assistance. Therefore, also poor families make an effort to invest in this social network and to remain a part of this social network, connected with others despite their limited means. Such networks

are very important to them, in particular because today nobody can rely on assistance from the State. Only in this way, can they rely on support of other members of the network should the necessity arise. Economically speaking, expenses for social gatherings can therefore be considered as an investment into social security for possible future times of needs. It is in a way comparable to the investment in livestock that can be capitalised at any time should there be a sudden financial need.

Investing the income made from selling products harvested on the leases forest plot into physical assets such as infrastructure seems to be particularly popular amongst medium and rich households. Buying a car, a coach or a lorry with the money gained is something especially rich households do. Having a car or another vehicle allows diversifying one's economic activities by offering taxi or transport services to others. Such investments generally reduce the dependency of the households on natural resources. Typically, a considerable amount of financial capital is needed to diversify one's livelihood strategy in this way, and the new activities also involve some particular risks. But, at the same time, such off-farm activities promise good, i.e. relatively high financial returns. The fact that such major financial investments promising good returns are only afforded by richer, but not by poor and most mediate households points to the risk of growing income disparities. Suggestions for measures promoting more equitable development are made in Section 9.10.



Figure 32: Selling walnut halves and whole walnuts on the market in Bazar-Korgon.

The results also show that a number of rich informants use the income gained for educational expenses of their children, in particular to pay their tuition fees at the university or, as informants from two rich households openly admitted, to pay the bribes demanded by the teachers and lecturers for “making sure” that their children pass their exams. Such investments in the field of education are long-term investments in human capital. They can be seen as a means to enhance the livelihood security for the family as a whole in the long run. They are expected to increase the chances for the future generation of eventually getting a good job and becoming more influential and powerful.

Summarising the results for each wealth group individually, it appears that poor households use their income gained from the leased forest plot primarily to satisfy basic needs (food, clothes, essential household goods), if possibly to broaden their resource base by investing into livestock and to secure their place in local social networks. Medium households seem to be less dependent on forest-based income to purchase essential goods for everyday life (food, clothes, essential household goods) than poor households. They therefore tend to invest their financial capital more into additional areas, such as the amelioration of their houses and farms (physical capital, infrastructure). Many rich families use their forest-gained income even for a wider range of different purposes. Increasing their physical (housing, vehicle) or human assets (education of children) are typical areas in which mostly rich households invest. This suggests that rich households have sufficient other sources of revenues than their leased forest plot to cover their basic needs. Therefore, a considerable part of the returns from forest products remains available for other ends, including long-term investments.

The differences between the wealth groups in terms of the significance of products from the leased forest plots, most importantly of walnut, become even clearer if one looks at statements describing the effect of a lack of walnut and other marketable products. Poor families suffer often severe shortages of food and clothes in years without any substantial income from the walnut harvest on their leased forest plots. Medium households are, in most cases, able to buy at least enough food and other essential products with income gained from other sources than the forest plot. For rich households a lack of walnut typically means that they will not have the money necessary for major investments. But, it does not threaten the livelihoods of these households.

Representatives of ten households considered to be poor told the author that in years without walnut they lacked the money to buy sufficient food. Six of them added that they have either to ask their neighbours to give them food on credit or to take up a loan, typically with very high interest rates, to buy food. One family described its struggle during the winter after a year with low yields saying that, under such conditions, they could usually not afford buying tea and sometimes they even had no salt in the household. Another poor household said that it usually lacked flour to bake bread. A few of these poor households seem to be a bit better off under the same circumstances, but insisted that they could buy only food, nothing else. Some informants also said that they could not buy urgently needed clothes.

The most frequently quoted statements by households of the intermediate wealth group was that in years without or with only little walnut they could not buy anything other than the necessary food products and essential clothes for their children. Other informants from the intermediate wealth group mentioned the sale of livestock as source of needed income, which could, in certain circumstances, be a means of last resort.

Amongst rich informants, the statement (mentioned eight times) that they could not buy a car if there was no walnut harvest was the most frequently used single description of the consequence of a lack of walnut. Another informant from rich households in Arstanbap-Ata said that it would be impossible to build a house in a year following a bad walnut harvest. A relatively wealthy farmer in Ortok, where land for tillage is limited, also pointed out that the revenues generated from tillage did not suffice to purchase livestock. Thus, it appears that the sale of products from the leased forest plot, especially of walnut, enables rich households to make major investments.

The extreme dependency of poor households on walnut for cash income prompts the question how this vulnerable group could best be protected when the walnut harvest fails. This question is addressed in the following Section on the basis of an assessment of the potential of forest use to contribute to poverty alleviation in the WFF-belt.

9.10 Local people's participation in forest management and poverty alleviation³¹

The interviews with representatives of the *Ail-Okmots* and the SFS revealed that generally the *Ail-Okmots* are more active in the field of poverty alleviation or reduction than foresters. While foresters from all levels of the SFS (from forest rangers up to the deputy head) emphasised the contribution of forest resources and new approaches, such as CFM, to increased living standards in rural areas during interviews, they seemed not concerned with the more focused issue of poverty alleviation. From all the interviewed foresters, only one *leshoz* director explicitly mentioned poverty alleviation. In this context, it should be emphasised that income generation and economic growth do not necessarily contribute to poverty alleviation, unless it is made sure that the benefits reach the poor. The way property rights to forests are being allocated at the moment (c.f. equity issues presented and discussed in Section 7.3) raises doubts as to whether the current practice contributes to reduce poverty. A CFM service provider who told the author that foresters never referred to the idea of poverty reduction when discussing issues related to the implementation of CFM further confirms the impression that poverty alleviation is not a real concern with most foresters. Furthermore, Scherrer (2004) found that "poverty" was never mentioned as a criterion used for allocating CFM plots by the informants of her study. Despite poverty alleviation being an expressed priority of the government, this has not yet translated into specific actions by SFS at the field level.

The *Ail-Okmots* conduct, at least once a year, socio-economic surveys of all local households. The resulting statistical summary indicates how many households are categorised as "very poor" and as "poor". "Very poor" households usually get financial assistance from the *Ail-Okmot*. In Arstanbap-Ata and similarly also on the other sites, the *Ail-Okmot* compiles a list of households to be provided with support by the *leshoz* on the basis of this survey and hands it over to the *leshoz*.

Examples of material support to poor families provided by *leshozes* include:

- Reduced taxes to be paid to the *leshoz* for use of farmland and harvest of agricultural and forest products for poor families, in particular reduction of the share of the walnut harvest to be given to the *leshoz* as tax by seasonal tenants, i.e. less than the usual 50-60% of the total walnut harvested (Arstanbap-Ata);
- Allocation of more walnut trees to families with many children for the time of the walnut harvest (Arstanbap-Ata);
- In-kind support to poor local families (e.g. free allocation of flour and sugar) (Achy);
- In the framework of the National Poverty Reduction Programme, forest rangers in Uzgen were ordered to supply poor families with fuel wood for free. All expenses involved, in some cases including transport of fuel wood right to the houses of the poor families, were covered by the forest range.

³¹ Some of the information gained from fieldwork for this Sections has been published in Fisher *et al.* (2004) and Schmidt (2006).

The nature of the support provided to poor families by the *leshozes* shows that their assistance focuses very much on material support, while little or nothing is done at the moment by the *leshozes* in terms of empowerment of poor rural families. The information gained from the interviews confirms that there is a readiness to provide poor households with material support but little priority amongst forestry decision makers to empower the rural poor. Foresters generally consider social development as the main responsibility of the *Ail-Okmot* and the higher levels of the civil administration.

When discussing opportunities for poverty reduction and access to forest resources to poor people, some forestry officials (including both senior SFS officials and *leshoz* staff) presented arguments against granting leases to the rural poor by referring to widespread laziness and drink problems amongst the poor. A senior SFS official said that poor people were in most cases themselves responsible for their poverty, and that poverty was mainly due to laziness. He also considered the latter factor to account for low success rates of applications for forest leases handed in by poor people. They would often not fulfil the necessary criteria, such as reliability and ability, to carry out particular tasks. A chief forester expressed his sympathy and understanding for what he called “poor, but hard-working families” whom the *leshoz* helped with reduced tax rates for the walnut harvest. He clearly distinguished this first group from a second, bigger group which he called “lazy people who do not stick to the contract conditions” and which included mainly people with a drink problem.

The head of the *Ak Sakal* council of one of the villages in Arstanbap-Ata refused to accept any simplistic explanation of the reasons behind poverty by pointing out that a positive working attitude alone did not guarantee economic well being. He said he knew many hard-working people who had remained poor despite all their efforts to improve their situation. A *leshoz* director also alluded to more complex factors referring to what he saw as the two main reasons for poverty: firstly, negative attitudes of some people like talking too much, complaining all the time and being lazy, and, secondly, that some poor people “have a weaker voice so that decision makers do often not hear them”. The social responsibilities held by civil servants and decision makers in official positions would however require them to listen especially to marginalised groups. Derogatory statements about poor people like to ones quoted above – which seem to reflect a widespread harsh attitude towards poor people in the transitional Kyrgyz society that is by no means confined to the forestry sector – raise doubts as to the availability of a political will for empowerment of the rural poor. Furthermore, such statements raise questions concerning the social cohesion of society in Kyrgyzstan.

The experience made so far suggests that providing private access to forest resources alone does not equate to poverty alleviation. In fact, the continuation of schemes, such as CFM and other leases, providing exclusive forest access to a few people is even likely to lead to an increasing number of people disempowered in terms of access to natural resources. To counteract this risk, the least that could be done is guaranteeing equal access to forests and other natural resources to people of all wealth groups. But, to achieve poverty alleviation even more is needed. A deliberate “positive discrimination” of poor households in the allocation of access rights to forest resources, as suggested by many informants, would be a first step towards concrete measures in favour of the poor. The strong technical, administrative orientation of the SFS and certain reluctance amongst forest authorities to commit themselves to social development goals such as poverty alleviation can be seen as key constraints for the development and implementation of such a pro-poor policy. At the bottom of this reluctance, there might also be certain insecurity regarding social questions,

as many foresters have little or no experience in dealing with social questions regarding forests. Hence, the SFS has hardly any institutional capacity to address such issues.

The potential contribution of participatory forest management to poverty alleviation in the WFFs and critical issues can be summarised as follows using the three dimensions “opportunity, security and empowerment” of the World Bank’s poverty definition as a framework (World Bank 2001b):

Opportunity

- The use of products from the WFFs clearly offers interesting income opportunities to local households.
- Poor households have at least some access to commercially valuable NTFPs, in particular to walnut, and to products *s.l.* which are important in terms of subsistence (e.g. firewood, hay, grazing for livestock).
- There is a possibility to generate added value by processing NTFPs in local communities.

Security issues

- Wide yield fluctuations of walnut and of some other commercially interesting NTFPs severely constrain the role of the walnut fruit forests as safety nets for the poor.
- It is, therefore, critically important that poor households have also access to other sources of income than forest products in order to increase their livelihood security. In fact, people depending solely on forest products may become trapped in poverty.
- Market demand for forest products is increasing, both in terms of the number of products requested as well as the total volume. This might eventually reduce the dependency of poor households on walnut.
- However, generally access to a given forest product usually becomes more competitive with its increasing commercialisation. Under these circumstances the poor risk losing user rights, while powerful households tend to profit excessively (Arnold & Ruiz-Pérez 2001; Angelsen & Wunder 2003).

Empowerment

- The allocation of user rights to forest products is often not transparent, and there are tendencies in favour of rich, influential households. A deliberate focus on providing and guaranteeing access to forest resources for the poor is therefore required to achieve poverty alleviation.
- Although Kyrgyzstan has a national poverty reduction strategy to which the SFS is also committed, poverty reduction has not yet become an effective priority of the SFS. Thus, this high level commitment has yet to be translated into concrete policies and actions for the empowerment of the poor at the local level. One of the reasons for this is that there is still little understanding of the social dimension of sustainable forest management.

Thus, it can be concluded that participatory forest management in the WFFs can contribute to poverty alleviation provided that the institutional arrangements governing access to the products are reformed for the benefit of the rural poor. In this context it is important to remember that *leshozes* often have not only forested areas, but also open land (including pastures and arable plots). If a pro-poor policy was applied to non-forested plots as well as forested plots, there is potential for *leshozes* to make a considerable contribution to poverty reduction. This would help poor people to diversify their farming systems and reduce

vulnerability. Granting use rights to forest plots will help little to reduce vulnerability substantially, because of the strong fluctuations in walnut yield - unless efforts are also made to increase and diversify production on the plot. So, non-forested areas under *leshoz* control play an important role to reduce vulnerability and increase livelihood security.

Forest authorities may be reluctant to fully commit themselves to poverty reduction objectives in place of more traditional concerns with forest protection, reforestation and even institutional maintenance. Therefore, mechanisms may be needed which make them more accountable to broader government objectives and policies. The areas of concern here are i) the need for institutional change within the SFS and its departments as they begin to manage forests for the benefit of people and in collaboration with people, and ii) the need for strengthened civil society institutions which can empower people in forest management and access issues. An example of the latter is the idea to found an association of CFM tenants in Uzgen which was brought up during a research interview with a tenant. He explained that such an association might act as a counterbalance to the powerful *leshoz* and expressed his hopes that it would in this way strengthen the position of the tenants in negotiations with the *leshoz* and other State agencies.

9.11 Discussion on forest use practices and the significance of forest resources in local people's livelihoods

9.11.1 Forest use practices

The results presented in the previous sections of this chapter paint the picture of a use of relatively few products from the leased forest plot by a majority of forest leaseholders and more occasional use of a wider range of products from the plots (c.f. Table 43). This is consistent with the findings of Marti (2000) who found that local people in Kara-Alma, the neighbouring *leshoz* to Ortok, use only a relatively small number of forest products from the broad range of products available.

In terms of frequency of use amongst the interviewed leaseholders, walnut and firewood clearly stand out. Products that are still used by at least half of the informants include mushrooms, wild fruit (e.g. wild apples, rosehips, Sogdiana plum taken together) and hay. Favre (1997) and Marti (2000) equally identified walnut and firewood as key forest products in several *leshozes* of the walnut-fruit forest belt. Asanbaeva (2006) notes the importance of walnut, for which there is always a market demand, for households of a village of Uzgen and a village of Kara-Alma *Leshoz*. Schmidt (2005b; 2005a) describes a very similar pattern of forest use to the one found in the study at hand for Arstanbap-Ata, Kara-Alma and Kyzyl-Unkur (another *leshoz* neighbouring Arstanbap-Ata): walnut and firewood being collected by nearly all interviewed households, between 50 and 90% of the households collecting fruits and morels and around 40% of the households gathering medicinal herbs.

Given the wide range of forest products *s.l.* available in the walnut-fruit forests and the economic difficulties of the transition period, it seems, at least at first sight, rather surprising to discover that most households involved in forestry use only a limited number of the broad range of forest products available (Marti 2000). The findings from this study (see Section 9.5) do however provide plausible explanations for the limited use of many NTFPs. A complete lack of market demand or unattractive prices and a lack of time or labour in the household, which is presumably devoted to other, more profitable activities, are the most important reasons for non-use of available forest products from a plot (c.f. Table 46). This illustrates the significance of market related factors in determining and shaping resource use

practices. The fact that a lack of knowledge concerned only the use of medicinal herbs in a small number of households confirms that forest leaseholders usually dispose of good knowledge about the use options for forest resources (c.f. Chapter 8). Thus, one can conclude that generally the knowledge available with local forest tenants does not constrain immediate forest use.

The preferences of the informants for forest products *s.l.* described in Section 9.4 reflect the importance of walnut and firewood for local livelihoods. Besides them, agricultural products and activities linked to livestock rearing are also highly valued. This clearly demonstrates the significance of the forest plots as land on which it is often possible to grow arable crops, graze livestock and/or make hay. Forested areas in the walnut-fruit forest belt are significant for livestock production, regardless of existing regulations officially banning grazing livestock from forests (see Section 4.3.4). On a conceptual level, the high values attributed to agricultural products and activities emphasise the need to think of the walnut-fruit forests as a resource that is largely used in an agroforestry way (Messerli 2002).

9.11.2 Forest use and biodiversity conservation

Widespread agroforestry practices and ongoing planting and sowing activities by tenants point to an increasing domestication of the walnut-fruit forests. Moreover, some of the interviewed forest leaseholders also harbour ideas to conduct enrichment planting and to graft cultivated varieties on wild rootstocks. Such activities result in qualitative changes of the composition of forest stands. This domestication of forest stands can be observed on all four research sites, albeit to a different degree. For instance, undergrowth is cut, be it for fuel or to ease the collection of walnut, the ground vegetation is used for hay, and wild growing apple and other fruit bearing woody species are grafted. In this way, forest stands are increasingly turned into agroforestry plots. Stands in which woody species used to grow seemingly uncontrolled over the last decades are increasingly being influenced by man and sometimes even turned into park like stands.

This process of domestication of the walnut-fruit forests has already been described during the Soviet era. The well-known and respected Soviet scientist I. T. Vasilchenko is reported to have deplored the transformation of what he described as an “ancient natural forests” into “cultural plantations” (Sherbinina 1998). New evidence (Beer & Tinner 2004; Kaiser 2006; Beer *et al.* n.d.) pointing to an anthropogenic origin of the dominance of walnut in these forests suggests that man has in fact been influencing these ecosystems for a long time. This new understanding of the origin of these forests and the ongoing domestication of forest stands that is likely to have been accelerated over the years of transition raises a series of questions regarding biodiversity conservation: What is the biodiversity available in the walnut-fruit forests, and especially the diversity of woody species (having in mind that some of them might have been largely propagated by man)? How can the biodiversity of the cultural landscape of the walnut-fruit forests, of this mosaic of different land-use practices and ecosystems used at different intensities by man most effectively be preserved?

More research into the biodiversity of woody and other species in order to develop a better idea of the value of these forests in terms of biodiversity should be conducted. This would help to put future biodiversity management on a solid, scientific basis. In the meantime, precautionary principles should be applied until more data on the biodiversity of the species concerned is available. This would, for example, include a systematic application of the existing regulations concerning the use of cultivated varieties and of the ban on grafting wild woody species in natural forest stands.

Given the ongoing difficult economic situation in Kyrgyzstan, pressure on forest resources is likely to continue or even to increase over the years to come. With it, the trend towards further domestication of forests is expected to continue. A possible way to manage this dynamic and limit damage on forest ecosystems at the landscape level would be to identify forest areas which can be used more intensively and zones where no or only very extensive use would be allowed. In this way, the resilience of the forest ecosystems could be maintained allowing the forests to return to their previous states once human pressure on forests decreases.

9.11.3 Significance of forest resources for local people's livelihoods

In the following the role of the walnut-fruit forests in local livelihoods and the question to which extent they fulfil the three functions, namely i) safety net, ii) support of the current level of consumption, and iii) pathway out of poverty (Cavendish 2003; Vedeld *et al.* 2004), will be discussed.

The key features of the walnut-fruit forests in terms of their significance for local people's livelihoods undoubtedly are i) the considerable yield fluctuations of walnut as the commercially most important forest product, and ii) the importance of the forested areas for subsistence including the use of agricultural products. The latter contributes to food security for the population of the walnut-fruit forest belt (Asanbaeva 2006). The strong variations in forest-based revenues between a year with a good walnut yield and a year with virtually no walnut at all, and the ways local people adapted to the lack of walnut in 2003 illustrate the consequences of these yield fluctuations for people living in the walnut-fruit forest belt. The fact that even in years without walnut, the leased forest plots and the general forest are still being considered as a source of some, albeit lower levels of revenues demonstrates the significance of products gained for subsistence such as firewood, hay and, where available, arable crops cultivated in the forest.

These distinct yield fluctuations in walnut and also wild apples severely constrain the role of the walnut-fruit forests as a safety net. This is especially the case in places with limited forest resources and high human pressure (e.g. Arstanbap-Ata, Achy) where competition for access to forest resources is particularly strong. There are no wild growing forest products that are available every year and that the local population could use as food or to generate substantial income in periods of unexpected shortfalls. The limited role of the forests as a safety net is confirmed by the findings that the majority of households actively trying to compensate for the lack of income from walnut in 2003 engaged in non-forestry activities.

The importance of products collected from the leased plots for subsistence and the fact that in all three wealth groups the majority of statements on the use of forest-based income concerned consumption indicates that the prime role of the walnut-fruit forests in local people's livelihoods lies in their contribution to the maintenance of current consumption levels. Forest products used for subsistence and cash income gained from forest-based activities complement other sources of in-kind and cash revenues available to local households.

The results of this study suggest that the function of the walnut-fruit forests to provide a pathway out of poverty is rather limited. However, under special circumstances, such as the lucky chance of a series of successive good walnut harvests within a short period of only a few years time, these forests could potentially fulfil this function at least for people with

access to relatively large forested areas. But in practice, such series rarely occur (c.f. Figure 23). To a certain extent, income gained from using forest resources allows local households to pursue and engage in other economic activities. This applies particularly to wealthier households who use the income generated from forest products less often for immediate consumption than households of lower wealth groups.

The finding that forest-based revenues accounted for 16% (2003) to 32% (2002) of the total annual revenues of the interviewed households shows that forest resources play an important, but varied role in the livelihoods of forest leaseholders. Interestingly, these data from the walnut-fruit forests lie in the same order of magnitude than the findings of Vedeld *et al.* (2007). These authors found, in their meta-study analysing 51 case studies, forest environmental income to constitute on average 22% of the mean total household income. Amongst the households included in this study, poor households rely distinctively more on forest resources than rich households and, under conditions of low walnut yields, also than intermediate households. This pattern is observed in many cases in the tropics (Byron & Arnold 1999; Vedeld *et al.* 2007).

The socio-economic results of this study pointing to a significant role of livestock rearing and tillage and, to a varying extent, of forest resources for the livelihoods of forest leaseholders are consistent with the findings of Marti (2000, p. I). This author questioned the previously widely held assumption that the rural population depended heavily on forest products on the basis of her studies in Kara-Alma *Leshoz*. While the findings of the study at hand and Marti (2000) suggest that forest resources constitute just one of a range of important sources of revenues, Favre (1997, p. 107) came to the conclusion that forest products and particularly walnut played a crucial role in the economies of local households in the walnut-fruit forest belt. These differences in the assessment of the significance of forest products might be explained by the fact that Favre (1997) focused only on forest products whereas this study analysed forest products in the context of other sources of revenues available to local households. Also, since 1996, when Favre conducted his fieldwork, more income opportunities outside of the forests might have developed. Furthermore, his analysis was based on data from years with a medium (1995) and a good (1996) walnut harvest (c.f. Figure 23).

The motivations to apply for a forest lease show that having a forest plot is for many informants a means of livelihood diversification. Their main motivations are i) the prospect of irregular but, when available, high returns from harvesting walnut, and ii) the need for particular products and, in some cases, also for land to cultivate arable crops. The main function of walnut in this context is to provide much needed cash income. Walnut differs from other available NTFPs in a few ways, most importantly a high market price, the ease of collection that requires no significant other inputs than labour, and the possibility to add value to the product by cracking the nuts for which again no technology is required. These reasons explain the special role of walnut despite its unreliability of which local people are very well aware.

10. Towards sustainable livelihoods and sustainable forest management in the walnut-fruit forest belt

In this concluding chapter, the initial assumption:

Local people can contribute to the sustainable forest management of the walnut-fruit forests with their knowledge and capabilities, provided that sound and fair agreements between the State forest farms and local people exist.

is revisited and discussed. The chapter draws on the results presented in this thesis and particularly on the discussions on forest management in the walnut-fruit forest belt in times of transition (research objective 1, Chapters 5 and 6), on issues of forest governance and the roles of key-stakeholders in forest management (research objective 2, Chapter 7), on local knowledge and innovation in the field of forestry (research objective 3, Chapter 8) and on forest use practices and the role of forest resources in the livelihoods of forest leaseholders (research objective 4, Chapter 9). In bringing together key issues from the discussions presented in previous chapters, this Chapter completes this study, highlights key elements of the understanding of forest management and local livelihoods gained from this research and develops conclusions and recommendations for policy and practice. In so doing, this concluding chapter contributes to the objective 5 of this study, i.e. to the exploration of ways to implement participatory sustainable forest management in the walnut-fruit forests of Southern Kyrgyzstan.

This discussion follows the levels indicated in the conceptual framework of this thesis, from the level of the political-economic system, over the conceptual and the policy level to the level of implementation. On the latter, the discussion focuses on key issues of this study, namely forest governance including institutional questions, the collaboration of key stakeholders in the management of the walnut-fruit forests and on local knowledge and forest use practices.

The transition towards a democratic system, an open society and a market economy in Kyrgyzstan has proved to be a long and painful process, especially for people living in rural areas. Similarly, the change from a highly centralised, Soviet-style system marked by top-down decision-making towards more decentralised governance and devolved, bottom-up decision-making has only begun. The implementation of these changes in governance will need a lot more time and energy, many small steps to be made and convincing early successes.

On the conceptual level, the changes happening in the Kyrgyz forestry sector have to be seen in the context of the transition process of the country, but also in the context of important changes in forestry and development thinking at the international level. These include, for instance, the adoption of a comprehensive understanding of sustainable forest management and the concept of participation. It was observed that international exchanges going beyond the Russian-speaking world allowed the Kyrgyz specialists to take up some elements from the international debate and include them in new policies.

In the challenging context of the transition process, the participation of local people in forest management is widely considered not only as a means to support rural communities in times of economic hardship but also as a necessity to guarantee sustainable forest management

under conditions of severely restricted State funding. Thus, private and public actors, local people, the SFS and the *Ail-Okmots* as the local self-government bodies enter into a partnership, as the definition of CFM used in this thesis stipulates. The role of forest policy in this context is to promote joint private and public responsibilities and financial investments from private and public source to guarantee a balanced provision of private and public benefits from forests. This thinking has entered official forest policy in Kyrgyzstan, which went through a thorough, participatory reform process over recent years aiming at adapting it to the emerging new political, economic and social system. The new long-term Concept of Forestry Sector Development (see Section 6.3.4) advocates an increasing role for local people and other private stakeholders in forest management. Also, it explicitly states the need for the State to change its role from a commanding and controlling agent to that of a facilitator and coordinator of the various efforts made towards sustainable forest management. Other relevant developments on the policy and the implementation level include the pioneering role that Kyrgyzstan has been playing since the late 1990s in the development of participatory approaches to forest management (e.g. development of the Kyrgyz CFM model, formulation of integrated management plans for the country's juniper forests). Thus, on the policy level, there have been significant developments since about the mid-1990s. However, from his research and observations in the field the author got the impression that all these policy changes have not yet fully trickled down to the field level. For this to happen, sufficiently long periods of time as well as support at all levels involved are required.

10.1 Forest governance and institutional arrangements for the management of the walnut-fruit forests

The existence of two parallel local State structures in the form of the *Ail-Okmots* and the *leshozes* raises questions concerning the effectiveness and efficiency of local natural resource governance. Several informants, including representatives of these two State bodies suggested the unification of the *Ail-Okmots* and the *leshozes*, whilst keeping a supervisory role for the SFS to safeguard public interests in the forests. As discussed in Section 7.7.6, such a new institutional set-up holds the promise of making the *leshozes* accountable to the local population and easing the collaboration in the field of social development. The transfer of full ownership or at least extensive use and control rights to the *Ail-Okmots* would also allow them to decide on a model for the involvement of local people and might be the beginning of some form of a common property right regime. It is suggested that the SFS, the *Ail-Okmots* and their partner organisations discuss the issue of an effective and viable institutional arrangements and other measures to improve natural resource governance in the WFFs in an open and positive manner.

The experience gained with leasehold approaches so far is ambiguous. On the one hand, it benefits the livelihoods of the leaseholders and provides the *leshozes* with revenues and labour. On the other hand, the leasehold approaches and their implementation in the WFF-belt have also some weaknesses, including: i) equity issues regarding access to forest resources concerning the present and future generations, ii) the risk of a creeping *de facto* privatisation of forest plots via long-term leases that may increase social problems and disparities, and iii) the fact that such leases do not contribute to the improvement of the state of those parts of the forest that are kept under *leshoz* management and that may be exposed to even higher human pressure than before the introduction of leases.

Several recommendations for addressing the equity issues raised by the often-intransparent allocation of access rights to forest resources can be made: Firstly, existing rules and criteria

guaranteeing equal access have to be applied by the *leshozes* involved. Where this and administrative mechanisms to supervise the application of such rules fail to take effect, an alternative option would be the empowerment of groups in society which have difficulties to make their voices heard, such as poor people, in decision-making. Existing institutions such as women's or elders' councils and newly founded support groups and other civil society organisation could play a role in this process. Generally, there is a need to identify a simple and robust system of decision-making regarding the allocation of all types of leases and forest user rights. Ideally, such a system would involve all key stakeholders and increase the accountability of the decision makers to local communities.

The risks of a creeping *de facto* privatisation with potential negative social and ecological effects are rather difficult to address. In theory, a model according to which responsibility for an entire forested area (e.g. valley, watershed) is transferred to a larger, open group or "community" (e.g. neighbourhood, hamlet, village) would be a way of addressing such issues. Such a common property regime would also allow managing human pressure on forest resources on the entire forested area. However, given widespread strong resentments against collective work and community-based organisation, it is clear that any attempt to push any such approach from outside is doomed to fail. However, the research found cases in which group-based approaches have evolved endogenously on a voluntary basis. This indicates that, under certain circumstances, local people value the benefits of working in a group higher than an individual organisation of work. The recommendations in this respect would be: i) to study the conditions under which such group-based arrangements emerge in more detail in order to identify key enabling factors, and ii) to support such approaches whenever they evolve spontaneously.

10.2 Using the local knowledge available and role change of forest leaseholders and foresters

Generally, the skills and knowledge available with local people form an important asset for their participation in forest management in the walnut-fruit forests. The findings from this study point to a wide availability of technical forestry skills and marketing relevant knowledge about the use options of a wide range of forest products amongst forest leaseholders in the walnut-fruit forest belt. Also, forest tenants do exchange and discuss forestry issues with their co-residents and particularly with staff members of local *leshozes*. Only a part of the respondents interviewed for this study has actually already started to manage the leased forest plots more actively. However, their ideas and visions for the long-term development constitutes a valuable basis and possible starting points for the silvicultural management of leased forested areas. Also, there are clear indications from this study that with the time, a longer association of the tenants with their plots and with long-term tenure security (e.g. extension of the CFM contracts) forest leaseholders are increasingly getting interested in active forest management.

The main constraints in terms of local knowledge concern the limited capacities of many leaseholders to imagine the dynamic of forest ecosystems in the long run and to derive silvicultural conclusions from this. Silvicultural decision-making is a new area for most of the interviewed leaseholders. This points to a need for i) further capacity building for leaseholders in forest management and especially in silviculture, and ii) the provision of advice to leaseholders by the trained and experienced forestry staff from the *leshozes*.

A successful collaboration between local people and foresters entails, as discussed in Section 8.8.2, significant role changes for both parties. Local people have to change from being mere recipients of orders to become proactive partners of the SFS. The foresters have, in

accordance with the above-mentioned principles of the Concept of Forestry Sector Development, to make the transition from commanding and controlling to providing advice to local people and monitoring forest and land use.

To support the key stakeholders in their new roles, further training in forest management for forest leaseholders, as already conducted by the CFM project and the Orech-Les project, should continue to build up the capacities in local communities to assume more responsibility in forest management. In parallel, both foresters and researchers should be assisted in adopting their new roles. In that respect, the experience gained from building up Kyrgyzstan's new agricultural extension service might offer valuable and relevant lessons learned.

To put the knowledge of local people, their innovativeness and, with it, their private initiative to maximum use, they should be given more scope for decision-making about the management of their forest plots. Furthermore, mechanisms for all long-term leaseholders, not only CFM tenants, to take part in the SFS-led formal planning of forest management should be developed. In this way, their growing experience from managing their forest plot can be incorporated in forest management plans.

10.3 The role of forest resources in local livelihood systems – acknowledging the social side of forestry

The research found that forest resources are an important source of subsistence and a rather unreliable source of potentially high cash income from collecting walnut for local households. They complement the other sources of revenues available to the households, and fulfil primarily the role of contributing to the maintenance of the households' current consumption levels. However, livelihoods depending largely on forest resources are very vulnerable. There is a risk that households depending to a large extent on forests for their livelihoods are caught in a poverty trap. The main reasons for this are the high yield fluctuations of walnut and wild apples and the limited potential to substitute walnut with other NFTP in a year with low walnut yields. As often, the solution for this problem, lies partly outside the forest, in more diversified livelihood systems, increased livelihood options and thus, broadly speaking, in the development of the economy in the walnut-fruit forest-belt and in Southern Kyrgyzstan. Within the realm of natural resources, the development and wider application of agroforestry systems, including sylvopastoral systems offers some opportunities to diversify the range of products being used, to lower risks and thus to reduce the vulnerability of local livelihoods.

Under the current conditions of economic transition, with all its consequences such as severely limited opportunities for salaried employment, access to forests and other natural resources is crucial for local livelihoods. This applies particularly to poor households, for which forests constitute, even in years without walnut, an important source of subsistence. Thus, questions of forest management and social development are inextricably linked and forestry is, also in Kyrgyzstan, quintessentially an interdisciplinary field and no longer purely a technical discipline. The fact that most of the natural resources within the walnut-fruit forest-belt is controlled by the *leshozes* further emphasises that the SFS and its subordinate *leshozes* have an important role to play in social policy and rural development. In accordance with a comprehensive understanding of the concept of sustainable forest management, the SFS and the *leshozes* should therefore acknowledge that they share responsibility for the social well-being of the population with the *Ail-Okmots*. Institutionally, the *Ail-Okmots* and *leshozes* should increase their efforts to closely collaborate in furthering

local development. At the same time, it appears urgent that the SFS builds up its institutional capacities to address social questions related to forest resources and land use.

An opening towards the concerns of local people is also important for political reasons. People in general, the partners of the SFS and political decision makers have to be convinced by deed of the necessity for a professional forest service to ensure the conservation of Kyrgyzstan's forest resources and of the legitimacy of the existence of such a service. Thus, the SFS has to prove that its policies and actions are about sustaining the forests and not about sustaining the forest sector and SFS itself. This will contribute to regain the trust of people and thus, in the long run, increase social capital available for forest management.

10.4 Concluding thoughts

The vision for the future role of local people and foresters is that of a system changing from a hierarchical "command and control" system towards a system in which local people play an active role in forest management. The results of this research demonstrate that local people, generally having good forestry skills and increasingly getting interested in more active forest management, can make a substantial contribution to forest management. This holds particularly true if they are actively being supported and advised by professional foresters. The insights gained from the interviews also point to the importance of having agreements that clearly define the rights and responsibilities of the contractual partners and guarantee a balanced benefit sharing between the tenant and the State. Hereby, contractually secured long-term access to forests is particularly critical to stimulate the passage from passive forest use to active forest management by local people. Thus, the initial assumption of this study can largely be confirmed and turned into the following statement:

Local people can, with the professional assistance of foresters, contribute to the sustainable forest management of the walnut-fruit forests with their knowledge and capabilities, provided that clear agreements between the State and local people exist. Active forest management by local people is particularly likely to occur under conditions of secured long-term forest tenure.

To realise the potential constituted by local knowledge and to move towards the vision of local people playing an active role in forest management, they should be entrusted with co-responsibility for sustainable natural resource management and should be given enough room for decision-making. Ideally, the collaboration between forest authorities, the *Ail-Okmots* and local people takes the form of a partnership in which they, and possible additional key stakeholders, jointly reach agreement on the management of the walnut-fruit forests. This collaboration should be part of a wider institutional framework creating favourable conditions for the sustainable forest management of the walnut-fruit forests for the benefit of local communities and society at large.

The stakeholders involved in forest management in the walnut-fruit forests and in other forested areas of Kyrgyzstan began only relatively recently to explore and promote participatory approaches to forest management. Given the Soviet past, it is not surprising that this development started on the lower levels of Pretty's (1995) participation ladder. The change from top-down decision making towards a system that functions largely on the basis of bottom-up decision making involves huge challenges. Progress also requires a strong political commitment on the part of the administration to the decentralisation and devolution of authority. While technical, organisational and administrative steps for the development of

participatory forest management were rather speedily taken; social learning about the fundamental principles underpinning the concepts of participation and CFM requires much more time. This process can, at the most, be facilitated by outside agents. As long as mutual learning amongst the involved stakeholders continues, there are real chances that (more) participatory forest management will, with the time, gradually move up the participation ladder.

Any participatory approach to forest management can only be developed and implemented successfully under conducive conditions. A positive wider dynamic towards a stronger civil society, a democratic system and good governance can substantially facilitate progress towards sustainable forest co-management by local people and State authorities. Given the difficult starting point that Kyrgyzstan shares with other CIS republics and the harsh realities of the transition process undoubtedly much time and efforts will still be needed for these changes to happen.



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Appendix 1: Form to record key data on the interview, the interviewee(s) and the conditions of the interview

The following points were noted for every interview conducted during the research process:

Date, time interview	
No. household (if applicable)	
Research site (if applicable)	
Name, first name informant(s)	1) <input type="checkbox"/> Male <input type="checkbox"/> Female 2) <input type="checkbox"/> Male <input type="checkbox"/> Female
Function, position	1) 2)
Place	
Duration	
Interviewer	
Remarks	
Other people than informant(s) present? Reason?	<input type="checkbox"/> Yes <input type="checkbox"/> No

Appendix 2: Guidelines for interviews with representatives of different stakeholder groups on potential and constraints for the involvement of local people in forest management

Indications and instructions for the interviewer are noted in *[square brackets and in italics]*.
Research site _____

Are you involved in forest management?	<input type="checkbox"/> Yes <input type="checkbox"/> No If yes, in which way? <input type="checkbox"/> CFM <input type="checkbox"/> Long term non-CFM leaseholder <input type="checkbox"/> Seasonal leaseholder If yes, since when? Year:
Remarks	

[Make clear that we are talking not only about CFM but also about other ways to involve local people in forest use/management (long term leases, seasonal leases, et cetera)]

[Make sure that you know precisely what the informant is talking about (CFM, involvement of local people in general, long-term lease arrangements other than CFM)]

Role of local people in forest use, management;

- Interest of local people in forest use, management;
- Non-interest of local people, who and why?
- Scope for decision-making?
- Scope for silvicultural interventions, active forest management by local people;
 - Sowing, planting (in existing stands, on open land);
 - Helping natural regeneration;
 - Grafting;
 - Tending (Russian: *rubki uchoda*);
 - Thinning (Russian: *kompleksni rubki*, complex fellings);
 - Sanitary fellings (Russian: *sanrubki*);
 - Infrastructure (e.g. shed on the plot, improve road to the plot, *et cetera*).
- Aspects of forest management local people are excluded from;
- Level of knowledge and experience of local people in forestry and related areas (e.g. agroforestry);
- Important gaps in knowledge held be local people regarding forest use and management;
- Capacity of local people to manage forest resources;
- Why are local people not more involved, get more responsibility?
- Experience with involvement of local people so far?
- Problems, difficulties regarding involvement of local people in forest use/management?

Role of *leshozes* in the involvement of local people in forest use/management;

- Important tasks of the *leshoz* supporting forest use/management by local people;
- Problems, difficulties regarding involvement of local people in forest use/management.

Institutional arrangements for the collaboration between *leshoz* and local people in forest use/management;

- Other ways to involve local people in forest use/management than the ones developed so far?

Interest of *leshozes* in involvement of local people in forest use/management;

- Interest of the *leshoz*?
- Benefit for the *leshoz*?
- Why should local people/should local people not get involved in forest management?
To which extent?
- Involvement of local people in the future;
 - Why or why not?
 - To which extent?
 - In which form?

Interest of other stakeholders than the *leshoz* (*Ail-Okmot*, Others: _____) in the involvement of local people in forest use/management;

- Interest?
- Benefits?
- Why should local people/should local people not get involved in forest management?
To which extent?
- Problems, difficulties regarding involvement of local people in forest use/management?

How have forests on the site the interview is conducted and the walnut-fruit forests at large changed during the past? Why?

Appendix 3: Questionnaire on characteristics of the household, the lease agreement and the household's livelihood system

Indications and instructions for the interviewer are noted in *[square brackets and in italics]*.

No. household _____

1 General household characteristics

Place

Name of the place of residence _____
 Village _____
 Municipality/rural commune (*Ail-Okmot*) _____
 State forest farm (*leshoz*) _____
 Forest range (in which the forest plot lays) _____

Household

	Senior male member	Senior female member
First name		
Surname		
Age		
Education C = Compulsory school; T = Professional technical school; H = Higher education		
Current occupation		

Total number of households members actually living here _____

Occupation in the past

- What used to be the main occupation of the husband and his wife during Soviet times?
- Has a member of the household been working in a agricultural farm (*kolhoz* or *sovhoz*) or the *leshoz*?
 - Yes No
 - If yes, where: *Kolhoz* or *sovhoz* *Leshoz*
 - If yes, give time span/ _____ and
 - Position(s) _____
- Did you undertake your own farming activities during Soviet times?
 - Yes No

Origins

	Senior male member	Senior female member
Place of birth		
Where did your ancestors come from?		
If you were not born at the current place of living, when did you come here?		
Ethnic group		
Clan		

2 Characteristics of the agreement with the *leshoze*

[questions to all informants]

- Type of agreement?
 - CFM
 - Long term lease
 - Seasonal lease
 - Other, specify _____
- Form of the agreement?
 - Written
 - Oral
- Do other people (i.e. from outside the household) have access to the plot, particular rights to use?
 - Yes No
 - If yes, for which uses, products?
 - If yes, who gives them the right?
- How do you feel about your lease agreement?
- How sure do you feel about the ownership of your leased forest plot?

[questions to CFM and other long term leaseholders (not to seasonal tenants)]

- Start of the lease? Year _____
- Duration of lease? _____ years
- Did you or your household use this plot (for example as seasonal tenant for nut collection *et cetera*) before taking up this lease?
 - Yes No
 - If yes, since when?
 - Year _____
- Why did you decide to apply for a leasehold?

3 Livelihood system of the household

Components of the farming system

- What agricultural, forest and other natural resources do you dispose of? [*Checklist: irrigated fields, non-irrigated fields, homegarden, orchard, forest plots, high pastures, haymaking plot, et cetera*]

What?	Surface (ha)	Distance from the house (km or walking/riding time)	Tenure 1 Own property 2 Individual lease 3 Shared lease 4 CFM 5 Others, specify	Remarks

- Which cattle, other livestock and poultry do you have?

Animals	Number	Animals	Number
Cows		Chicken	
Calves		Turkey	
Bulls		Ducks	
Horses		Geese	
Foals		Bees	
Sheeps		Others:	
Goats			
Yaks			

Remarks:

Technical equipment, machinery

- What technical equipment do you have? [*Checklist: tractor, trailer, plough, bulldozer, lorry, car, motorcycle, sidecar, et cetera*]

Economic activities of the household in general

- What sources of revenue and products for subsistence needs do you have in addition to your agricultural and forestry resources? [*Checklist: general forest, pension, child allowances, commerce, processing of agricultural products, paid position, remittances from household members working out of the household, craft, artisan, giving credits, et cetera*]

4 Notes

Indicators of wealth and social status

[Notes to be taken by the interviewer based on his observations; mark what is available, take notes, especially whether something dates from Soviet times or is more recent]

- | | |
|--|--|
| <input type="checkbox"/> Surface of the compound | _____ [are = 10 m x 10 m = 100 m ²] |
| <input type="checkbox"/> Total no. of living houses | _____ |
| <input type="checkbox"/> Total no. of rooms | _____ |
| <input type="checkbox"/> TV (Soviet TV or new TV set?) | <input type="checkbox"/> Yes <input type="checkbox"/> Soviet TV or <input type="checkbox"/> New TV |
| | <input type="checkbox"/> No |
| <input type="checkbox"/> Radio | <input type="checkbox"/> Yes <input type="checkbox"/> Soviet radio or <input type="checkbox"/> New radio |
| | <input type="checkbox"/> No |
| <input type="checkbox"/> Washing machine | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| <input type="checkbox"/> Fridge | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| <input type="checkbox"/> Furniture | _____ |

Observations concerning the status and role of the household or of individual household members within the village and society?

Appendix 4: Ranking and scoring exercises and guideline for interviews on the socio-economic significance of forest resources for local people's livelihoods

Indications and instructions for the interviewer are noted in *[square brackets and in italics]*.

No. household _____

5 Role of forest resources in the livelihood system (2002 + 2003)

- Please rank all your sources of revenues (cash, in-kind) and subsistence in order of economic importance for your household.
- Can you please lay 20 stones to the resources you use/economic activities of your household corresponding to the distribution of revenues (cash and in-kind) and subsistence goods which you got from these sources during the last year.

Source/economic activity	Ranking	Scoring	Remarks

- What is different in a year with good harvest from a year with no or only little harvest? What do you use the collected fruit mainly for? Are there things you can buy if there is a good harvest and you can not buy if there is none?
- What is the role of the leased forest plot for your and your family's life?
- Why do you value your leased forest plot?

Specific questions for 2003 (no walnut)

- In what ways is your and your family's life now, after the poor walnut harvest of autumn 2003, different from your life after the walnut harvest of the year 2002? What consequences does the low walnut harvest of the last season (= autumn 2003) have on your and your family's life?
- How did you react when you realised that the walnut-harvest in autumn 2003 will be poor? Have you adapted your economic activities when you realised that the walnut-harvest in autumn 2003 will be poor? If yes, in which way?
- Have you found a way to substitute the income from the walnut harvest? If yes, what way?

Appendix 5: Guideline for interviews on local knowledge related to forest management

Indications and instructions for the interviewer are noted in *[square brackets and in italics]*.

No. household _____

6 Local knowledge and innovation in forest management

Condition of the forest plot, problems, difficulties and risks

- How do you perceive the current condition of the forest plot?
- Are you happy with the quality and quantity of products you get from your forest plot?
 - Yes No
 - [if no spontaneous reply, probe on the most important products for the household including quality of the ground vegetation for grazing, hay making]*
 - If no, what are you not happy with?
- Do you have any difficulties, risks or problems that you face on your plot?
 - Yes No
 - If yes, which ones?

Male	
Female	

- Do you undertake anything to ensure that you get a benefit from your forest plot even in years with a low walnut harvest?
 - Yes No
 - If yes, what do you do? _____

Management of the forest plot in the long run

- How will you use your forest plot in the future?
 - Did you change or do you plan to change the use of some forest products?
 - What are your ideas or intentions for the use of the leased forest plot in the future (regardless whether these are consistent with the current forest policy or not)? Please explain why you consider them.

Ideas, intentions Change of use of forest plot, harvested forest products	Change made	Change planned	Reasons for change, reasons behind the new ideas
Male	<input type="checkbox"/>	<input type="checkbox"/>	
Female	<input type="checkbox"/>	<input type="checkbox"/>	

- How would you like your plot to be when you hand it over to your children or your grandchildren (i.e. in 30-50 years)?

[if no immediate reply is given ask informants to describe plot, stand composition, quantity and quality of products, et cetera ; ask for changes on comparison with the current state or use, separately by man and women]

	Description of the plot in ca. 40 years
Male	
Female	

- Are there other things regarding your forest plot which you would like to change or see changed

Yes No

If yes, please tell us what and explain why

Aspects of forest management	Reasons
1)	
2)	
3)	
...	

- Where did you get the new ideas for new uses and management of your forest plot from?

Source <i>[multiple entries possible]</i>	1)	2)	3)	...
- Idea of the informant <i>[mark sex with "m" or "f"]</i>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- From discussion with other household members	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- From residents of the village who are not foresters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- From <i>leshoz</i> staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- From non-foresters from outside the village	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- From foresters outside the village	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Duty of the tenant specified in the lease contract	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Others, specify	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Experiments, farmer trials

- Do you conduct any experiments, trials on your forest plot?

Yes No

If yes, which ones?

If no, do you plan to conduct any experiments?

What is your motivation, why did you start or do you consider starting such an experiment?

Experiment	Motivation
1)	
2)	
3)	
...	

- How did you get the idea for such trials? [*multiple entries possible*]

Source	1)	2)	3)	...
- Idea of the informant [<i>mark sex with "m" or "f"</i>]	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- From discussion with other household members	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- From residents of the village who are not foresters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- From <i>leshoz</i> staff	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- From non-foresters from outside the village	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- From foresters outside the village	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Others, specify	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Planting and protecting natural regeneration

- Do you plant trees or bushes on the forest plot?

Yes No

If yes, which species, where, and for what purpose?

Species	Where	Purpose
	1 close stand	
	2 open stand	
	3 open land	

- If you plant trees or shrubs, which factors do you take into consideration when you decide where to plant trees or shrubs?
- If you plant trees or shrubs, where do you get the seedlings from?
- If you do not plant trees or shrubs, please explain why
- Are you protecting natural regeneration?
- Yes No
- If yes, which species, how and why?

Species	Method of protection	Reason for protection

If no, please explain why: _____

Ecological and botanical knowledge

- Do you know which individual trees on your plot give good harvest and which do not?
- Yes No
- If yes, how do you know?
- By using which criteria do you get information on the quality of fruit (walnut, apple, cherry plum, *et cetera*) and the productivity of a given tree, even if there is no walnut?
- Are there different varieties of particular species on your plot?
- Yes No
- If yes, which ones and how do you distinguish them from each other?

Sources of knowledge

- How do you know how to conduct forestry activities in general
[if no spontaneous answer, probe on: own experience, parents, neighbours, other residents of the village, leshoz staff, newspaper, et cetera]?
- Does the *leshoz* or other people give you recommendations on how to conduct forestry activities?
 Yes No
- Do you receive any other assistance with forestry activities?
 Yes No
 If yes, what and from where?

What	Provided by

- Do you discuss forestry activities on your plot, forest use with other people?
 Yes No
 If yes, with whom?
- Household members
- Neighbours
- Other non forester residents of the village
- Leshoz* staff
- Others, specify: _____

Appendix 6: Guideline for interviews on forest use practices

Indications and instructions for the interviewer are noted in *[square brackets and in italics]*.

No. household _____

7 Forest use practices

Current use of forest resources

- What kind of activities do you undertake on your plot?
- Which products do you use on the forest plot?
- For which purpose do you use these products?
- How is labour for these forestry activities divided? Who does which kind of work?
- Which of the forest products you use do you value most? Please rank them and explain your preferences.
[write products used on 2 set of cards, ask woman and man to rank them separately according to their own preferences, note results and reasons in the table below]
- Which species, products occurring on your leased plot are currently not used? Please explain why you do not use these products

- Do you use forest products from the general forest (i.e. forest under *leshoz* management)?
 - Yes No
 - If yes, which ones? Please explain why you get them from the general forest.

Activities, use of forest plot, harvested products	Purpose	Ranking woman	Ranking man	Labor division <i>[Multiple entries possible]</i>						Used from the leased forest plot	Used from other parts of the forest (general forest)	Remarks
				Mostly adult male members	Male + female members equal	Mostly adult female members	Children	Grand-parents	Hired labour (costs)			
	1 Own consumption 2 Barter 3 Selling 4 In kind support to people outside household 5 Construction 6 Others, specify											

Remarks concerning ongoing forest use, additional information to the tables above:

Fuel used in the household, use of firewood

- What do you use as fuel in your household?
 - Firewood
 - Cattle dung, manure
 - Coal
 - Gas
 - Others, specify _____

- What do you use mainly as firewood?
[note preferences, multiple entries possible]
 - Dead, dry wood collected from the ground
 - Dead or ill bushes, trees
 - Felled green bushes, trees

- What species do you use for firewood? Which species do you prefer? Please explain why?

Species used ranked according to preferences	Reasons for preferences (fuel value, easiness to fell, to split, <i>et cetera</i>)
1)	
2)	
3)	
...	
Last place	

[Pay attention to the language: Do people use particular words to describe the qualities of these species? Do these words stand for groups of species with common properties? If so, please note]

Kyrgyz / Uzbek / Russian word	Characteristic described by this word	Examples of species

Grazing on the forest plot

- Does grazing take place on your forest plot?
 - Yes No
 - If yes, during which period of the year? _____
- By what kind of livestock? _____
- How many heads? _____
- Do you manage the grazing on the plot (limited to only one part of the plot, to a particular season, *et cetera*)?
 - Yes No
 - If yes, please explain how and why
 - If not, please explain why not

Way grazing is controlled	Motivation for grazing management

Appendix 7: Form for the market observation

Wholesale market:

Date of record:

Name of informant collecting the market data:

Product	Unit	Wholesale market price for producer [Som]	Remarks
---------	------	---	---------

1	Walnut	kg	
2	Walnut kernel	kg	
3	Lower quality walnut kernel (fragments etc.)	kg	
4	Wild apples	kg	
5	Cultivated apples	kg	
6	Yellow hawthorn fruit	kg	
7	Red hawthorn fruit	kg	
8	Pistachio	kg	
9	Almond	kg	
10	Rose hips	kg	
11	Dried rose hips	kg	
12	Honey	kg	
13	Mushrooms	kg	
14	Maize	kg	
15	Potato	kg	
16	Wheat	kg	
17	Egg	piece	
18	Meat (sheep/mutton)	kg	
19	Meat (beef)	kg	

Observations, remarks:

Weather conditions:

Currency rate (1 USD = x Som):

Date, signature member research team:

Appendix 8: Conversion table, converting ranks to scores

Converting ranks to scores

Scale for converting ranks to score adapted from (Abeyasekera *et al.* 2001)

No of items ranked	Conversion scale												Total score
3	Rank	1	2	3	-	-	-	-	-	-	-	-	-
	Allocated score	8	7	5	0	0	0	0	0	0	0	0	20
4	Rank	1	2	3	4	-	-	-	-	-	-	-	-
	Allocated score	8	6	4	2	0	0	0	0	0	0	0	20
5	Rank	1	2	3	4	5	-	-	-	-	-	-	-
	Allocated score	8	5	3	2	2	0	0	0	0	0	0	20
6	Rank	1	2	3	4	5	6	-	-	-	-	-	-
	Allocated score	8	5	3	2	1	1	0	0	0	0	0	20
7	Rank	1	2	3	4	5	6	7	-	-	-	-	-
	Allocated score	8	5	3	2	1	1	0	0	0	0	0	20
8	Rank	1	2	3	4	5	6	7	8	-	-	-	-
	Allocated score	8	5	3	2	1	0.5	0.5	0	0	0	0	20
9	Rank	1	2	3	4	5	6	7	8	9	-	-	-
	Allocated score	8	5	3	2	0.5	0.5	0.5	0.5	0	0	0	20

Please note:

- Where there were ties, average scores were allocated. Thus a rank of 3.5 occurring with 7 ranked items, was given the average score of 3 and 2, i.e. 2.5;
- The scores all add to the total of 20. So the data of each household is given the same weight regardless of the number of forest products (items) ranked by the household members;
- Forest products (items) that were not ranked by the informants were given a score of zero (0).

Appendix 9: Indicators used in the wealth ranking exercises

Locally defined indicators of poverty and wealth in rural Southern Kyrgyzstan

Results and summary of all wealth ranking exercises conducted by the researcher and his Kyrgyz colleagues in the course of their fieldwork on all the research sites (*leshozes* Arstanbap-Ata, Achy, Ortok and Uzgen).

Criteria used by local informants to categorise households into wealth categories (top ones used in all or nearly all wealth ranking exercises, bottom ones less frequently used)

- Livestock;
- Land resources for agriculture;
- Economic situation of the household;
- Availability of other sources of revenues than agriculture (commercial activities, paid employment, taxi driving, *et cetera*);
- Characteristics of the house and farm;
- Poultry;
- Availability of processing technology (mill, oil-press, *et cetera*);
- Availability of agricultural technology (tractor, lorry, *et cetera*);
- Availability of a private car;
- Size of household, number of children;
- Beekeeping;
- Access to forest resources;
- Work organisation;
- Social life;
- Education of children;
- Working attitude;
- Features of farming;
- Household strategy during the 1990s.

Additional criteria which some informants said they would take into account when considering whether a given household was poor or rather wealthy, but for which no details were specified for every wealth category:

- Health of household members;
- Diversification of the farming system and the overall economic activities of a household;
- Ability to plan work in a household and execute these plans;
- Technical knowledge in the important fields for the given household;
- Availability of irrigated farmland within the household's farming system;
- Inheritance.

