

# ENHANCING CLIMATE RESILIENCE IN SEMI-ARID REGIONS IN ETHIOPIA

## Experiences – Challenges – Lessons Learned

In the North of Ethiopia, where HELVETAS operates, climate variability is a harsh reality for small-scale farmers who are largely dependent on subsistence agriculture. Over the past 40 years, changes in climate patterns have been linked to erratic, less predictable and often shorter rainy seasons. At the same time, weather events have become more intense and frequent. As a result, farmers are constantly coping with the adverse impacts of climate change and variability. But there is a limit to their abilities to adapt: Most small-scale farmers are unable to afford and implement effective measures to adjust their production systems, take necessary risks and utilize up-to-date technologies.

This publication illustrates how HELVETAS supports women and men in semi-arid regions in Northern Ethiopia to make their livelihoods and ecosystems more climate-resilient, and to enhance their abilities to manage risks brought on by disaster. A number of leaflets on specific interventions to enhance climate resilience have been published alongside this publication.

HELVETAS

May 2018

## THE CHANGING CLIMATE IN ETHIOPIA

In Northern Ethiopia's Tigray Region and in the Wag-Himera Zone of the Amhara Region, the main risks associated with climate change are **rising temperatures and rainfall variability**, characterized by **timing** and **amount.** This includes the intermittence of rain, long or short dry spells, a delay in onset or an early end to rains, and the loss of an entire rainy season (ASSAR 2015). The resulting degraded landscape renders the ecosystem and its inhabitants particularly vulnerable. Inappropriate agricultural practices and poor management of natural resources – such as the ploughing of steep slopes or uncontrolled open access grazing – compound the negative impacts on the landscape. The aforementioned **vulnerabilities** are thus the result of a **combination of environmental, climate and human factors**.

**Climate change, a stress multiplier,** will make it even more difficult to achieve sustainable development objectives in Ethiopia. Its adverse effects will exacerbate poverty, increase food insecurity, escalate migration, and intensify conflicts over natural resources.

Agriculture in Ethiopia, the main source of income for more than 80 % of the country's population, is characterized by small-scale production patterns. As 95 % of agriculture in Ethiopia is rain-fed, strengthening the adaptive capacities of small-scale farmers to deal with variable rainfall has become vital. Even under "normal" conditions, about 10 % of the population cannot meet its basic food needs and instead relies on food assistance (ASSAR 2015, EPCC 2015). When taking into account the projections for Ethiopia – an expected rise in temperatures, an increase in the unpredictability of rainfall, and an uptick in the frequency and intensity of extreme events – a true sense of **urgency for climate action** is required (Agriculture Future 2013; World Bank 2010, UNDP 2008).

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A women head household farm the drought tolerant crop of pearl millet in Abergele, Wag-Himera (2017).

*« Nowadays, the rainy season belg, from March to June, is weak or even missing. »*

Ms. Abeba Hagos, Negash village, Tigray

In Northern Ethiopia and most of the eastern half of the country, farmers once relied on two rainy seasons. Today, they are left with only one, known as *kiremt* (June to September). *Kiremt* often begins late and ends early, and as a result, agricultural production has become unreliable. In addition, the low or failed rainfall during the *belg* season makes it almost impossible to grow cereals during this period. In the past, farmers managed to grow sorghum, barley and/or teff in April, harvesting them in September. This would allow them to grow another crop, such as chickpea or linseed, towards the end of *kiremt* season.

## FROM RISK TO RESILIENCE – RESPONSE TO A CHANGING CLIMATE

These concerns have compelled HELVETAS to address and include specific climate-sensitive interventions in its projects. The focus of the Tigray Region and Wag-Himera Zone projects has been on poverty reduction through livelihood promotion and natural resource management. To achieve these goals, HELVETAS has promoted interventions related to sustainable watershed management, improved agricultural production and increased household incomes, thereby improving food security. These interventions have both direct and indirect impacts on reducing the adverse effects of climate change and contributing to local climate resilience. HELVETAS has devoted time and resources to better analyse and understand exactly how the different project interventions contribute to climate adaptation and disaster risk management.

This publication is the result of an intense internal and participatory analysis in spring 2017 featuring HELVETAS project teams in Ethiopia and local partners, including government representatives and NGOs. The analysis was led by the Knowledge Management Officer in Ethiopia, and the Senior Advisor Adaptation to Climate Change in Switzerland.

## STRENGTHENING ADAPTIVE AND TRANSFORMATIVE CAPACITIES

With organisational development and capacity building at their core, interventions implemented by HELVETAS in Tigray and Wag-Himera fit into **three broad categories:**

**Ecosystem-based Adaptation** involves rehabilitating degraded and eroded watersheds into productive vegetation. It also includes the conversion of steep slope hillsides into arable land for agricultural production.

**Interventions supported by HELVETAS:**

- Intensive hillside development, including bench terracing (**Leaflet No. 1** – Reducing climate impacts and avoiding new risks with intensive hillside farming)
- Watershed rehabilitation
- Gully development

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**Water Resource Management** involves harvesting drinking water supplies from roof catchment areas where water is scarce and access remains challenging. It also includes the establishment of water storage facilities by creating opportunities to collect water or cultivate crops near farmers' homes. Some interventions also contribute to the recharging and retaining of groundwater, as well as enhancing and improving soil moisture and quality.

**Interventions supported by HELVETAS:**

- Roofwaterharvestingsystem:KalaminoCistern(**Leaflet No. 2** – The Kalamino Cistern as an effective measure for overcoming water shortages)
- Rainwater harvesting ponds
- Moisture conservation tillage
- Ring-basin infiltration pit (**Leaflet No. 3** – Ring-basin infiltration pits in smallholders' backyards to adapt to moisture stress)

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**Diversification and Increase in Income** incorporates improved agricultural practices for small-scale farmers. It also includes the introduction of new crops and adaptive seeds, as well as the promotion of non-agricultural activities, such as poultry production or beekeeping.

**Interventions supported by HELVETAS:**

- Perma-garden with double digging (**Leaflet No. 4** – Perma-garden in smallholders' backyards to cope and adapt to climate shocks)
- High-value and drought tolerant crops (**Leaflet No. 5** – Promotion of economic diversification and improved farming practices to adapt to climate variability and extreme weather events)
- Livelihood diversification (non-agricultural activities) (**Leaflet No. 5**)

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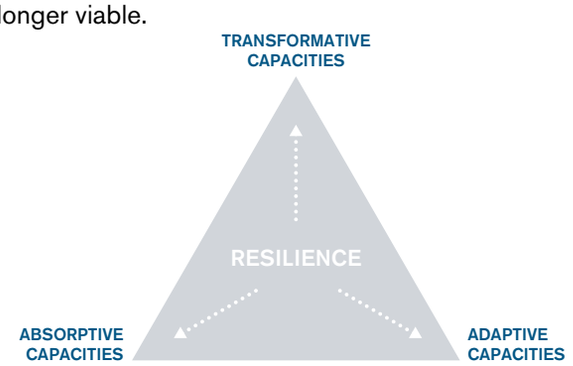
## Climate Resilience Framework

Resilience is not just about the ability to maintain or return to a previous state; it is also about adapting and learning to live with changes and uncertainty. The newer definitions highlight the capacity for reorganisation and transformation. Resilience is therefore both an ability to manage change in the context of dynamic systems, and a means to achieve a goal, such as food security or improved health. It is useful to think of resilience as a characteristic made up of three capacities:

**Absorptive capacity:** The ability to absorb and cope with the effects of shock and stress.
**Adaptive capacity:** The ability of individuals or societies to continue functioning as they adjust and adapt to shock and stress.
**Transformative capacity:** The ability to fundamentally change the system when its modus operandi is no longer viable.

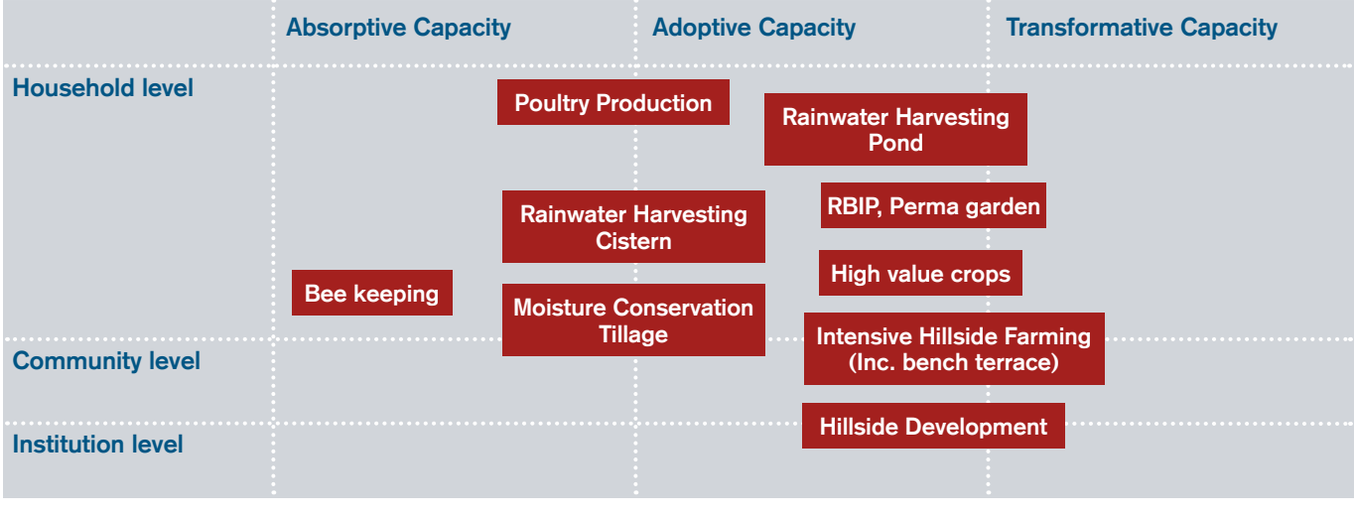



Source: HELVETAS (2017), https://www.helvetas.org/Publications-PDFs/topicsheet_resilience_en.pdf

After using the climate resilience framework to analyse the interventions, we learned that many interventions improve adaptive capacities at both the household and community levels, while simultaneously enhancing absorptive capacities during extreme events. For example, during the severe drought in 2015–2016, fodder for livestock remained available due to hillside development activities. This was a major benefit for more than 150 farmers living in this sub-watershed in Wag-Himera Zone's Gaqiwe kebele.

Some of the interventions also have potential to contribute to long-term transformative capacities within the household, up to the community and institutional levels as well. For instance, intensive hillside farming in the Wag-Himera Zone – where only about 15 % of land is arable and belongs primarily to older men – creates a sustainable production system featuring improved soil and water management that is then given to landless youth.

At the same time, the local government regulations in the Wag-Himera Zone limited land allocation to 600 m², rendering it difficult for these young people to support a household. However, HELVETAS has requested the government to increase the minimum land holding size to one quarter of a hectare per youth.




Source: Field analysis (2017) HELVETAS Swiss Intercooperation

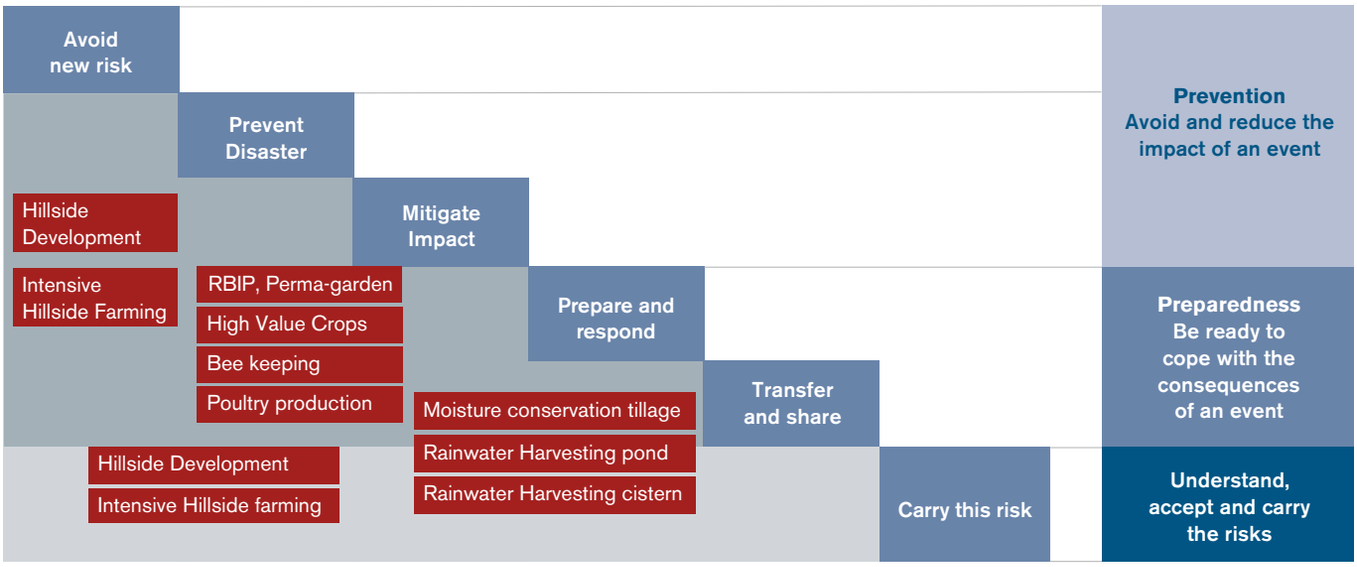
From a **disaster risk management point of view**, most of these interventions help in reducing the adverse effects of severe environmental degradation and drought, but they cannot prevent these events from occurring altogether. Some of the interventions also improve preparedness and response mechanisms during droughts or dry periods by stimulating income-generating activities and rain-water-harvesting technologies. For example, cisterns provide households with access to drinking water even when communal waterholes have dried out. If properly managed at the household level, cisterns are incredibly effective.

Ecosystem-based interventions, such as hillside development and intensive hillside farming, help mitigate the negative impacts brought on by climate change. If properly and sustainably managed by the community (by the woredas and kebeles, respectively) they also help avert new risks linked to land degradation and soil erosion. In Hagereselam in the Tigray Region, for instance, effective gully treatment has dramatically reduced the risk of losing farmland to flooding.

### Integrated Risk Management – Staircase

Risk response can vary considerably: Individuals and institutions can, for example, choose to ignore, accept, avoid, reduce, share or transfer risks. Each action leaves behind it a residual risk with which we have to live. The "risk staircase" provides a clear sequencing of risk reduction measures: Preventive measures are the starting point, followed by a mitigation of the impacts of disaster, and then a preparedness for future responses and risk-sharing mechanisms.

Source: Swiss NGO DRR Platform, adapted from SDC DRR Guidelines (2009)




Source: Field analysis (2017) HELVETAS Swiss Intercooperation

## MOVING TOWARDS ENHANCED CLIMATE-RESILIENCE AT THE WATERSHED LEVEL

The negative impacts of variability and change can be reduced by **increasing the efficiency of resource use at the watershed level,** which leads to improved capacities to absorb and adapt. The interventions presented in the climate resilience framework and in the disaster risk management staircase are both complementary and interdependent. It is not about choosing one particular capacity or response – it is instead about **diversifying options and enhancing the abilities of communities to choose the combination that works best.** Employing a combination of strategies also helps to diversify risk.

Adaptation to climate change in Ethiopia must address the challenge of having access to water at times vital for sustaining and improving crop production. To achieve this, communities must **maximise production in a good year of rainfall in order to keep a surplus for years when rainfall is low or even absent.** A ring-basin infiltration pit – where about 30 $m^3$ of water can be recharged to the soil profile per rainy season – is one example of a low-cost, efficient measure that allows small-scale farmers to cultivate high value crops and gain returns relatively quickly. Converting these resources into cash is an especially important strategy in a disaster-prone area, but at the same time, the cultivation of vegetable and fruit trees can contribute to an improved, diversified and sustained nutritious diet at the household level.

**When adapting to the changing climate, the promotion of adapted seeds is crucial.** Demonstration plots and trials help increase understanding as to how certain crops and seeds react to the changing climate, and which ones are particularly resilient. Over the last few years, HELVETAS initiated various trials with research institutions like the Sekota Dry Land Agricultural Research Centre to test new crop varieties and agricultural practices. However, adaptation measures must not concentrate exclusively on technical solutions. They must also focus heavily on social factors that contribute to awareness-raising and capacity-building. **Collective action and collaboration at the community and institutional levels** are key to enhancing resilience. Proactive measures in

the form of **asset-building at the community and watershed levels** – such as seed bank, food stocking and nursery, savings at the community level – must be in place. This becomes especially important in years when climate variability forces farmers to reseed, or in years characterized by small harvests or complete crop failure.

In the context of "climate-smart agriculture", adaptive capacities need to be strengthened and efforts must prioritize **low-carbon, climate-resilient development**. A number of practices – such as hillside development with a focus on improved soil nutrient management, as well as controlled grazing and regulated woodcutting – simultaneously **boost and improve agricultural productivity** while **contributing to mitigation** by reducing or stocking carbon.

**Innovation needs must go hand in hand with institutionalisation.** For interventions to successfully contribute to enhanced resilience and a preventive culture, long-term ownership must reside with local authorities. In this way, communities will be prepared before disaster strikes, and more capable of mitigating its impacts. Between 2011 and 2016 in the Tigray Region, HELVETAS facilitated land allocation of 2,646 hectares to 4,127 previously landless youth (32% of whom are women). In 2014 in the Ziquala District, HELVETAS piloted the advent of **moisture conservation tillage**. During an exposure visit the following year, the Zone Department of Agriculture understood the significance of the intervention, and organized a massive campaign to promote the practice throughout the Zone, where it has since been adopted to combat erratic rainfall (for more information on moisture conservation tillage, see https://www.helvetas.org/en/ethiopia).

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Ring basin infiltration pit (Feb 2016), showing how the intervention functions in severe drought; Gaqiew village, Wag-Himera Zone

## Some Overall Achievements

- **Institutionalization**: Watershed development is now managed by the Watershed User Association, a process initiated and facilitated by HELVETAS (see **Leaflet No. 1**).
- **Moisture Conservation Tillage**: This innovative initiative, led by HELVETAS in collaboration with the Department of Agriculture in the Wag-Himera Zone, employs technology that allows for a yield increment ranging from 33 to 47% (average of 38%).
- **Land allocation** of about 2,700 hectares to 4,127 previously-landless youth (32% women) between 2011 and 2016 in the context of hillside development (see **Leaflet No. 1**).
- **Social and Economic Empowerment of Women**: Women were equipped with improved agronomic practices, diversifying their methods while generating additional income (see **Leaflet No. 4**).
- **Increase in Income**: Farmers report an average increase of 15% in annual household income thanks to high value crops. In the case of ring-basin infiltration pits, an increase in income between 600 and 1,400 ETB (22–52 USD) can be achieved in the first year, and an increase of more than 2,000 ETB (73 USD) can be achieved in the second (see **Leaflet No. 5**).

*« It is now a key to enhance efforts to apply interventions more extensively and at a larger scale to ensure resilience not only for single households or communities but also for entire watersheds. »*

Ms. Abeba Hagos, Negash village, Tigray

**Climate change and extreme events have gender-specific impacts** and intensify constraints that are already placed on women. However, women are not simply victims of climate change and disaster. They are also powerful agents of change who play key roles in strengthening the resilience of their communities. The introduction of activities specifically oriented to women, such as permagardening and poultry production, coupled with the construction of household cisterns, has significantly reduced the workload of women and girls. According to women who now have cisterns, their daughters are now able to go to school regularly. Mothers make use of their additional time as well, to participate in community-based activities and/or to make additional income. Women-oriented interventions also help raise their self-esteem and contribute to social empowerment, while positively affecting shared decision-making at the household level.

The severe drought of 2015–2016 has reinforced the importance of a **nexus approach, linking relief, rehabilitation and development**, and highlighting the need for a strong and sustained link between humanitarian and development interventions in disaster-prone regions from the outset. To successfully contribute to enhanced, long-term resilience, aspects of **climate-sensitive** and sustainable development must be built into preparedness strategies and emergency response situations early on.

## Linking Relief, Rehabilitation and Development

**Increasing resilience in the longer term through climate-smart emergency response measures**

In response to the severe drought in 2015–2016, which lasted for over a year, HELVETAS initiated emergency response activities in the Wag-Himera Zone. One in particular – the introduction of the drought-resistant Madagascar beans – helped families make their first harvest just two months later.

The fast-growing crop, which can reach heights of up to 4m, offers shade for shorter crops and young fruit trees. In terms of nutrition, Madagascar beans are very rich in protein and contribute positively to a daily diet. Thanks to this climate-sensitive emergency intervention, households could make money within a very short period of time and overcame aid dependence within just a few months.

Lastly, in Ethiopia, **climate change is a significant "hunger-risk multiplier"**. The interdependencies between water use, climate and agriculture call for holistic and integrative tactics. A **cross-sectorial approach in policy-making** is integral in order to speak on these subjects with one, unified voice. The complexity of today's food systems requires all stakeholders – civil society, the private sector, governments and research institutions – to collaborate in addressing the needs of the agricultural sector. The role of organizations like HELVETAS is to bring these actors together, and to support collective action on the ground, as well as at the national and global levels.

*« I harvested 200 kg on a 20 m² plot, and I sold 150 kg for 6,100 ETB (221 USD) in 2017. Madagascar beans can be harvested throughout the year with irrigation. The earnings on the Madagascar bean were much better than sorghum harvested on a quarter hectare. »*

Mr. Abera Alefe, Fikreselam, Wag-Himera

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## HELVETAS SWISS INTERCOOPERATION

HELVETAS Swiss Intercooperation's goal is a fairer world in which every person can determine how he or she wishes to live and in which all people's basic needs are satisfied. HELVETAS Swiss Intercooperation believes in helping people to help themselves and in working together as partners in development. As a learning organization, HELVETAS Swiss Intercooperation critically assesses the impact of its endeavours and strives to make sustainable changes.

Our vision is a just world where all men and women determine the course of their lives in dignity and security, using environmental resources in a sustainable manner.

Our mission: Working with our partners, we support the efforts of disadvantaged people and communities in developing countries to determine the course of their own lives, thereby helping them to help themselves. In Switzerland we promote a spirit of solidarity among the public and we campaign for coherent policies that benefit people in developing countries.

**With thematic focus on:**


## HELVETAS Ethiopia

HELVETAS has been a committed development partner in Ethiopia from 1976 to 1983 and again since 2002. The mission of HELVETAS in Ethiopia is to promote and support innovative and sustainable development that improves livelihoods of economically poor and socially disadvantaged women and men.

HELVETAS deploys people centred, multi-stakeholder approaches, thereby building partnerships and capacity through facilitation, innovation and technical assistance, as well as alliances and networking for knowledge, and learning.

**Thematic areas of HELVETAS in Ethiopia are:**

- **Rural infrastructure**
- **Natural resources management**
- **Support to Civil Society Organisations and local government**
- **Skill development and education**
- **Emergency response**

## HELVETAS Swiss Intercooperation's work on climate change and environment:

### From risk to resilience

HELVETAS has built its work on climate change on the foundations of decades of work in sustainable resource management, empowering community institutions and forging partnerships, which are the basis for adapting to a changing climate. It has been working on adaptation and mitigation for the past 15 years, focusing on the sectors of agriculture, forestry, land use and, increasingly, water.

HELVETAS has been working towards ensuring that climate and development policies are mutually reinforcing at the local, national and global levels. The organization has been focusing on the interface between climate and development, aiming to reduce risks while moving towards increased resilience.

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