Best practices in

# LANDSCAPE MANAGEMENT

**Review of good practices in projects implemented within Czech Development Assistance in Ethiopia**

**between 2010 and 2020**

PEOPLE IN NEED CZECH REPUBLIC

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# LIST OF ABBREVIATIONS

| | |
|---|---|
| **AFS** | All for Soil |
| **CCR** | Charitas Czech Republic |
| **CzDA** | Czech Development Agency |
| **CGS** | Czech Geological Survey |
| **DAs** | Development Agents |
| **FTCs** | Farmers Training Centres |
| **GSE** | Geological Survey of Ethiopia |
| **GTP I,II** | Growth and Transformation Plan |
| **I/NGOs** | International / Non-governmental organisations |
| **IWM** | Integrated watershed management |
| **JICA** | Japan International Cooperation Agency |
| **KAP** | Knowledge, attitudes and practices |
| **MoARD** | Ministry of Agriculture and Rural Development |
| **MFA** | Ministry of Foreign Affairs |
| **MENDELU** | Mendel University in Brno |
| **MERET** | Managing Resources to Enable Transition to Sustainable Livelihoods |
| **NRM** | Natural resource management |
| **ODA** | Official development assistance |
| **PIN** | People in Need |
| **SMS** | Sector Matter Specialist |
| **WASH** | Water, sanitation and hygiene |
| **WAO** | Woreda Agriculture office |
| **WMCs** | Watershed Management Committee |

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**Photo on the cover:** Real gift campaign beneficiaries, Halaba, 2011; author: Jan Svitálek

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# 1 CONTEXT OF THE PUBLICATION

Wind erosion in Halaba Special Woreda, 2011

# 1.1 Czech development cooperation in Ethiopia in short

Ethiopia and the Czech Republic share a long history of mutual cooperation which includes humanitarian aid, scholarships, development cooperation, business relations, among others. The objective of this publication however is to present the experience of successful implementation of development projects with a focus on the management of natural resources (NRM) arising from the cooperation between these two countries. Ethiopia, as the vast country with the economy generating income mainly from agriculture, is highly dependent on its natural resources, namely soil and water. Therefore, the importance of the conservation of these resources in the country is deeply related to sufficient food production, stability, the well-being of the population and sustainable development.

Wheat field with erosion gully, Alaba, 2020

## Exploited lands

As discussed further in detail, Ethiopia is facing the impacts and consequences of extensive deforestation which accelerated significantly between 1960s to the 1980s and Ethiopia during these years basically lost - according various sources - 60-70 % of its forests' coverage. This was mostly due to the needs of the growing population and the agricultural sector. This resulted in problems such as disturbed landscapes, massive erosion, the loss of productive soil, and famines. All these problems were also linked to agriculture, where Ethiopia was not able to meet production standards, adequately feed its population and overcome poverty. The trees which were intended to help reduce carbon dioxide and the effects of global warming and climate change were gone. It was at this point when all of the similar NRM initiatives began as an effort to address the challenges that Ethiopia was increasingly facing due to deforestation.

So, the NRM programs, and the climate smart programming implemented later on, have actually been part of an Ethiopian strategy for many years, now it has become more obvious, not only in the country's Growth and Development Plan, but also as part of the Green Legacy Initiative in Ethiopia, which is a campaign that supports yearly afforestation movements across Ethiopia.

**60-70%**

**of its forests' coverage lost Ethiopia from the 1960s to the 1980s.**

The first reforestation projects financed from the Czech official development assistance (ODA) budget were realized in Ethiopia started in 2008. These projects were implemented under specific sectoral ministries of the Czech Republic. This publication, however, is mapping first of all the experience of projects which were realized since the formulation of the first Memorandum of Understanding between the Czech Ministry of Foreign Affairs and the Ethiopian Ministry of Finance and Economic Development (MoFED)[1] and in 2011 that led to the classification of Ethiopia as a priority country for Czech development cooperation and, subsequently, the formulation of bilateral Development Cooperation Programmes for the periods of 2012-2017[2] and more recently for 2018-2023[3], under the supervision of the Czech Development Agency (CzDA).

## Setting priorities

The objectives of the initial program period prioritised social development (education and health),

Plowed field in Lebu Koromo kebele, 2010

agriculture (forestry and fishing) and the environment (water and disaster risk reduction). The subsequent strategy then stressed even more the importance of environmental resilience in the context of Ethiopia, by formulating three key objectives:

## I. Agriculture and rural development

Ensuring universal access to safe, nutritious, and sufficient food at all times of the year; introducing sustainable soil and landscape management strategies.

## II. Sustainable management of natural resources

Ensuring universal and equal access to safe and affordable drinking water and to adequate sanitary and hygiene facilities (with special regard to the needs of women, girls, and young children); building sustainable drinking water supply systems.

## III. Humanitarian assistance

It stated clearly that the programme strategies of the NRM agenda are closely interlinked with sectors of environment, agriculture, and water accessibility. Over multiple project cycles, many improvements had been made in terms of the programme design and in terms of aligning the strategies and harmonising the approaches among the Czech and Ethiopian partners. The major improvements can most clearly be seen in the area of coordination in terms of:

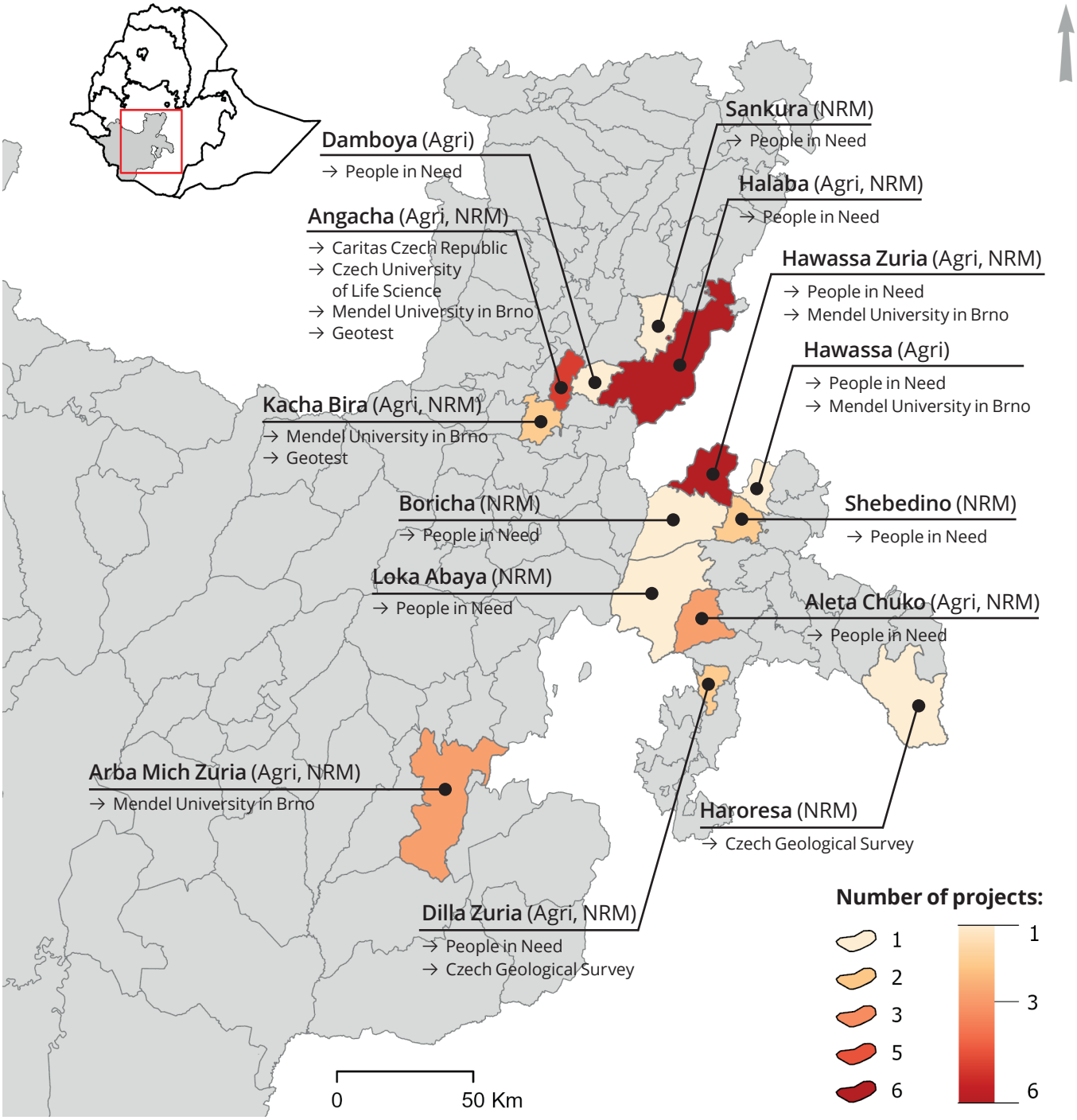
- → **geographical coordination** – projects were gathered in the same or neighbouring areas
- → **integration of sectors** – projects with different scope were integrated together in one area

Examples of good practice from the Czech development assistance can be seen among projects which were realized in Sidama, Gedeo and the Halaba zone. These projects combine the focus on appropriate NRM techniques, afforestation, good agricultural practices, climate smart agriculture and most of them are related CzDA projects in the Water, Sanitation and Hygiene sector (WASH) which are dealing with water supply, the rehabilitation of water sources, and sanitation in communities. Through this integration, projects have a very positive impact on entire villages and communities as they solve many challenges simultaneously. Besides the direct benefits to the local population, the water source either for the nurseries or fields are established and maintained, so the forests and agriculture production can prosper, as does the socio-economic situation of the areas as well.

The next step for the future within the mutual cooperation of CzDA and Ethiopia would be the overall integration of projects focusing on the comprehensive development of a particular area, the sharing of best practices by neighbouring woredas or zones (learning by doing) and the integration of commonly used indicators used for monitoring and evaluation purposes. Not to forget, building on the good practices collected so far.

1 Memorandum of Understanding between the Czech MFA and the Ethiopian MoFED
2 Development Cooparation Programme of the CzDA – 2012-2017
3 Development Cooperation Programme of the CzDA – 2018-2023

# 1.2 Projects implemented in the timeframe 2010 – 2020



# 1.3 Key implementing agencies

**Ethiopia and the Czech Republic enjoy a long history of cooperation and a variety of stable partnerships namely on the institutional level or in technical transfers. Soon after the establishment of the CzDA in 2008, new programs of bilateral cooperation had been initiated in 2010, smoothening the cooperation, and allowing multiple partners from both sides to provide also the direct assistance to vulnerable communities including those imminently affected by environmental degradation and related challenges.**

## People in Need Ethiopia

People in Need has had a stable, institutionally established mission in Ethiopia since 2003. The mission is led by a country director and has several departments ensuring the mission set up. Besides CzDA, People in Need enjoys support from multiple donors, including the EC, DFID, ECHO, OCHA and a variety of national and private donors.

During this time, the character of the implemented projects has changed, as have the sectors covered. Initially PIN was supporting the educational sector, later on WASH projects were included together with agriculture, social programmes, and humanitarian aid. Nowadays there are four main programming areas in Ethiopia including various long-term projects.

→ Environmental and Livelihoods Program
→ Water, Sanitation and Hygiene Program - WASH
→ Education and social programme
→ Emergency assistance

PIN is implementing the NRM projects based on the internally formulated strategy of sustainable livelihoods and environment (global) and the Environment, Livelihoods and Agriculture Program Strategy, both of which were formulated for 2015 – 2020.

## MENDELU

Mendel University in Brno (MENDELU) has been working in Ethiopia since 2010.

Over the 10 years of experience it has a sound record of successful development projects and interventions in Ethiopia that respond to the global as well as local environmental challenges (see the table in the Annex 1 for all projects realized under the Czech Development Agency during the GTP I and II phases).

The focus has been on NRM and agriculture in the Southern Nations, Nationalities and Peoples' Regions (SNNPR), specifically:

→ Reforestation and forestry restoration, agroforestry, and non-timber production
→ Management of protected areas, the rehabilitation of soil and its management
→ Water management and irrigation
→ Climate smart agriculture practices

# Partners from Ethiopia

**Hawassa University**
Hawassa University is the biggest university in the SNNPR state. Between 2017 and 2020, Awassa University has been implementing one NRM project collaboratively with PIN - "The Participatory Development of a Productive Landscape in Sidama". The university implemented some of major project activities such as: the capacity building of technical farmers to make sure that the beneficiaries are actively involved in the rehabilitation of degraded lands and in regularly promoting the Ethiopian Government's campaigns for the rehabilitation of degraded catchment areas, afforestation, etc.

**Wondo Genet College of Forestry**
The Wondo Genet College of Forestry and Natural Resources is a college situated in Shashemene, Oromia region, Ethiopia. Mendel University cooperates with Wondo Genet College in holistic management, climate smart agriculture, pastoral farming, agroforestry, afforestation, etc.

**Arba Minch University**
Arba Minch University is a national university in Arba Minch, SNNPR, Ethiopia. Mendel University cooperates with Arba Minch University in the fields of holistic management, climate smart agriculture, consultation in agriculture, pastoral farming and agroforestry, cattle care, afforestation, and seedlings.

**MERET**
MERET (Managing Environmental Resource to Enable Transition to more sustainable livelihoods) is a project operating in five regions and 72 woredas in Ethiopia. In the current phase, the project deals with soil and water conservation, reforestation and re-vegetation activities, the closure and management of degraded lands, water harvesting, low-cost soil fertility management, agricultural intensification around homesteads, income generating activities, feeder road construction and maintenance, and local capacity building at different levels.

# Other partners

**Czech Geological Survey**
The Czech Republic and Ethiopia maintain a longstanding cooperation in the field of geology. It dates back to late 1970s with the exchanging of experts between the Geological Survey of Ethiopia and the Czech Geological Survey. In 2019, after forty years of cooperation, CGS and GSE achieved the milestone of completing the hydrogeological mapping of the whole territory of Ethiopia. In 2012, CzDA started to support surveys related to the mapping of geological risks, soil mapping, the prevention of landslides, monitoring seismic activity and overall development of the capacities in geo-hazard mapping, landscape management and monitoring.

**Charitas Czech Republic (CCR)**
CCR is a Czech branch of the international Charitas network, providing both emergency relief as well as development assistance. It is active in a majority of the priority countries of the CzDA and also supports the bilateral programming in Ethiopia through its local network. It's support of small-scale farming in the Kembata Tembaro zone highlighted the importance to integrated watershed management in relation to food security.

**Holistic Solutions**
Holistic Solutions is a Czech company focused on technical consultations and providing comprehensive services in the field of environmental protection, agriculture, and technology innovations. In Ethiopia, the company contributes to the sustainable agricultural activities of local farmers, access to drinking water for people and livestock, simple irrigation system for small-scale farmers, the developing of solar dryers for fruit, the protection of Lake Hawassa, as well as the rehabilitation of Hawassa's city parks.

**All for Soil**
All for Soil is a Czech NGO specialised in the field of soil and water conservation management in SNNPR region. In Ethiopia it directly addresses the importance of landscape management in practical use by preparing and communicating advanced GIS and Remote Sensing analysis to local authorities and partners through preparation of thematic map materials, various workshops and training sessions. The main activities and focus of AFS are soil quality analysis, mapping and monitoring of natural resources, soil and water conservation management, landscape modelling and advanced GIS and remote sensing analysis.

# 1.4 Relevant strategies in Ethiopia

## Growth and Transformation Plan

In GTP I (formulated for 2010/11[4] – 2014/15), it was clearly indicated that the agricultural sector would continue to be the main source of economic growth for the country. Within this sector the NRM was defined as the sub-sector. When looking on NRM from the broader perspective it is clear that the strong link with agriculture must be taken into account. GTP II has been formulated for the period 2015/16 – 2019/20 and basically follows the structure of GTP I. NRM is the sub-sector of agriculture and rural transformation and it fits there from the reasons which were presented in the previous chapter.

There are three main goals and they are described as follows and further elaborated at the second part of this chapter:

→ the development of smallholder crop and pastoral agriculture will be further enhanced and hence will remain the main source of growth and rural transformation during the GTP II[5] period;

→ provide all around support to educated youth to enable them to organise and engage in agriculture investment;

→ enhance the provision of the necessary support for domestic and selected foreign investors taking their capacity into consideration to enable them to participate in transformative agriculture sub-sectors such as crop, flower, vegetables and fruits and livestock development;

→ further pursue the implementation of the scaling up strategy as suitable to the various agro-ecological development zones; and

Harvest treshing in Halaba, 2011

> ***"Ensuring sustainable agriculture through the development of natural resources, aligning the agriculture development plan with the green economy development strategy coupled with the expansion of irrigation developments are the strategic directions to be pursued with regard to natural resource conservation and management."***

→ the pursuit of holistic measures aimed at addressing the constraints and challenges related to the supply of agricultural inputs and the utilization of agricultural technologies.

These points could be summarized by the formulation of the objectives gathered from the GTP II document: "Ensuring sustainable agriculture through the development of natural resources, aligning the agriculture development plan with the green economy development strategy coupled with the expansion of irrigation developments are the strategic directions to be pursued with regard to natural resource conservation and management".

4 https://www.greengrowthknowledge.org/national-documents/ethiopia-growth-and-transformation-plan-i

5 https://ethiopia.un.org/en/15231-growth-and-transformation-plan-ii

**i The particular targets:**

**Crop Farming and Pastoral Development** section of GTP II, includes following targets related to NRM:

- → Crop productivity and production
- → Coffee productivity and production
- → Horticulture productivity and production
- → Livestock productivity and production
- → **Natural resources conservation and utilization**
- → Improved production and productivity through strengthening demand driven agricultural research works
- → Improved sustainable national biodiversity conservation and equitable benefit to the community
- → Food security, disaster prevention and preparedness

## Community-base Participatory Watershed Development Strategy

Following the trending international initiatives of the Food and Agriculture Organisation and the World Bank in early 2000s, the Ethiopian government developed a variety of strategies and guidelines, addressing the climate actions and stabilisation of the natural resources in the landscape. In 2005, the Federal Ministry of Agriculture and Rural Development (MoARD), issued the Guidelines and methodology for integrated watershed development – "Community-based Participatory Watershed Development".

Integrated Watershed Management (IWM) is an approach that uses collective action by a group of people reliant on a watershed area to proactively manage the resources and natural community assets within the area. This includes actions to carefully manage the surface water (rivers, streams, lakes, and ponds) and groundwater (shallow and deep wells) within the watershed, as well as mutual agreements on resource use, including the use of surrounding land for agriculture and livestock grazing. As a result, IWM activities are happening all around Ethiopia with

Worker in Argeda nursery, Sidama 2019

different success rates. Many NGOs are conducting NRM measures to protect the scarce land and preserve it for the people and needed production. The common recommendation of the actors involved in such projects is that the duration should be long term as only couple of years is not sufficient and these programs are complex in nature which results from the description above. Ensuring the funding for it should be a common effort of the donor and recipient country.

This publication is intended to be an introduction to the common NRM practices (as part of IWM strategies in Ethiopia/GTP II) that are being used in Ethiopia. The practices are well known among actors involved in IWM however the methods of execution differ. These practices must be put into the context of the specific geographic area, not the administrative borders. Then the placement within the landscape must be considered and at last people must be determined and well trained to understand the need for maintenance and further management of NRM.

## One WASH

In 2013, Ethiopia has introduced a unique program called One WASH, outlined in the WASH Implementation Framework launched in 2011, aiming to make significant improvements to the harmonization, coordination, and monitoring of water supply initiatives. The Ministries of Water, Health, Finance, Education, and a network of private development partners are trying to tackle the water and sanitation crisis. This program primarily focuses on the rehabilitation of water resources and the overall coverage of the country in terms of water, however the other components like sanitation are included. The evidence of water sources is being mapped jointly by different actors and their databases are included and are providing data on the functionality of water sources, however these are not standardized among the implementors and regions. One WASH could represent an example of similar initiatives that could happen in IWM and would be a great example of intersectoral integration.

## Climate Resilience and Green Economy Strategy

Ethiopia is experiencing the effects of climate change. Besides the direct effects, such as an increase in average temperature or a change in rainfall patterns, climate change also presents the necessity and opportunity to switch to a new, sustainable development model. The Government of the Federal Democratic Republic of Ethiopia has therefore initiated the Climate-Resilient Green Economy (CRGE) Initiative to protect the country from the adverse effects of climate change and to build a green economy that will help the country realise its ambition of reaching middle income status before 2025. The objective is to identify green economy opportunities that could help Ethiopia reach its ambitious growth targets while keeping greenhouse gas emissions low. The government Intends to attract development partners to help implement this new and sustainable growth model.

**72%**

**of Ethiopians rely on farming or are employed in agriculture.**

## Reforestation campaigns - Green Legacy Ethiopia

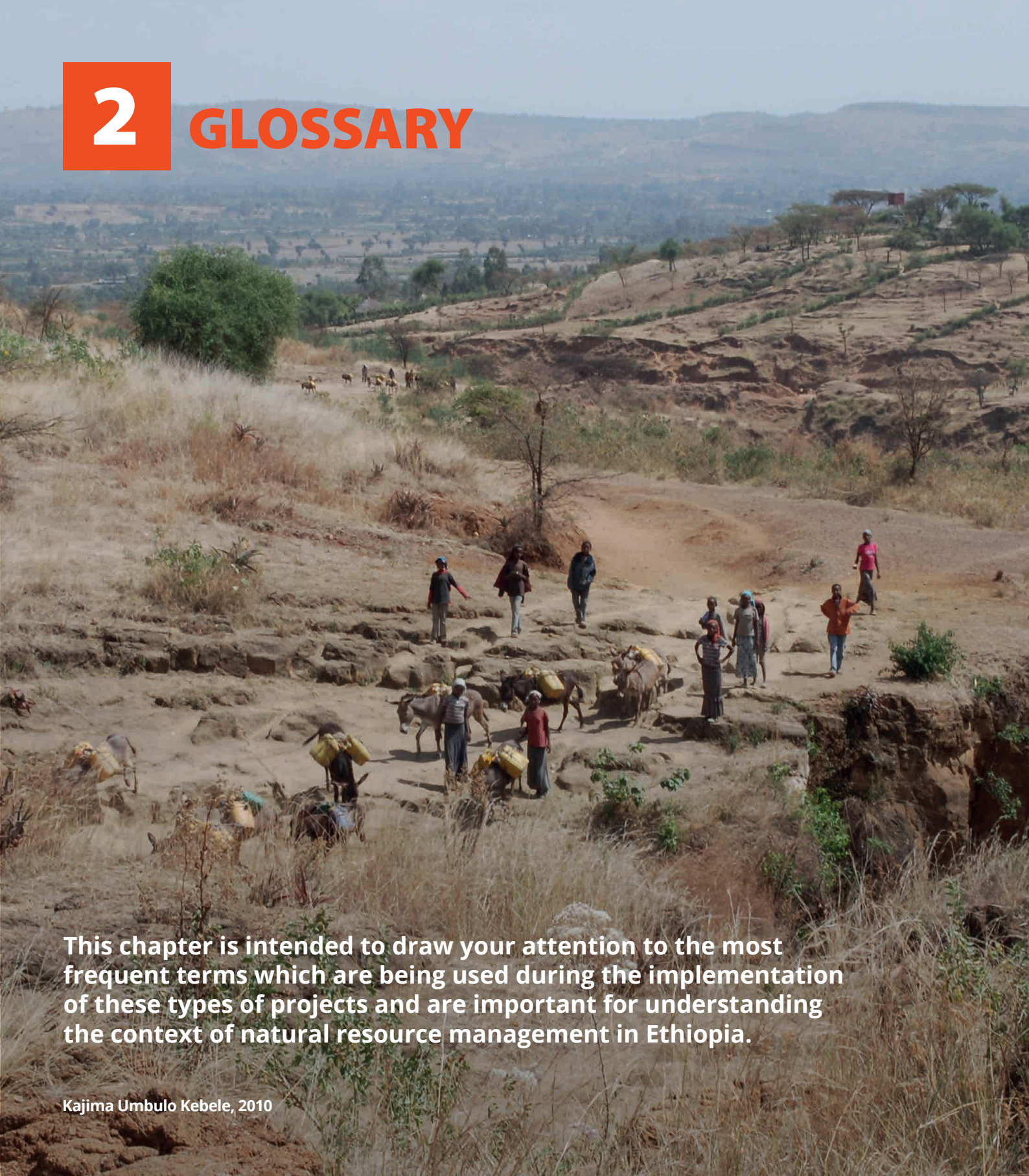
Through the Green Legacy campaign, Ethiopia is targeting the ghosts from the past during which Ethiopia has lost three quarters of its forested areas over the last 60 years. The campaign was launched in 2019, with a demonstration in 2020 on June 5th in Hawassa by prime minister Abyi Ahmed. This campaign is presenting the effort of Ethiopia to sustain biodiversity and its commitment to green, climate resilient growth. It is great to see an underdeveloped country approaching development this way as many developed countries are still denying the need for a climate resilient economy. Ethiopia has planned for a huge number of trees to be planted (20 billion over the next 4 years), but even if the targeted survival rate which will be hard to verify, the effort should be appreciated and supported.

It is also necessary to point out that the Green Legacy Initiative is nothing new to Ethiopia. The afforestation efforts have been happening regularly every year as part of so-called watershed campaign around July during the Meher (i.e. the long rainy season). The watershed campaign mobilizes people all across the country to work on NRM measures including tree planting that usual start in July with the rainy season in Ethiopia. These watershed campaigns are followed and supported by many donors, including CzDA, as the seedlings production is cost demanding and wouldn´t be possible to such a large extent without external funding.

Planting trees, but especially ensuring the survival of the seedlings, wouldn´t be possible without additional activities which must take place jointly. Rivers, ponds, or water reservoirs in the vicinity must be established for the irrigation purposes, or the ground water recharged through various NRM measures. These activities are usually also supported in development projects and must be seen as an inseparable part of these initiatives.


Kajima Umbulo 2010 - 2018

# 2 GLOSSARY



**This chapter is intended to draw your attention to the most frequent terms which are being used during the implementation of these types of projects and are important for understanding the context of natural resource management in Ethiopia.**

Kajima Umbulo Kebele, 2010

# 2.1 Institutions

## Woreda Office

Is the basic administration unit serving multiple communities (kebeles). It fulfils the role of governance, coordination, planning and monitoring to the lowest level of kebeles of particular woreda. The structure is similar to the whole state apparatus. On each level we can find specific woreda offices with a certain purpose (WAO – woreda agriculture office, WHO – woreda health office, WWO – woreda water office, etc.)

## Watershed Management Committees

Exist in each kebele but the level of their activity varies. These committees are primarily established to monitor the situation in the watershed and are involved in the works during watershed campaigns. They should also be involved in maintenance and rehabilitation works. The level of the technical knowledge among members varies which is very visible and essential during the performed works in the watershed.

## Development Armies

Is the name for a group of people, usually volunteers who are willing to advise their respective community on a certain topic which is currently being promoted under governmental strategies. They also invest their free time to visit people from the kebele to check on how they are doing, if they experience any difficulties with the promoted topic. Such topic might be focused on malnutrition or issues like fertiliser usage, building terraces, etc. For specific purposes, the Development armies breakdown into a more specific development group either according the topic or for practice reasons such as the coverage of a given community.

## Model & Technical Farmers

There is a division in every woreda and kebele which exists for the classification of farmers. Despite some standardisation efforts, the specific selection criteria and definitions differs across kebeles. This fact complicates the work of development workers and also make the evaluation and monitoring more difficult, as we get slightly different data from different kebeles based on what these farmers are responsible for. Nonetheless, a model farmer is a farmer who is the role model for other farmers in the neighbourhood. He/she is usually responsible for 5 other farmers and their responsibilities lie in transferring the good practices or know-how in agriculture like the usage of fertilisers, conservation agriculture and other modern methods which are also promoted on the level of FTC. Technical farmers sometimes are misinterpreted as model farmers which complicates the classification even more. But generally technical farmers are supposed to be those who are able to give advice on technical issues like building erosion-control structures, managing the drip irrigation, etc. Similarly, like model farmers, every technical farmer should be responsible for five ordinary farmers in a given neighbourhood.

## Productive Safety Net Program (PSNP)

In reaction to persisting food security in some areas PSNP had been initiated in 2005 in order to prevent household asset depletion and create community assets among most vulnerable households. With assistance from Development Agents, the system monitors the situation of individual households and triggers the public works in cases of urgent need. For participating in the public works, the beneficiaries are granted cash, food, or agriculture materials. This program has a high level of relevance to activities related to NRM as the most common works are usually done during annual campaigns related to agriculture. Typically annual watershed or irrigation campaign organised for works in degraded and rehabilitated community areas.

Corn field by erosion gully, Awassa Zuria, 2011

Kajima Umbulo Kebele, 2010

# 2.2 Landscape

## Pastures

Ethiopia suffers from overgrazing. Cattle, goats, and sheep are found basically on all types of land and significantly contribute to land degradation. The variety of pastures ranges from those in densely populated areas in the Ethiopian highlands, where more sedentary livelihoods are common to arid extensive pastures which are populated by pastoralists that are at times even nomads. In both contexts, at present these pastures are usually overexploited as extensive farming is still broadly applied in Ethiopia instead of more suitable forms of intensification. In densely populated areas, the trend is set for the fodder production and adoption of cut and carry system.

## Forests

Ethiopia has a broad variety of the ecosystems, from deserted arid areas through bushlands and savannas, alpine vegetation, to tropical humid riverine forests. The definition of a forest in Ethiopia is therefore complicated and broad at best. Nonetheless, Ethiopia lost its forest cover in whatever form over the last six decades and this loss is responsible for most of the problems with land degradation and loss of the productive soil, the decrease in agriculture production and the infertility of the land.

## Fields

Related to the problem of land degradation also the fields are being affected. One of the most significant problem is loss of fertile land which is being washed away when no erosion-control measures are applied. This does not only concern the fertility of the land, but also how it decreased the quantity of soil. Families are facing problems that their fields are not able to provide them with sufficient quantity of food and because of decreasing land area farmers are no longer able to plant sufficient crops. Ethiopia within the watershed campaigns should shift the focus from the communal land to the private land and farmers' fields to protect the productive soil from further loss. This can and is being slowly done by protective (physical and biological) measures on private lands, rotation of crops, etc.

## Erosion gullies

Erosion gullies are visible in almost all parts of Ethiopia. Formed as the result of land disturbance, they are most often created because of the loss of natural cover like forests, which makes the soil more susceptible to water and wind erosion. Gullies represent a serious threat to people, land (fields) in this case they are not treated properly can expand several centimetres every year due to the rains. Gullies are absorbing the soil from neighbouring areas thus making walkways or fields smaller and unusable.

Besides the soil loss and increased threat of flash-floods, the gullies have become a vivid evidence and feature of Ethiopia's fragmented landscape often creating a significant problems when it comes to the movement of people, or development of infrastructure (roads, pipelines).

# 2.3 Infrastructure


Practical training at FTC

## Farmers Training Centres (FTCs)

These are units established under a woreda agricultural office (WAO). Each kebele should have an FTC within its administration area. An FTC serves as the training centre for particular farmers and is responsible for their training and direct support on their fields and cooperation during governmental campaigns. They are also responsible for the presentation of innovative techniques and direct demonstrations of agricultural practices on demonstration fields. They employ Development Agents responsible for the dissemination of best practices among farmers and close observation of the works taking place in farmers' fields.

## Nurseries

There are several types of nurseries but the most common ones are the governmental district nurseries. They are responsible for the sufficient production of tree seedlings which are then usually used for the plantations involved in governmental campaigns, usually on degraded lands and the production is planned based on the inquiries from particular kebeles. When the funding is ensured the workforce, materials, seedlings, and other consumables are usually used efficiently to produce the large numbers of needed seedling. Nonetheless, the governmental nurseries are not profitable and heavily dependent on the external governmental and often international funding. Very few profitable private nurseries provide the services in the targeted areas.

**18 000**

**More then 18 000 FTCs Farmers Training Centres were established all over the country by 2019.**

## Closure areas

Present one of the non-technical institutional erosion control measures. Most of the closure areas are established on degraded lands. Access and use of such areas is limited by administrative measures (bylaws, community agreements) and physical measures (guards, fences). Management of the areas is intended to be established from the very beginning in some of the areas while some are simply closed and left so that they can regenerate naturally. The primary goal desired by the community is to rehabilitate the grass cover, so the cut-and-carry system can be restarted and grass could be either sold or used as fodder. The concept of closure areas serves both the rehabilitation of degraded land and it is one of the first steps on the way of transitioning from extensive to intensive farming, while creating complementary livelihoods like beekeeping, fruit production, etc.


Woreda nursers in Halaba Kulito

# 3 RESPONSE OF CZECH COOPERATION

Colletion of soil samples by AFS, Lebu Koromo, 2018

# 3.1 Key topics in NRM to CzDA's project teams

The results of GTP I suggest that the main target within the agriculture sector was to bring a shift from subsistence farming to the production of high value agricultural products. These resulted in an average real agricultural GDP growth rate of 6.6% per annum during the plan implementation period which was below the planned 8 %, suggesting that the sector was still underperforming, despite the application and promotion of improved seeds, inputs, and techniques in agriculture. One of the primary reasons behind this, is the **excessive exploitation of natural resources**, including deforestation, that further fuel the ongoing degradation of fragile soils and their loss by heavy water and wind erosion.

Another reason for not reaching the targets is also seen in **insufficient scaling up of the knowledge among the network** of Agriculture Development Armies i.e. the local community actors that are supposed to scale up the use of recommended technologies and know-how. Actually, the concept of Development Armies, regardless of how they are being used, is a key modality for the dissemination of good practices in Ethiopia. Therefore in the subsequent GTP II, this is seen as the key instrument of moving from subsistence farming into the production of commercial crops. The concept of these community networks is quite suitable to the context and culturally also well accepted. The issue here is again the quality of the work, skills and knowledge which is being transferred through this network as it might hinder the attainment of the end product.

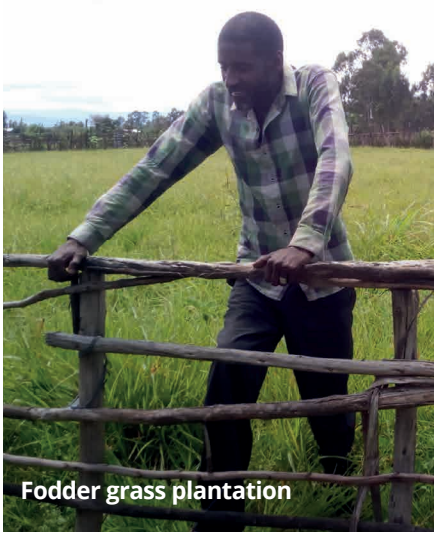
## Technical support

All in all, the steps for natural resource conservation and development that were performed during GTP I are still considered to be a success. Therefore, the authors of the GTP II followed with the same practices, while addressing main gaps.

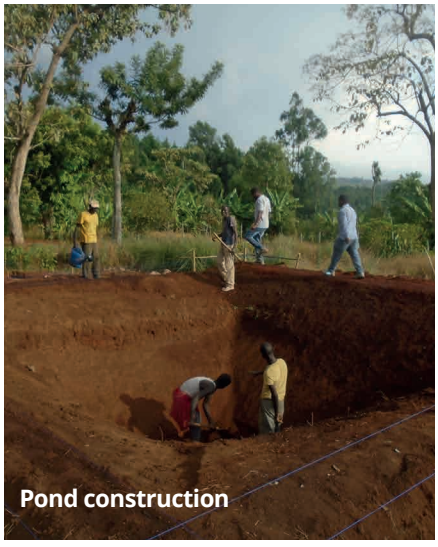
**i The particular targets:**

By the end, in GTP II section on "Crop productivity and production", NRM actions fall under three areas:
→ rural land administration,
→ watershed management and
→ expansion of small-scale irrigation.

When it comes to the CzDA's NRM programming, most of the projects in last decade fell under the strategic area of **watershed management** and targeted primarily the direct field works in the affected and degraded areas and supporting the communities through agriculture development armies in activities like establishment of the closure areas, the application of biological measures or physical constructions of erosion control infrastructure with the complementary support to the production of the tree seedlings in nurseries. More details in Chapters 3.2 and 3.4.


Fodder grass plantation


Seedling transport


Pond construction

Alaba beneficiaries feedback


Grain mill installation


Instalation of irrigation in Ramada

Along with the implementation of these technical activities, all implementing teams provided a variety of technical expertise in related specialisations (nursery production, reforestation, gully treatment, soil works etc.) as well as the support and guidance to various actors in the community – Development Armies, Technical Farmers, Model Farmers, as well as Development Agents, representing the government extension actors in each of the kebeles.

These technical activities confirmed the existing gaps in the organisation of community structures and their general awareness of NRM, as well as the know-how of technical farmers or Development Agents of good landscape management. These gaps often challenged the sustainability and durability of the provided technical measures.

## Soft components

Therefore, in later project cycles implementers focused much more on the soft components that would target the population of individual communities as well as the capacity of assigned governmental specialists and the use of extension workers in fields and on the woreda level. So they could efficiently follow agreed **Annual Action Plans** for irrigation and watershed management campaigns. These soft components ranged from technical trainings to community campaigning and communication. More details are explained in chapter 3.3.

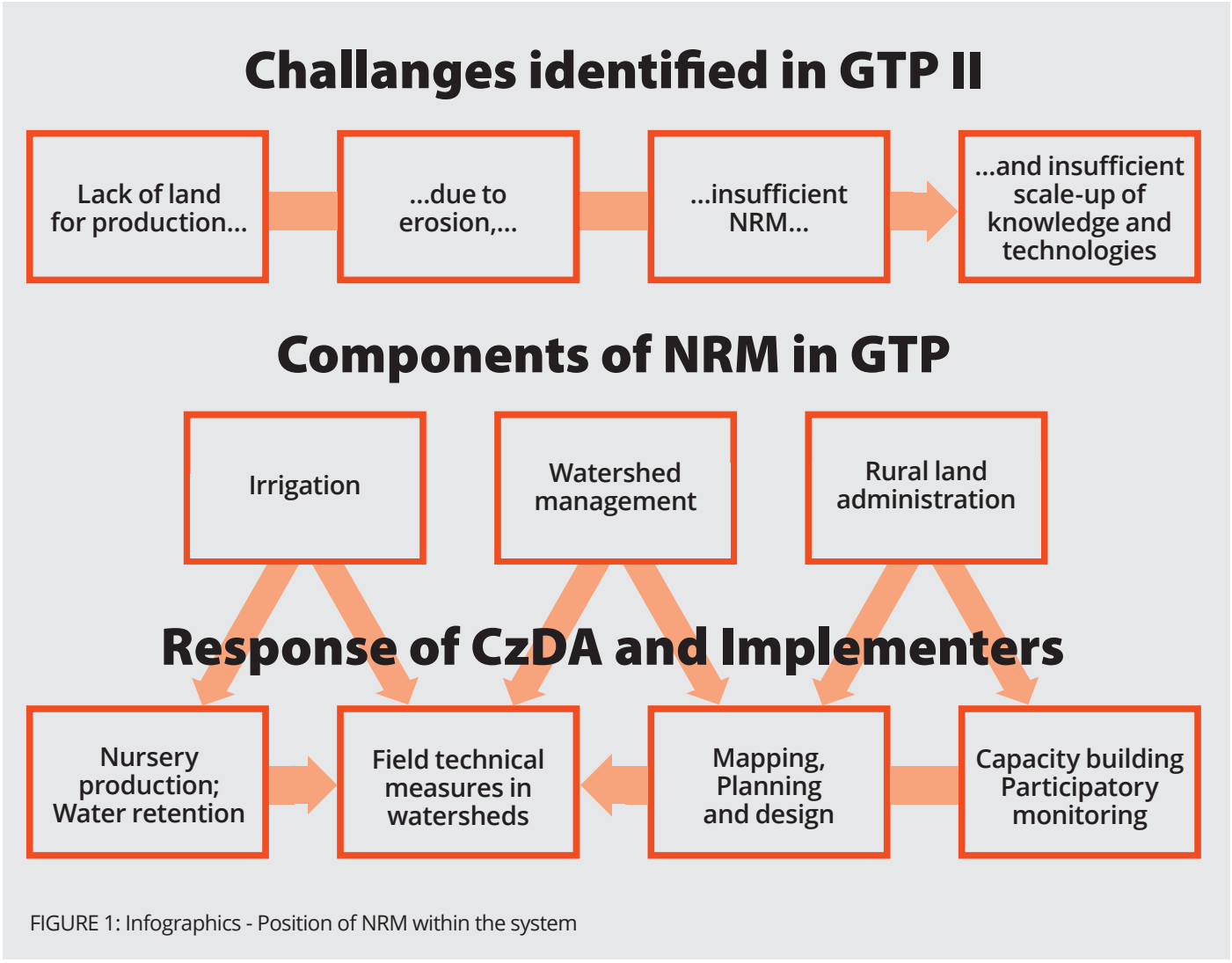



FIGURE 1: Infographics - Position of NRM within the system

The key to the establishment of sustainable practices though, is to search for and promote long-term solutions. In each kebele, these are defined in the Kebele Development Plan or Strategy, which should also include a **Landscape Management Plan**.

It's a formulation and long-term application that poses a crucial development objective, that pays significant attention to all the stages related to:

→ technical and socioeconomic analysis,
→ participatory planning – taking into account the land use and land ownership dynamics,
→ quality technical and community works, and
→ participatory monitoring.

There are more details in Chapter 3.5.

## Rural administration support

This long-term planning and formulation does indeed still fall under the watershed development component of the Growth and Transformation Plan II Natural resource management (NRM) strategy, but essentially overlaps with the Rural Land Administration. This had been supported technically by the Czech Development Agency's projects through analysis and training, community facilitation sessions or awareness campaigns.

Local administration then has an irreplaceable role for example in terms of the development of the local bylaws and regulations – e.g. in agreeing on the land access and land use rights, as well as the duties and responsibilities or the landowners.

# 3.2 Field level technical practices

## Key challenges addressed

Today soil and water conservation occupies a very important place, if not the most important one, in natural resource management planning at all administrative levels across Ethiopia (from a region to a kebele and to a community). Field level technical practices (FLTPs) are basically the very last stage of natural resource management, but the most critical one and also the most visible one. At the same time, FLTPs are the main implementation tool for sustainable development in rural areas.

Half-moon basins demonstration

Uncertain land tenure, deforestation, excessive grazing, outdated farming methods, and recurrent droughts (due to climate change) are the main causes of land degradation on sloped pieces of land, followed by severe water erosion. The extensive formation of gullies and landslides causes damage over a large area. One of the origins of gully erosion on hillisdes is the mismanagement of roads and footpaths in terms of drainage. The areas that are particularly affected are communal grazing lands, woodlands with open access and cultivated lands on hillsides. There is no restriction on the ownership of livestock, land users can own as much livestock as they can afford, which is another factor that contributes significantly to land overload.

The technical quality of the implemented erosion control measures varies from kebele to kebele. The underestimation of natural conditions and processes, incorrect design or management of environmental remediation works very often leads to further degradation instead of improved conditions within the watershed.

The most common mistakes in erosion control management and soil and water conservation measures implementation are:

→ Not respecting the borders of a watershed area.

### ⓘ Gully erosion phenomenon:

Gully erosion is one of the most challenging environmental problems in Ethiopia. In the intervention areas where we work there are gullies sometimes of enormous size. Their formation is influenced by a number of physical factors such as rainfall, topography, soil properties and vegetation cover. But still most of the gullies are formed due to human activities (improper land use, overgrazing / free grazing, road construction, trails, and footpaths).

The rehabilitation of gullies is lengthy, more complicated, and expensive than taking measures to reduce splash and rill erosion. It is generally known that preventing a gully formation is more economical than reclaiming them. When a gully is already formed, it is most often controlled by using check dams (gabion, stone, sandbags, etc.). This is only possible if the soil present is not rich in swellable clays (so-called Vertisol) in the locality of interest. However, Vertisol is a widespread soil type in Ethiopia. It is very difficult to control gullies with this soil type, because check dams constructions are damaged and bypassed by runoff in a very short amount of time due to the swelling and shrinking behaviour of Vertisols in soil. Gully rehabilitation thus becomes inefficient and extremely expensive in terms of unnecessarily spent funds and human labour. This example highlights the importance of having knowledge of soil typology and soil properties for sustainable gully rehabilitation. Based on the knowledge we have acquired of the soil typology, check dams and other stone-based structural measures are not recommended in this area.

- → Improper design of erosion control structures (deviation from contour lines – the level of soil bunds and fanya juu; inadequate or poorly placed water harvesting systems, structures misplacement etc.).
- → Poor or complete lack of maintenance of erosion control structures.
- → Poor revegetation activities and management of trees, shrubs, and fodder grass.
- → A completely missing network of waterways (which are needed for draining excess runoff).
- → Free or unrestricted grazing.
- → Poor knowledge and underestimation of natural conditions and processes.
- → The different level of technical knowledge among the main actors.
- → Insufficient planting based on the size of the watershed area.

## Provided solution

**Support to public community works** - FLTPs have been implemented mostly during the watershed campaign on public land (usually in closure areas) through assistance to public community works. The most frequently implemented erosion control measures within the watershed campaign on public land are: soil/stone bunds, water harvesting systems (trenches, pits, etc.), micro-basins, check dams, revegetation and cut and carry practices. Level bunds, level fanya juu, bench terraces, intercropping and mulching are locally applied on cropland. Despite all the successes we have had in land rehabilitation, only a small percentage of croplands have been treated with soil and water conservation measures. If we consider that most rural areas have steeper slopes, there is still a need to further apply such measures on a large area of croplands.

**Appropriate application of technical standards to specific areas:** The community structures, represented usually by the WMCs,

**Model construction of the terraces and water retention structures, Arba Minch Zuria, 2019**

Closure area in Boricha Woreda, Sidama, 2016

Development Armies and WAO experts, are already well aware of the guidelines and standards presented by the government. These include:

- → Community Based Participatory Watershed Development Guideline
- → Soil and Water Conservation in Ethiopia: Guidelines for Development Agents
- → Managing Land. A Practical Guidebook for Development Agents in Ethiopia.

However their proper application in a specific locality and ecological context is crucial. Since the localities where CzDA operates have a wide range of climatic conditions and soil variety, as well as many different altitudes from lowlands to highlands, the same soil and water conservation techniques cannot be applied everywhere. Natural conditions, such as climate and soil, are the framework for land management. Therefore, it is necessary to know the characteristics of the area where soil and water conservation measures are to be implemented.

**Proper planning and designing:** An important issue of sustainable design of soil and land rehabilitation is the identification of users and the development of a use concept or management plan. In most cases, the erosion control measures extend beyond the various fields of land owned by many land users.

**8,6 million**

**farmers participated in PSNP in Ethiopia in 2020.**

Therefore, the users should be identified and the boundaries need to be clearly defined and reflect the topography of the functional landscape before proposing erosion control measures. The process of implementing erosion control measures should be objective oriented and the responsibility of the owners in managing, maintaining, and utilizing the erosion control measures. These measures need to be elaborated and agreed upon, including who will have access to the eventual production (grass, trees, wood, water).

**Runoff control across the watershed area:** The network of grassed waterways should be developed in the first year of rehabilitation activities (before constructing any other structures) to improve soil conservation management on clay-rich soil. Graded structures rather than level structures should be preferred on clay-rich soils (due to their slow infiltration rate) to bring the excess runoff water safely down to the lowest parts of the landscape. This is the only way to protect clay soils against water erosion.

**Reducing overgrazing:** Since one of the great contribution factors for land degradation is free, unrestricted grazing. Most of the livestock animals freely graze on both communal and individual farmland. Due to this critical challenges, both the farmlands and communal lands are affected by severe erosion problems. Based on these visible problems, as has been the case of the Halaba NRM project starting from 2016 up to now, effectively working on the expansion and adoption of new fodder grasses at both the FTCs and Individual farmer's level need to take this issue into consideration. Currently most of the targeted farmers and FTCs are successfully adopting the development of fodder grasses in their gardens.

**The inclusion of private lands:** The field level technical practices in recent years have been carried out on a large scale mostly during the watershed campaign on public land mostly with level soil bunds and afforestation on degraded land in area closures. Much more must be done in the future mainly on private lands and in the upper parts of the watershed area. In order to stop the spreading of degraded areas into cultivated land, it is also necessary to conserve the borders of the degraded areas. Long-term growth and sustainable development in rural areas can be achieved if community and individual farmers are supported in their efforts to conserve nature, use wisely the natural resources connected with afforestation, and engage in soil and water conservation.

> ***Farmers are often reluctant to build terraces an other measures on their fields as they fear loosing cropping area. Those who do it though, do so because it actually improves their production and yields.***

**Hands-on design of the erosion control measures:** The importance of well performed FLTP in the field lies within the farmers hands under the guidance of Technical farmers and DAs. The proper planning of the WAO is necessary only when it comes to more technical structures (dams, ponds, waterways). As explained earlier, the success of such measures is based on having an understanding not only the technical measures, but also of the landscape dynamics and watershed principles, as well as of the communication within the relevant watershed committees and cross border authorities. The solution lies among having sufficient technical knowledge in watershed management and also in good communication between all of the relevant actors.

## Recommendations and best practices

**Erosion control in cultivated land:** While the attention has remained largely on degraded lands, the areas most at risk are actually the actively cultivated lands and private fields. These however require different conservation measures from those required on grassland or forestland. The attention to cultural and social aspects are also crucial, so the farmers are willing to accept and adopt the appropriate farming methods. Nonetheless, without such understanding and cooperation from the farmers, landscape management planning is impossible to implement. That is why closely working with the community is considered essential, along with the intensive promotion of good agriculture practices, e.g. conservation agriculture.

Faynaju terraces in fields

Water runoff control - contour soil bunds

The design of the FLTPs must be preceded by detailed planning. As to be described below and in further chapters 3.4 and 3.5

**Planning at the watershed level:** The recommended soil and water conservation measures must be carefully selected with respect to the agro-climatic zone and soil conditions within the area of interest, as well as the local topography, land use and land cover and cultural and social aspects. Erosion control must respect the borders of a watershed area and always start in the upper part of the watershed, especially when it comes to water harvesting activities.

**Good knowledge of soil properties:** Understanding soils conditions (e.g. soil depth, soil texture - such as loam, sandy loam, or clay) and how they affect soil and water conservation practices. Soil's physical and chemical properties affect plant growth and soil conservation management therefore, they should be taken into account in erosion management planning. Agricultural practices should be promoted that improve soil quality and fertility: intercropping, multi-story cropping - combination with farmland agroforestry, crop rotation, cover crops and green manuring, composting, and manuring.

**Promotion of fodder crops and trees as biological forms of erosion control:** To relieve the pressure of overgrazing, especially in densely populated areas, it is important to support the production of fodder crops and grasses. The planting fodder crops, grasses or trees as a biological control measure then serves two purposes – it stabilises the erosion-control measures and it contributes to the development of integrated agriculture (i.e. the combined production of animals and crops).

Therefore, all implementers promoted the diversification of fodder resources by combining grasses and legumes, the planting of fodder as an erosion control measures through the use of grasses and legumes (e.g. desho grass with pigeon pea), by planting of fodder on unproductive places on farms and by promotion of the cut-and-carry system for fodder harvesting.

Degraded area in Aleta Chuko Woreda, 2017

# 3.3 Nursery practices

## Key challenges addressed

The production of seedlings and tree nurseries have a long tradition in Ethiopia and a large variety of these nurseries can be found in each of the regions. The tree seedling production had been supported by the Ethiopian governments for decades now, creating a good awareness of the importance of the tree seedling production. The seedling production then varies from the household level, through community and FTC nurseries, to district or cluster nurseries run on the level of individual woredas. The production of tree seedlings is then less common in the traditional sense of agriculture or forestry. With few historical and regional exceptions, the investment in reforestation is usually seen as the role of the government.

Demand for the tree seedlings is also motivated largely by annual governmental campaigns, such as the annual watershed management campaign or national reforestation campaigns, such as Green Legacy Initiative in 2019. Therefore, the backbone of the recent governmental reforestation efforts is still seen in the district and woreda nurseries, supported from the woreda and governmental budgets, which can produce high quantities of resilient and easy to produce seedlings. Only few private nurseries are being created as a result.

From the technical perspective, there are several key challenges related to the production in the district nurseries, such as untrained workers, (who are often paid in cash-for-work schemes), low-quality genetic seed material (either generative of vegetative origin) and lack of infrastructure that creates bad conditions for seedling production (lack of shading, no water source, no irrigation system). The biggest challenge then is the budgetary and economic unsustainability, combined with costly solutions of the production, just like the use of the polyethylene tubes as a main production system.

Fruit tree distributions for households

**4.1 billion**

**trees planted in "Green Legacy Initiative" in 2020.**

## Provided solutions

Building on the requests of the Ethiopian counterparts, CzDA assistance led by individual implementers focused on the technical improvements and sustained production of woreda nurseries. This request was highly relevant as the steady supply of the tree seedling is a major preconditions for any landscape management measures and works to take place in target communities and kebeles. Over 15 tree nurseries were supported and improved within the program. These nurseries are producing fruit trees, fast-growing and multifunctional trees, and trees for park greenery, either in containers or bare root. All of the support nurseries were modernized and provided with the essential production materials and infrastructure

**Irrigation systems:** All nurseries have a water source that includes the primary distribution (pump, elevated tank, and metal pipes), and secondary distribution (pipes and hoses) which distribute the water among the germination and planting plots. Water

Seedlings production in Ramada nursery

source and access had usually been improved, typically exploiting available surface water nearby, seep-in wells, ponds, or shallow wells.

**Infrastructure:** The large production of the seedlings require, if we counting the sometimes hundreds of thousands of seedlings required, an appropriate logistical and technical background. Fencing, warehouses, tools, access roads were therefore provided to nurseries as needed, so that the production could not only be achieved, but protected, managed, and properly distribute the seedlings.

**Adjustment of the germination methods:** Shading materials, germination tents and tools had been provided for germination process. In order to decrease germination losses, the new materials were tested, such as non-woven fabric shading were used before and after their transplantation into plastic bags. For the seedling production, quality genetic material was used, and to ensure the health of seedlings, the non-woven fabric was used instead of traditional palm leaves (palm leaves can cause fungal diseases.

**Training foremen and labourers**: To ensure quality seedling production, suitable nursery staff was trained during training and workshops. Both skilled and unskilled labourers were trained, with the topics ranging from the management of work, transplanting, germination, seedling care, protection to seed collection, reproduction, and grafting.

**Increasing the genetic variety**: Quality genetic material was taken from verified seed sources, provided in cooperation with a partner, the Forestry Research Centre. Suitable tree species were selected for each special locality and produces in nurseries purpose – *Acacia saligna, Grevillea robusta* and *Olea Africana* as fast-growing trees for erosion-control plantations, and *Mangifera indica, Papaya spp., Coffea spp., Moringa stenopetalla* and *M. oleifera* and over 30 more species. Fruit trees were promoted among local farmers, fast-growing and multifunctional trees were used in erosion-control plantations, and trees for park greenery were planted in public areas in Hawassa.

## Recommended practices

As seen above, multiple technical improvements and recommendations have been promoted over the last decade by Czech and Ethiopian specialists in order to make the production of tree seedlings more efficient, so the total production of seedling available for reforestation has increased. This did not necessarily always decrease the number of the workers in the nurseries, lowered costs, or increased community demand for the seedlings.

**Recognising the emergency and development context:** Reforestation and related nursery production efforts have been and still are often carried out in the format of cash-for-work or using emergency funding. This approach is entirely justifiable as many of the households in rural Ethiopian find themselves in the emergency status repeatedly and are in need of imminent support. Such an approach has also been widely supported by funding from PSNP or MERET initiatives giving the opportunities to sustain their livelihoods and contribute to NRM or nursery works. This though also means that often unskilled labour gives assistance to nursery production. Implementers therefore navigated the cooperation with individual WAOs to balance the trainings of skilled and unskilled labour and focus primarily on the long-term investments and also include livelihoods groups in order to increase the long-term impact of the CzDA programming.

> ***Ethiopia hosts two of the world's 34 biodiversity hotspots; Ethiopian flora is estimated to about 6000 species of higher plants of which 10% are considered to be endemic.***

**Replacing the polyethylene tubes:** "PET" tubes are the preferred material for the germination and a transportation container, which is unfortunately costly and causes plastic pollution. Alternative solutions, such as hobra had been tested. Growing seedlings in hobra, helps to create strong root system compared to the

green part of the plant. The survival of such planting material is higher than seedlings in plastic pots. Use of hobra bricks also saves the nursery space as one brick takes only 10 cm² compared to 8cm pot, which takes about 50 cm². Another issue is inaccessibility of the material in southern Ethiopia, which could be solved through the construction of a simple mechanical winch that can create such bricks by pressing them out of local sawdust. The Patrik system has also been used as an alternative innovative solution, which consists of the reusable plastic crates and provides a good environment for germination and transportation.

**Production of planting materials on community level:** As long as the seedlings are primarily produced in the district, cluster or woreda nurseries and then provided for the plantation to the communities for free, there is almost no sense of ownership of the resulting plantation by the community. Needless to say, the capacities of the centralised production is rarely sufficient to meet the needs of all the woredas and the kebeles in one season, so many development armies are idle.

Therefore, in all areas, Sidama, Halaba or Kembata Tembaro, the implementers focused also on the support of the production of the tree seedlings in the community. The community seedling production can be concentrated on the FTC premises, with agriculture cooperatives, elementary schools, church structure or variety of youth groups and individuals, including private entities. The key element is to provide the variety of seedlings and planting materials, which not only serves for reforestation purposes, but also covers the demands of the community and leads to greater economic sustainability of the community nursery.


**Handover of fruit tree seedlings at FTC premises in Loka Abaya Woreda, 2018**

# 3.4 Institutional and technical capacity building

## Key challenge addressed

When it comes to institutional capacity building, the extension system as it is currently set up in Ethiopia presents quite a solid and well-developed structure on its own. In terms of information dissemination Ethiopia managed to develop and staff a robust structure from top to bottom, including the extension agents based in every individual kebele. However, what is missing, is often the technical knowledge on particular issues and knowledge being well transferred between the various levels followed up by proper monitoring mechanisms and evaluations. It is very common that the information is misinterpreted and inappropriately adjusted when applied. This was also stated in the GTP II as one of the key challenges.

## Provided solutions

Introducing new knowledge, principle, or technology, like Landscape Management Plans or the soil survey used in PIN´s programs, always requires inviting representatives from different administrative levels. For each of them different information is important. For the region level, this is more about planning and strategies covering more affected areas, for zone we go to the specific cross border strategies and cooperation, while on the woreda/ kebele level we talk about the actual works to be performed. But all the concerned people should understand the whole strategy, its purpose and this should be reflected into actual yearly plans and discussed with farmers who are at the end of the day the main people that have to perform the work well if the structures are to stay in good shape.

| | ACTORS | ROLE IN THE NRM SYSTEM | CHALLENGES |
|---|---|---|---|
| **Community** | Watershed Management Comities - WMCs<br>Technical farmers - TFs<br>Lead farmers - LFs<br>Development Armies | Landscape planning in the Community<br>Mobilising the community for public work campaigns.<br>Building the Infrastructure | → Lack of analysis<br>→ Lack of technical skills<br>→ Lack of investments |
| **Woreda level** | Development Agents - DAs<br>Sector Matter Specialists - SMSs<br>WAO teams<br>Communication officers | → Summarising Action plans<br>→ Guidance & evaluation<br>→ Funding & mobilisation<br>→ FTP Formulation | → High turnover of DAs – poor long-term know-how<br>→ Loss of experts<br>→ Unclear messaging |
| **Zone level & Regional level** | Regional / Zonal Agriculture Office & Bureau | → Guidance in watershed management | → Lack of quality monitoring data |

FIGURE 2: Infographics - Actors and documents influencing the NRM

When it comes to landscape management and NRM, the importance according to the authors of this publication lies in three key areas.

→ Systematic knowledge transfer among administration levels, monitoring and evaluation.
→ Well trained staff in terms of technical knowledge and skills.
→ Dedicated and responsible extension agents with low turnover in their positions.

## Systematic knowledge transfer among administration levels, monitoring and evaluation

**Knowledge transfer**: proper follow-up among the stakeholders on the planned strategies is one of the biggest challenges experienced in the implemented projects. In fact, the activities and capacities of the NGOs and external development agencies often step in to fill the gaps, where the implementation of the governmental strategies is not being applied properly or without a sufficient understanding of the long-term effects.

The information comes from the regional or zonal level, with more or less clear instructions which is somehow modified by the users as it passes through the system. The external or local experts then provide trainings on the key concepts of the governmental strategies, testing the

feasibility of the technical solutions and tailoring the solutions to specific contexts.

**Cross-border coordination among administrations:** The system of control over the knowledge and the way it is interpreted by the kebeles or woredas is based on the cluster teams of SMSs, is supposed to unify the interpretation of the knowledge among farmers. However, the administrative boundaries do not always reflect the watershed boundaries and once the extension officers are informed in a different way it is hard to talk about cross-border cooperation within a particular watershed. So when the Landscape Management Plans are formulated, joint planning and training sessions need to be held, even for the staff beyond the project immediate area of implementation.

**Electronic monitoring, presentations & participatory monitoring:** If everyone shares the same information, then all of the work can be jointly planned with concerned neighbouring areas and there should be also an evaluation done at the end by respective authorities. Once the field work is done the evaluation should take place and the results should be communicated to the zone and the region. This reporting however generally only provide overall managerial data and provides little technical information or feedback to farmers.

Promotion of Conservation agriculture

In the last project cycle People in Need with its partner All for Soil, started to focus more on the development of the database and monitoring system, which tested four main components:

→ participatory monitoring of the community Technical Farmers,
→ electronic data collection,
→ building a monitoring database, and
→ tools for presentation – in electronic and online formats.

## Well trained staff in technical knowledge and skills

**Watershed management trainings:** As described in detail in chapter 3.2., there is variety of erosion control measures promoted in general, and experts - as well as public - are generally aware about the erosion-control measures. But the quality and appropriateness of the application of these is still a challenge. Even if something has been repeated many times in field, there's a problem with incorrectly performed works. This


Soil monitoring workshop conference "Sustainable Landscape Practices and Challanges in Sidama" supported by CzDA, Hawassa, 2018

Training of community Health Extension Workers, Awassa Zuria, 2011

is caused by different factors, but insufficient technical knowledge or a lack of practical experience with leading the farmers and workers in the field are two common ones. Therefore, watershed management trainings usually focuses on providing a refresher to improve the appropriate application or innovation in the structural and biological erosion control measures among DAs, SMSs, and primarily then among WMCs, Voluntary Technical farmers, who then usually go on to design and supervise public and community works.

**Soil survey and monitoring trainings:** A soil survey is a quite technical analysis which needs trained staff and equipment to be able to get correct results. However, it is essential for the planning of farming practices, as well as the designing of the erosion control measures. When it comes to fertilisers it can help with deciding which plants and crops are suitable and will improve the fertility on a particular piece of land. For other practices in the field, it might be enough to determine which type of soil is present in the area (vertisol, luvisol, fluvisol, etc.). Nonetheless, investments made to the development of NRM and erosion control measures (such as gabions and check dams) or community infrastructure (such as ponds and construction projects) can be significant, but the lack of soil analysis often leads to their loss due to these measures being incorrectly designed or even to environmental damage.

## Dedicated and responsible community extension agents with low turnover and improved work conditions of Development Agents

Multiple projects included in the CzDA programming, both focusing on the NRM topics and agriculture development, prided themselves on their support to FTCs by providing tools, materials and building infrastructure. Nonetheless, the support also addressed the working conditions of the Development Agents, who are the key frontline extension workers. Besides the training, equipment, and materials that were provided, this also included teaching and trainings materials, (books, stationery, manuals and guidelines, office equipment), equipment for their living quarters and for accommodation, bicycles, motorbikes and on occasion also computer equipment and TVs.

**Support of the community structures:** The quality and capacity of the established structure varies greatly in each of the woredas and even kebeles. Often, watershed management committees are established only formally for the purposes of the individual campaigns, while their members do or do not have the required skills or role in the communities. Also the numbers of community members engaged in Development Armies, development groups, voluntary/technical farmers or model farmers can range from couple of individuals to dozens of people per kebele. Ensuring the functionality and supporting the local structure is therefore an essential component in every new area, where the CzDA programme implementor will expand their efforts.

## Recommended practices

**Engaging the external technical experts:** When it comes to technical training and technical capacity building of government officers, this can be always done by external subjects (and even should be) as this is very commonly done anywhere else in the world. These people or organizations can be contracted in order to teach a specific topic or transfer the needed know-how (like soil analysis). The impact of the technical training and know-how transfer, will nonetheless depend on the people involved, their understanding of the topic and sharing with colleagues.

**Ensuring functional community structures:** The above assumes though that the extension and community structure are in place and are functional. If the performance of community or extension structure is low, the impact of any technical training or support will be rather accidental. Therefore, it is a necessary component of any NRM intervention to include a component focused on capacity building to ensure the sustainability.

**Building trust between beneficiaries and extension agents**: As in all human efforts, the success of the work stands and falls with the involvement of responsible and dedicated people. This is very visible during the public community works as there are significant differences between kebeles and woredas. The crucial difference, regardless of the technical challenges, is the dedication of the extension agents along with their community counterparts and their mutual communication and trust. The follow-up, and supervision provided by woreda and zonal authorities through funding, materials, or monitoring, serves then as a motivation and yet it can also hinder the progress of community efforts.

**Capacity and quality before quantity:** While NRM projects often aim at high numbers and quantities of seedlings planted, hectares rehabilitated in annual campaigns, the perspective on the landscape and the functionality of the extension and community systems are what should be targeted long-term.

Youth group training sessions

**Follow-up of WAO on the zonal level:** The zone officer might be well trained and they can interpret the knowledge of the strategy to the woreda well, but if a woreda level officer has no capacity or sometimes intention to perform the work well (poor field engagement, low understanding of the topic, lack of budget, etc.) the final impact of the works in the field (on the kebele level) will be minimum or zero. If all the people in the chain are working properly and they are continuously evaluated, the system can work. External subjects then can play a crucial role to facilitate and assist with setting up the monitoring system and the evaluation of works that should be directly related to building up the capacity of the government staff.

**18,2**

**millions of farmers should have been consulted according to GTP II plan in 2020.**

**Involvement of people on different levels:** All of them should cooperate and have the possibility of commenting on plans and strategies through the various committees. It means that a farmer as a member of the watershed committee should have right to comment on planned works during a watershed campaign if these could harm the environment.

**Involvement of stakeholders in the whole process cycle:** The whole strategy/plan of such works should be discussed in advance with all the people along the administration structure – zone, woreda, kebele (DAs, technical farmers, watershed committees, etc.) and the works should only be performed after reaching consensus. Lastly, all works should be evaluated and reported back to zone officers who will be responsible for evaluating their impact and preparing the strategy for the coming year. This situation assumes that all concerned people have sufficient technical knowledge based on their technical capacity building and training.

# 3.5 Landscape mapping and risk analysis

## Key challenges addressed

The Participatory Watershed Development Planning Guideline is currently the most accepted planning tool for landscape planning and natural resource management. This guideline is designed to ensure the involvement of all stakeholders. However, this method of planning often fails due to gaps in knowledge and practical use of watershed management government guidelines due to its inappropriate application by the main actors (experts and communities). Another key challenge is also the insufficient or poor quality of basic field data and the minimal or complete lack of planning documentation (thematic maps, databases or incomplete sets of basic GIS data).

This leads to a bad definition of the watersheds, intervention areas and to a bad selection of priorities. Typically, the community Action Plans prioritize the degraded community lands for public works, rather then private lands and fields that are at risk. Within all the examined areas it was also found that the upper parts of the watershed were not taken into consideration. The surface runoff coming from the upper part of the watershed represents then a significant threat for the middle and lower parts, which are the typically more inhabited areas.

Even though the process is community oriented, participatory, and the authorities try to form functional kebele clusters, Landscape Management Plans and natural resource management works are often prepared according to the administrative boundaries. All suggested development maps respect the administrative boundaries of the kebele, but do not work with the watershed and sub-watershed boundaries, which are essential for implementing erosion control measures and water harvesting structures.

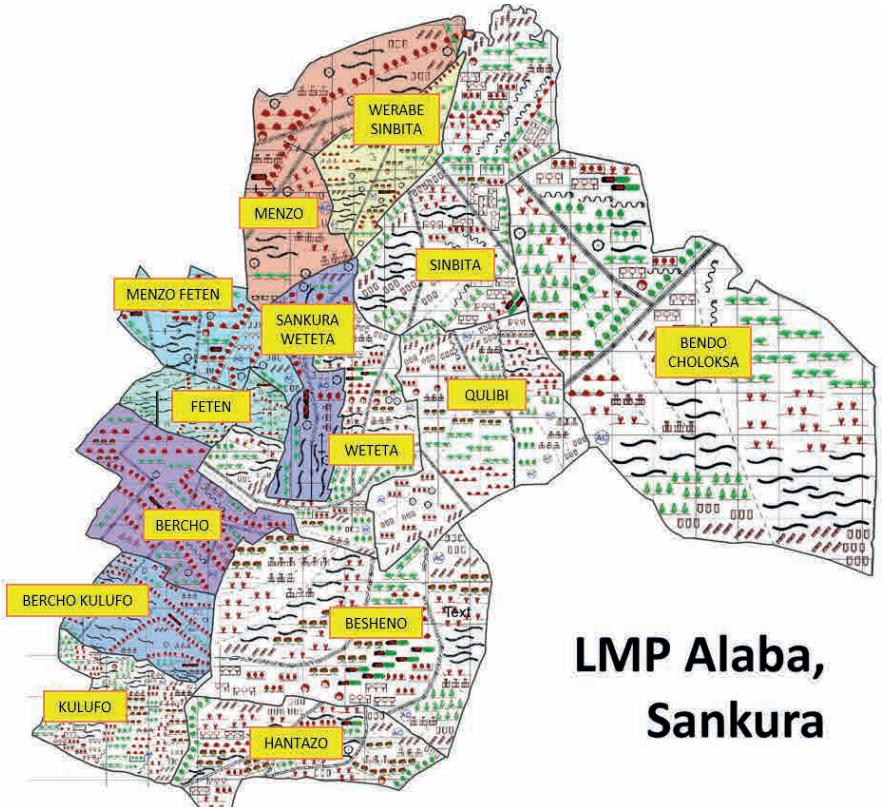



Figure 3: Kebele plans are often prepared for each of the kebeles individually. When the individual kebele plans are aligned, they often display a mismatch of the recommendations along the administrative boundaries, erosion, flood risks and terrain in general. The recommended soil and water conservation measures also do not respect the topography of the area and the map scale.

For example, the visualisation of the Landscape Management Plan of Besheno and surrounding kebeles (see figure 3) presents well a thoroughly designed intervention and suggested works for each of the target kebeles, nonetheless, such a map is not suitable for the orientation and planning of watershed management.

## Provided solutions

The management of basic natural resources, on which a large part of the populations in rural areas depends upon, must be based on an individual approach to each site and detailed planning based on reliable data, expert analysis and synoptic maps.

Before developing any Landscape Management Plans and performing any work, we should be sure that all of the responsible actors have sufficient knowledge of landscape processes, watershed concepts, existing risks and soil and water conservation principles.

**Common planning procedures at woreda/kebele/community level:**

→ Establishing a responsible group of experts assigned to support and follow-up watershed development and management planning work and technical issues.
→ Participatory targeting with the community, preparation of community mind maps - Local farmers, other land users and a wider community who depend on the land have to be involved from the very beginning of the planning process, since they are the ones that will live with its results.
→ Gender sensitization followed by group meetings and brainstorming.
→ Vulnerability and the identification and ranking of other problems.
→ Transect walks with WMCs and semi-structured interviews.
→ Village and household mapping.
→ Soil, vegetation and topographic surveys in selected watersheds.
→ Watershed and community area delineation.
→ Preparation of the Action plans.
→ Participatory and results-based monitoring.

**Landscape Management Plans (LMP) definition:** LMP is an effective tool for detailed watershed management planning. LMP's consist of a written part with recommendations for erosion control management and maps as documentation, which primarily defines the water regime in the area and the most vulnerable, endangered areas and therefore the areas that have to be protected. A detailed analysis of the territory is created by compiling field knowledge (survey and verification of field data, sampling), collecting information from local authorities and farmers (discussions and training FTC, TF, MF, DAs, WAO and others), using available sources (some prepared by Hawassa University, government guidelines) and modern remote sensing analytical methods (satellite imagery, spatial analysis + appropriate classification and interpretation). LMP's can be flexibly updated with the most recent data and also according to the changing situation in the area due to successful implementation.

Presentation and feedback session on provided Landscape Management Plans, Hawassa, 2019

## Recommended practices

**Ensuring access to documentation of landscape planning**: In cooperation with the partner organization AFS, PIN has started extensive digital mapping and detailed collection of GIS data across a large area. Similarly, a landscape analysis had been done in area of Arba Mich Zuria by the company Geotest along with Mendelu. Based on advanced GIS analyses and remote sensing, the data are recorded in a database, analysed and presented in the form of thematic maps, which are an integral part of the LMP.

As a result, the project teams provide all partners active in the community with following type of data:

→ User manual for the map section of the Landscape Management Plans
→ Narrative Landscape Management Plans and Action plans
→ Map documentation

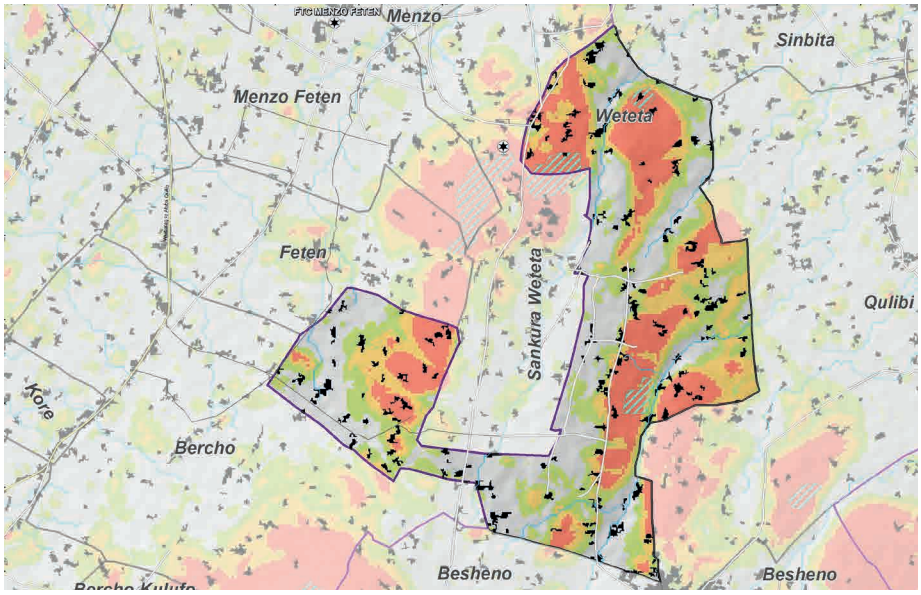
All recorded data from the watershed campaign presentation are then stored in a database, in an easily presentable format, but mainly available for evaluation or update.

| ANALYTICAL MAPS | MAPS FOR COMMUNITY DISCUSSION AND PLANNING |
|---|---|
| Soil degradation risk area<br>Surface runoff and water delineation<br>Land Use / Land Cover analysis | Blank maps – administrative boundaries<br>Blank background satellite images |

The LMP map documentation consists of several individual maps, which are divided into two separate groups: Analytical maps are designed to work at the zone / woreda level and partly at the kebele level. Whereas maps for community discussion and planning are designed mostly to work at woreda, kebele and community level.

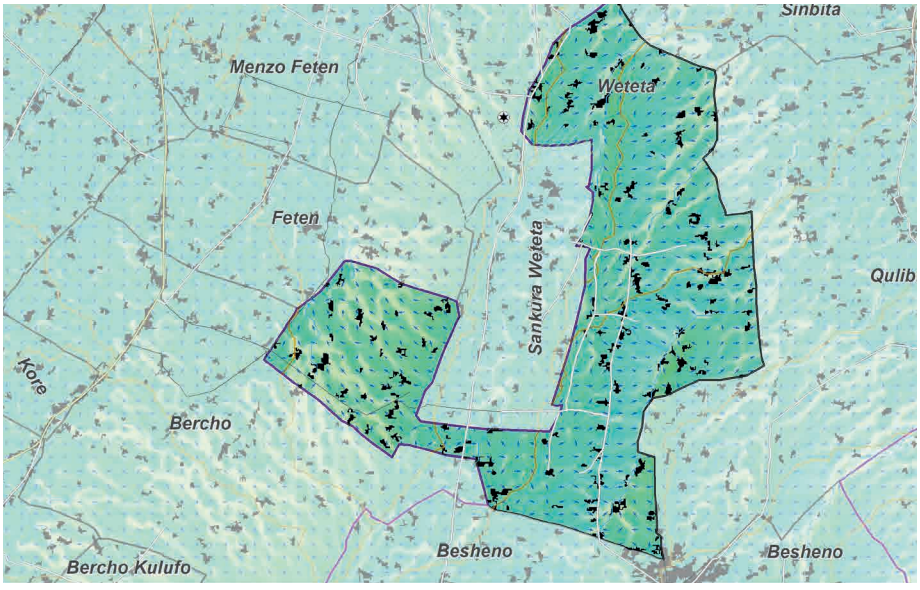
**Identification of erosion and soil degradation risk areas:** The analysis is focused on the identification of the most erosion prone areas. The maps below help to identify where the activities during the next watershed campaign should be concentrated at and where the erosion control measures need to be implemented first in order to minimize any soil degradation of fertile land.

Areas labelled as a “High Risk Zone” are to be selected for the activities of the nearest watershed campaign, while the areas labelled as a "Medium risk zone" could be covered in subsequent seasons. In most cases these reddish parts represent the upper parts of the watershed or steeply sloped areas where erosion control, retention and accumulation measures should be implemented as a priority. The areas labelled as a "Low risk zone" can then be rehabilitated in later works or projects.



Map of Weteta kebele: Soil degradation risk areas

**Surface runoff and watershed delineation analyses:** These maps represent the hydrology regime of the area. The area is divided into individual watersheds and points out the necessary cooperation between kebeles in activities during watershed campaigns. It is important to note that the boundaries between watersheds are not the same as the boundaries between kebeles. In order to achieve maximum landscape and erosion protection of the areas of interest the boundaries between the watersheds (not the kebeles) have to be respected.



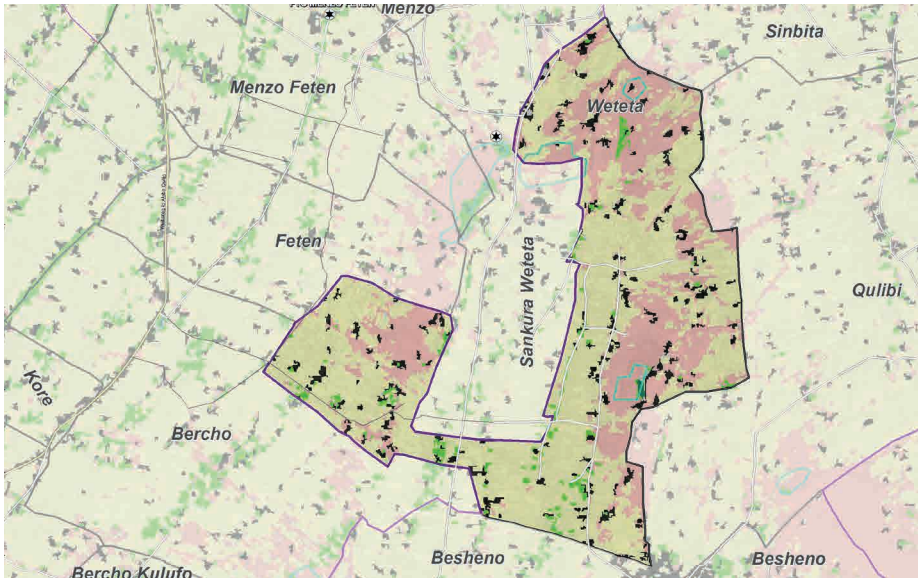
Map of Weteta kebele: Surface runoff and water delineation

**i What is a watershed?**

Watershed is any area of land where precipitation collects and drains off into a common outlet.

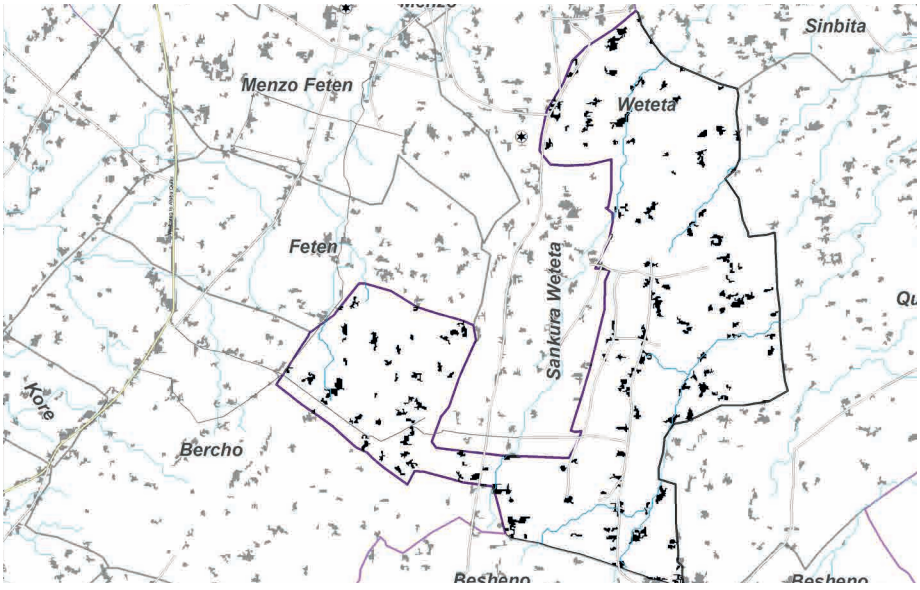
**Mapping of Land use & Land cover:** Working with Landuse and Land cover (LU/LC) gives supplementary information when planning the activities for the watershed campaign. The main strength of the analysis is that it gives the best idea of the natural conditions on site, while also showing human usage and influence

on the whole landscape. Land cover indicates the physical land type such as forest, shrubs, grassland, build-up area or bare land. To see the change over time, land cover maps for several different years are needed. With this information, decisions made in the past can be evaluated. It also helps to see a potential impact of future decisions before they are implemented. Just like the case of the mapping carried out by All for Soil in Halaba Special Woreda, the LU/LC analysis is based on modern remote technology data and is a powerful tool to address the situation in relatively large areas. For the PIN project, the focus of these analyses went towards the distribution of productive agricultural land and urban areas, the density and moisture of vegetation.



Map of Weteta kebele: Land-use and land-cover analysis

**Use of the Blank map:** A map that has a white background contains basic landmarks and administrative borders and is suitable for drawing and writing additional information. This map can be used for participatory mapping that encourages interaction and helps visualize the "mental map' of farmers and the community or for many other topics: demography, social and residential stratification, community use of natural resources, individual fields and land use, soil types, watershed units, water resources and many more.



Map of Weteta kebele: Blank map of administrative boundaries

## Recommended practices

→ All proposed soil and water conservation measures should respect the methods and recommendations of the current government manuals, technical handbooks and guidelines of the Ethiopian Ministry of Agriculture (MoA) see in chapter 3.1 and 3.2.

→ Recommended soil and water conservation measures within this LMP are carefully selected respecting the agroclimatic zone and soil conditions within the area of interest and respects the local topography, land use and land cover - more details provided in chapter 3.2.

→ Support digital mapping and basic GIS data collection (soil sampling, electronic data collection)

→ Selection of community watersheds should include the border interactions between watersheds/ kebele/communities and soil and water conservation measures must be applied in the upper part of watershed primarily.

→ Capacity building for all stakeholders will be explained in more detail in chapter 3.4.

# 4 INNOVATIVE CONCEPTS

Works in the Ramada nursery, Shebedino Woreda, Sidama, 2011

# 4.1 Conservation agriculture

Leaving aside the large-scale planning and design of the landscape as a whole, the key to soil fertility and the foundation of good agriculture management remains in the hands of individual farmers and the soil management practices they are using. For many years, the trend was set to improve agriculture production through the promotion of agriculture inputs, such as improved seeds, chemical fertilisers (NPK, urea), herbicides, pesticides, and regular and even multiple tillage.

This trend however leads to further deterioration of the soil conditions, and degradation of the farmers field from the physical, chemical, and biological perspective. In addition to the organic matter, the soil is losing the living microbiological structure, cohesion, nutrients and eventually it is washed or blown away by erosion.

Mulching demonstration for Conservation agriculture

## Key principles

Conservation agriculture, as a proven concept, changes the paradigm and promotes three principles:

- → Minimum disturbance of the soil – minimum or zero tillage practices
- → Permanent soil cover by organic matter – through perennials, cover crops or mulching
- → Species diversification – using space and time to address the nutrient content of the soil or pest and disease dynamics

In line with the trends and recommendations of the national and international specialists, conservation agriculture is becoming a part of national strategies and FTC curricula, however to many this is seen as an essential paradigm shift. It brings with it a completely new management of agriculture while still meeting the requirements for needed intensification, which is promoted by the Development Agents at FTCs.

Nonetheless, the best results were achieved working with model farmers who were willing to invest the time and demonstrate on their own lands the benefits of conservation agriculture. It is usually suggested to start with a small plot about 10x10 metres in size for testing and then to proceed with a farmer-to-farmer extension and the promotion of the achieved results.

The entry point for this can usually be found in the promotion of intercropping, promoting either the use of new combinations - usually by promoting leguminous crops - or enhancing the traditional methods. These techniques can be then combined with use of the crop residues for mulching and the use of organic fertilisers or biofertilisers.

## Long-term trials

As a shift to conservation agriculture involved changes to some essential practices, there are many misconceptions among farmers as well as agriculture extension workers. For example, it is often perceived that the application of conservation agriculture limits the land area for production or that it is not suitable for dry areas. Therefore, it is paramount to combine the technical evidence-based recommendations and trials with the raising awareness, and the promotion and application of KAP (knowledge-attitudes and practices) surveys or techniques for social behavioural change (see the chapter 4.3). Also, just like the effects of most of the activities, the effects of conservation agriculture aren´t visible instantly and the measurable improvement soil quality on crop yields will only manifest itself over the long-term, namely in stabilised production and lower expenditures on input costs.

# 4.2 Agroforestry

Agroforestry is a system of land use management in which trees or shrubs are grown over crops or pastureland. It is a sustainable concept providing benefits both on the production and income side and is advantageous over conventional agricultural and forest production methods in terms of increased productivity from the available plots of land, while having a largely positive impact on the microclimate of the plots. Over a short period of time, agroforestry contributes to reduction of soil erosion and water runoff, thus increasing the nutrients of the soil and water retention in the fields and landscape.

The efficient design of the agroforestry systems and a combination of a variety of crops, shrubs and trees can then actively improve the soil's nitrogen dynamics, increase the biological diversity, prevent the spread of pests and diseases, and improve the overall use of available energy in farming systems. All in all, the whole system leads to environmentally stabilised and climate resilient production. There are several types of agroforestry system:

→ Agri-silvicultural systems, which manage land for the production of crops and forest products
→ Silvopastoral systems, which produce both wood products, fodder for animals and livestock
→ Agri-silvopastoral systems, a mixture of the two systems above, which produces tree products, crops, and livestock

The initial steps for the introduction of agroforestry is the production of necessary plants, shrubs, bushes, and grasses that are suitable for the recent production system. The production of fodder grasses and other fodder for animals kept in the farm has proven to be very successful. Grasses or shrubs are then promoted to protect the land from landslides and leftovers like branches or leaves are plough into the soil in order to increase the organic content matter.

Traditional agroforestry system - enset field in Sidama

**i Enset & coffee & chat**

Enset & coffee & chat: traditional agroforestry plant, all indigenous to Ethiopia and Sidama, yet achieving global outreach.

A variety of agroforestry systems, combining various staple and cash crops as well as fodder plants, fruits and forest trees have already been presented on the premises of FTCs in all woredas in Sidama, Halaba, Kembata Tembaro and Arba Minch. The techniques were promoted in a variety of seminars, trainings, conferences, and support programmes to extension systems serving ordinary farmers.

Concept of permaculture as the ultimate variation of Agroforestry, has been presented in the Permaculture training centre. The training centre is growing and promoting moringa, a tree with erosion-control qualities and an agroforestry function, enriching the soil by binding atmospheric nitrogen, and serving as a source of food (leaves, seeds) and income; or planted crops such as root tubers (cassava, sweet potato, taro, yam) and leafy vegetables (chaya, cassava or moringa). This centre also promotes the principles of climate-smart agriculture and holistic management on gardens of 1 hectare.

# 4.3 Improved campaigning and participatory development

In the initial stages, Czech programming, especially under Czech Ministry of Agriculture and later also CzDA, relied on rather traditional Czech ODA approach of transferring of technical know-how and technologies. The hardware provision or technology supplies was seen as key deliverable of the projects, and the sustainability of outputs was largely ensured only through trainings of respective beneficiaries and Ethiopian staff. Soft components of the individual projects had developed gradually in line with the need to ensure the sustainability, of the landscape solutions that included the engagement of the whole community and awareness of the general public in sustainable land use.

## Community mobilisation

The capacity of the Ethiopian authorities to mobilise the community is well developed and works both through traditional structures as well as through a robust extension system that includes direct work of Development Agents based on kebele level. Community public works, which are not designed on the cash-for-work modality (e.g. PSNP or other) are organised within seasonal agriculture campaigns: Watershed campaign, belg campaign, meher campaign and irrigation campaign. The key policies and messages presented for those campaigns are usually drawn from government policies in top-down manner, while it is largely up to zonal or woreda agents (extension and communication officers) and also field/ kebele agents (Development Agents of Sector Matter Specialists) to tailor and adjust the key messages among farmers and the general public.

## Improved campaigning and communication

Special assigned personnel is usually dedicated to extension system communication and campaigning in most of the woredas or even kebeles. The dedicated staff - extension or communication officers- are then assigned with extension, social, cultural, or also political communication duties. However, the tools used were usually limited to those that were easy, a public meeting, printing banners and the distribution of thematic t-shirts. At the same time, the Development Agents active in kebeles and assigned to individual FTCs do often take the role of communicating about things other than agriculture topics. DAs do receive training in basic extension system communication during their studies.

In Sidama, the refreshment trainings in communication and campaigning, which were held using the extensive experience of an organisation like People in Need, focused namely on the appropriate formulation of messages, the identification of target groups and the proper selection of the communication tools along with their timing and sequencing. Multiple experiences and inputs for campaigning were then gathered using techniques

Works in the Ramada nursery, Shebedino Woreda, Sidama, 2011

Participatory resource analysis (PRA) excercise for self-help group members, Tesso kebele, Sidama, 2019

such as KAP surveys, barriers analysis or a positive deviance approach.

## Participatory landscape design and monitoring

The majority of the staff and expert are aware of some principles or components of the Community Based Participatory Watershed Development Guideline, which led to series of participatory Socioeconomic and Biophysical surveys, often presented as "Annex 9" to the guideline. These serve as the basis for the formulation of long-term Landscape Management Plan, action plans and annual plans. However, experience has shown that once such plans are prepared, these are understood by WAO experts, SMSs, partially by DA, but not necessarily by all members of community. This is phenomena is then exacerbated when there is high turnover among the WAO and FTC staff, leading the documentation and overall ownership to quickly get lost.

The ownership does have to stay primarily with the community, specifically the assigned structures like Watershed Management Comities on the kebele level. Their understanding of the identified landscape dynamics and participation in landscape designs are crucial for projects to have an impact. Based on the NRM Conference held in Hawassa in 2018, PIN implemented and tested the Participatory monitoring system, which allows community structures not only participate in planning, but to monitor the results.

The experience from the long-term intervention from Halaba and Sidama then show that building the capacity of Community structures so they can fully exploit the advantages of the participatory approaches is a key for the acceptance of good practices in the community and to instil a proactive approach to landscape development.

# 4.4 Behavioural change

Education, training, and awareness had long been the cornerstone of the extension system's work, while the lack of know-how and poor attitudes towards the promoted topics were often seen as the main barriers for achieving the desired changes among beneficiaries. Also the Ethiopian government invested in a robust system of FTCs and an annual awareness campaigns enjoying support from the Czech Development Assistance programme. However, this has continued to be seen as only something of secondary importance after material support and technical assistance. Nonetheless, the changes taking place after the trainings were still lengthy and the impact of the awareness campaigns and adult education did have often only a temporary or limited impact. Only some of the promoted practices, techniques, and behaviours were then adopted by high percentage of farmers.

## Analysing barriers to behaviour adoption

For a significant period of time, sectors like healthcare, nutrition or WASH have focused heavily on analyses of barriers to the acceptance of the desired promoted behaviours (e.g. handwashing, breastfeeding, HIV prevention), often analysing knowledge, attitudes, and practices of beneficiaries. Over time this has shown the need for an even deeper analysis of the variety of barriers that prevent beneficiaries from successfully changing behaviours and drivers to help them adopt the promoted practices.

Designing the activities around the concept of Social Behavioural Change is an approach that helps to formulate the projects and activities in more efficient ways, so the relevant barriers and drivers are addressed. This makes projects more efficient both in terms of time and budget. As long as the desired practices and behaviours are well identified and defined, the behavioural change design starts with the barrier analysis where we define the barriers that prevent people from adopting a particular behaviour or practice. The research is a kind of formative research composed of qualitative and quantitative questions, which helps to select and define most appropriate actions.

**i Behavioural determinants:**

- → knowledge and skills
- → perceived social norms
- → perceived positive & negative consequences
- → access to materials and services
- → cues and reminders for action
- → perceived risk susceptibility
- → perceived risk severity
- → perceived action efficacy
- → perceived divine will and superstitions
- → legal framework & policy
- → cultural background

**70%**

**of farmers believe humans are abusing evironment and 83% of them believe they have the right to do so.**

## Understanding perceptions

Formative surveys in Sidama and Halaba have helped the team to identify the communication and design gaps, which are now included in the project design. Please see three examples below:

- → **Farmers are not aware of the risk of erosion and need to be further educated of the impact**. Many awareness and education materials explain the risks and threats of the soil erosion; formative survey showed that farmers with sloping lands, who do not apply erosion-control measures feel actually more threatened by erosion than those who do apply those measures. Yet having this knowledge and recognising the severity of the risk does not change the practice.
- → **Farmers perceive the access to tools as a main barrier and motivators for erosion-control measures**. While these activities are generally accepted, farmers are more motivated and able to apply the erosion-control measures in their fields if they are provided with tools, there is no significant difference between those applying or not applying erosion control measures when it comes to access to tools.
- → **Farmers believe that funding is needed to apply the erosion-control measures**. Unlike those applying erosion-control measures, non-practitioners avoid these techniques as they are under the impression, that it is highly sophisticated and costly; which is probably the negative effect of continuous technical trainings that rely too much on experts and paid public works campaigns.

# 5 STORIES

Mr Shek Kedir, Model Farmer in the project "Increased Ecological stability of the Dijo and Bilate river watershed", Weira-Dijo Woreda, Alaba, 2018

## Mr. Betigel, businessperson

Mr. Betigel comes from a poor rural family supplementing their nutrition from the traditional knowledge of moringa trees. As an adult, he learned about moringa´s effects on human health and nutrition and decided to start his own business. At the beginning, he bought moringa from local farmers, dried it and sold it on the local market. With support of MENDELU and the Czech company Holistic solutions he built up his company from the scratch. Today he owns a successful moringa factory in Arba Minch that is locally processing moringa products. He has a dryer, oil press machine and pill press machine to produce added value products and sells them on the local and the national market. Currently there is 50 people employed directly plus a lot of seasonal workers. As Mr. Betigel is passionate about the moringa miracle he continues to increase awareness among local population to increase their livelihoods, health, and nutrition as it contains a lot of protein, calcium, or vitamins.

Mr. Betigel, trader and dealer of the moringa products, Arba Minch

## Mr. Shek Kedir Muhammed, farmer

Land degradation is one of the severe problems the operational kebeles are facing in the Halaba project. Many peoples are being affected year after year by soil erosion and its related problems of loss of productivity and vulnerability to displacement. Mr. Shek Kedir Mehammed lives in Halaba Zone, Wera Dijo woreda, Weteta kebele. His household was one of the most affected among the individual farmers. Before People in Need's project started in the area, he had lost more than two hectares of land due to soil erosion, and as the result; his family life depended on the safety net program of the government. As the result of the project intervention, especially land rehabilitation through effective erosion-control measures, which supports the area through the implementing of technical erosion-control measures, farm tools, seedlings, enclosing of degraded lands & applying required biophysical measures, Mr. Shek Kedir has successfully implemented the required erosion-control measures on his lands and returns his lands back to be productive. Apart from saving his land from degradation and displacement, Mr. Shek Kedir has also become a role model and exemplar to teach and shared his land management experience for the surrounding farmers, his neighbours, and relatives.

Mr Kassa Dilgeba, Model Farmer in the project "Increased Ecological stability of the Dijo and Bilate river watershed", Sankura Woreda, Silte, 2018

## Mrs. Negest, cooperative member

Mrs. Negest and other 40 women established a cooperative in 2012 with help of a government program and the JICA organization. This program gave women a chance to start working and to increase the income of their household. With support of MENDELU and the Czech company Holistic Solutions, the cooperative now has stable partner through which and can sell its products, mostly moringa powder from dried and powdered leaves.

They produced moringa powder and distribute it to bigger cities like Arba Minch or Addis Ababa. The money coming from the business is going into a joint bank account. Most of the money they earn is being reinvested to buy fresh moringa leaves, packaging etc. It also provides the women with a safety net and security as some of the money is used to help the members of the community in times of need (in cases of personal, natural, or other disasters). They also support other member of the community through their motivation and sharing their experience.

*Mr Kassa Dilgeba: I am free to share what I have and what I've learned from the project. Last year, I provided grass seedlings freely for over 30 farmers and gave advice for successful grass development*

Mrs. Negest says that the life is now better. Moringa production has increased, they have a better drying system. She can travel to exhibitions in Hawassa or other places, she meets many people from other countries, and they can exchange ideas and knowledge.

## Mr. Zekariyas Asaro, government official

Mr. Zekariyas Asaro is a Development Agent in Hawassa Zurya Woreda Agricultural Office. Currently, he is assigned as a DA and working in Kajimma Umbullo Kebele. Kajimma Umbullo is one of the Kebeles where Mendel University's project work has been implemented and Mr. Zekariyas was one of the focal point of the project and has been able to observe the different benefits of the results. "MENDELU has done successful afforestation using suitable species for the degraded land in the project area.

The project provided practical training to the local community in seedling raising and afforestation and improved living conditions of local community like reducing erosion or floods, increased biodiversity, more water culminated in the area, less pollution, and increased agricultural productivity. People were taught how to

produce honey and young people, who were jobless before, are now getting income from selling grass from the restored area."

### Mr. Kassa Dilgeba, farmer

Mr. Kassa is one of the model farmers in the Silte zone, Sankura woreda, Menezo Feten, in which one that has increased ecological stability due to it being a target kebele of the Dijo Bilate watershed project. Among the major root cause of land degradation in the targeted kebeles, free grazing has been the key challenge since the beginning. Due to the project implemented by People in Need and All for Soil, he started to introduce fodder grass at the FTCs, which has further extended to include other individual farmers. In this case, Mr. Kassa is one of the pioneer farmer that found it easy to adopt fodder grass production in his garden.

The project supports him through technical advice, training, providing a small number of seedlings & intensive follow up. Since starting in 2017, in addition to the use of the grass production for his cattle, he uses it as a major source of income for the household through the selling of grass seedlings to neighbouring farmers and other organizations who are looking for grass seedlings.

Now, he has more than 0.5 hectares of land covered by Desho grass and earns on average 50,000 ETB per year. Doing by this, this farmer is playing an important role in improving the adoption of grass production throughout the project-targeted kebeles, while at the same time contributing to the adoption of a cut and carry system and a reduction of free grazing.

Kassa says that now his life has changed and he is enjoying life more. He has supported at least 10 to 15 farmers yearly by providing sufficient grass seedlings to them for free.


Mrs Negest (on the right), a member of the cooperative producing moringa powder, Arba Minch, 2020

# 6 WAYS FORWARD AND RECOMMENDATIONS

Threshing of the harvest, Halaba, 2011

# 6.1 Technical innovations

## The promotion of environmentally and economically sustainable tree nurseries

Nurseries present a very important part of the country´s efforts to afforest the country again. However, there are a few things that should be pointed out. Most of the government nurseries would not be able to reach the sufficient production of seedlings without the significant financial or material support that is usually provided by INGOs or other institutions which makes the production unsustainable when such sources are not available. Large-scale production of tree seedlings also creates another problem when these seedlings are produced and kept in polybags which are then transported during the planting season to sites and usually kept in place, which leads to an ecological problem and thus should be done in a different way. Recyclable materials should be used and during planting these materials should be collected and either reused or recycled. One typical example is the extensive use of polyethylene bags, which are very demanding both economically and environmentally.

## The development of analytical capacities

Analytical capacities are indeed a key to diagnostics, monitoring, planning and design in most of the sectors. The analytical capacities in agriculture usually come second to those in areas such as healthcare or WASH programs, nonetheless, the variety of analysis needed for this sector are extensive. The analytical equipment varies from microbiological, veterinary, genetic, to those that are essential to field production, which comes down to soil analysis and testing.


Maize farmer from Lebu Koromo, 2010

As long as an informed decision should be made in relation to e.g. conservation agriculture, erosion control or improved agriculture practices, all farmers and experts need to have information on phenomena like soil structure, nutrient content, organic content, and pH levels. While many orientational estimations can be done using approximative methods with farmers, and through the use of field kits, there is a large opportunity for improving their capacities in soil analytical services. Especially given the role that agriculture plays especially in the economy of the SNNPR region. For now, these laboratory capacities and services are limited to only a few academic offices and governmental bureaus with limited amounts of equipment and outreach capacity among the farmers.

## The development of a land tenure cadastre systems

The participatory and community approach to landscape management shows the eminent importance of the topics related to topics of land-access, land-rights, and land ownership. Countries like the Czech Republic have a solid cadastre system, which includes combined data on the ownership along with pre-defined land use types and the legal definition related to this and access regulations.

These systems are being intensively developed also in Ethiopia, supported by World Bank programming and funding. During last decade, numerous efforts were made especially in terms of building the databases that assign land ownership / land access rights and the development of such a cadastre system is still in progress. Nonetheless, the land use application, inclusion of the Landscape Management Plan and the alignment with the community decision making process will continue to be a development challenge for years to come. The structure, track record and expertise of the Czech development assistance shows the high potential for program components that focus on capacity building in this area.

# 6.2 Programming

## Climate adaptation and resilience mainstreaming

Ethiopia, like many less developed countries, is facing the impacts from climate change more imminently than the developed world. The majority of their population is not able to adapt the rapidly changing conditions because of the level of underdeveloped or unavailable technologies and the vulnerable nature of their livelihood systems. Despite that governments are well aware of the need for climate resilience programming and have incorporated this topic into their strategic documents based on which particular steps and projects are to be realized.

There is more to this than climate mitigation. Climate adaptation programming and climate resilience are significantly more relevant in the context of the humanitarian-development nexus and the prevention of the environmental migration. The promotion of climate-smart agriculture is an integrated approach for developing strategies to secure sustainable food security in response to climate change in specific locations. While the overall production rate is not the ultimate goal, it still sustainably increases productivity, enhances resilience and adaptation, reduces, or removes greenhouse gases, and enhances the attainment of national food security and multiple SDGs.

## Aligning the geological surveys, landscape planning and community works

As mentioned in the introduction, hydrogeological surveys have a 40-year-old history of bilateral cooperation between the Czech Republic and Ethiopia. After the last decade's worth of experience with a robust program in landscape management and community extension, it is highly advisable to align the objectives of the projects designed. So far, there had been projects realized by PIN and CGS, which were realized in similar geographic areas. These would be ideal for data sharing as the mapping of CGS would be very useful for recent and future projects being realized in the sectors of agriculture and water. Both of these interventions have been found to be very useful and the impact of those joint efforts has significantly increased the impact of the intervention, the visibility of the CzDA programming and the likelihood of the formation of international consortia, not only on the level of NGOs, but also of donors.

**40**

**years of cooperation between Czech and Ethiopian Survey had been marked in 2019.**

## Planning long-term, well sequences interventions in selected areas

In comparison with other sectors, most of the NRM projects require some degree of time flexibility and a long-term timeframe for their implementation. All of this is due to the sensitivity of NRM in terms of climate and weather, both of which have become highly unpredictable. Also, the majority of the NRM activities are only possible to implement during a specific time of the year and the impacts of such activities are also possible to observe during the next year at the earliest. Here we are still only talking about the immediate impact, relatively speaking, not about the long-term impact, which is essential for successful NRM projects. These projects should also involve areas which are not selected administratively but rather geographically, which would make the areas covered by these programmes much larger than they currently are.

Lastly, projects should be then implemented in phases. Rather than thinking in terms of projects, we should talk about programmes which would include not only NRM, but also involve water and agricultural components.

## An integrated approach to landscape management projects

Landscape management projects are very complex projects and should in no way only be seen as hardware-oriented projects prioritising technology transfer and material support, neither should they be approached solely as emergency cash-for-work tasks. Currently, a well formulated NRM project is not only about treating land that has already been degraded. Frequently, fertile land should also be receiving protection through NRM measures and these increasingly include changing principles by also taking into consideration the perspective of agriculture, the social habits of people, water management or land access rights. NRM projects thus are confronted by a complex web of issues where many offices, people, farmers, and specialists should be involved. These projects usually last for couple of years so that they are able to demonstrate a significant impact and the quality of the impact of the proposed measures can be observed during different seasons and agricultural cycles.

# 6.3 Suggested modes of cooperation

## Data sharing and database maintenance

During the existence of CzDA programming there have been plenty of projects realized. Over the course of time, these projects have gathered a huge amount of data which are used usually only for the purpose of project evaluation and in the exchange between donor and implementer. After the project phase-out, these pieces of data are handed over to partners in Ethiopia and virtually lost or often unreachable for other implementing partners or future CzDA project cycles.

Datasets or readymade databases of collected information are neither kept in one place by donors nor by implementers or their partners. If we can manage to keep databases in one place which would be accessible by all the stakeholders (donors, implementers, partner organizations, partner/recipient countries) this would save a tremendous amount of time, money, and human resources when the initial studies are conducted, since these subjects could easily secure the necessary data from the databases without the need for additional baseline studies.

Moringa processing and promotion

## Unified monitoring and the use of program indicators

As written above, the efforts of CzDA to connect projects into programmes based on a topic or a geographic location should be done hand in hand with the unification of indicators. Even if the indicators are developed by the implementers, when it comes to the evaluation of a program, it is difficult for the donor to evaluate all of the projects from different implementers if they use different indicators. The common practice so far has been to divide the indicators into basic groups –general, specific outcome, output and activity indicators.

The introduction of Indikit, a tool developed by People in Need in 2018, was done with a similar intention. This tool was offered to CzDA so that it could be widely used among implementors and is available also on the webpage indikit.net. Indikit aims to make the monitoring and evaluation (M&E) of relief and development interventions easier and better. It was developed thanks to a financial contribution from CzDA and was offered to CzDA so that it could be shared with other implementers and could be used during project formulation. Doing this would enable the evaluation of the projects implemented by different implementers much easier.

## Promotion of consortia and participatory design

As has been shown in many prior examples, the cooperation of many subjects would be advisable. By many subjects we mean INGOs, government officers or offices, universities, specialist (like pedologists, hydrogeologists, agriculturalists, climatologists, etc.). The cooperation should start during the formulation phase. The idea should always come from the responsible governmental office or from affected people themselves. However, to be able to propose a well-thought out project, the idea should at least be commented on by other actors as they will be able to bring a new view on the problems and can propose different methods which could be used. This mutual cooperation should ideally continue during the project cycle and even after the project has been phased out the impact and results should still be monitored.

# 7 ANNEXES: Review of the projects implemented

| TIME FRAME | NAME OF THE PROJECT | TARGETED AREA | WOREDA | TYPE | IMPLEMENTED BY |
|---|---|---|---|---|---|
| 2008-2010 | Antierosion measures in the vicinity of lake Hawassa | Sidama | Hawassa Zuria | NRM | People in Need |
| 2010-2012 | Sustainable management of soil, forest and water resources as a pilot project of community development of South Ethiopia | Sidama | Hawassa Zuria | NRM | Mendel University in Brno |
| 2011-2013 | Support of household food security through integrated watershed management | Kembata Tembaro | Angacha | NRM | Caritas Czech Republic |
| 2011-2013 | Support to agriculture livelihoods and sustainable management of natural resources | Sidama | Hawassa Zuria, Boricha | NRM | People in Need |
| 2011-2013 | Support of farmers and agriculture education in Damboya and Halaba Special Woredas | Kembata Tembaro & Halaba | Damboya, Halaba | Agri | People in Need |
| 2011-2013 | Enhancement of quality and extent of extension services in woreda Angacha, Kembata Tembaro zone | Kembata Tembaro | Angacha | Agri | Czech University of Life Science |
| 2013-2016 | Support of agriculture consultancy in Ethiopia, Aleta Chuko, Dilla | Sidama | Aleta Chuko, Dilla | Agri | People in Need |
| 2014-2015 | Support to agriculture livelihoods and sustainable management of natural resources in Sidama II | Sidama | Shebedino | NRM | People in Need |
| 2014-2015 | Enhancement of quality and extent of extension services in woreda Angacha, Kembata Tembaro zone II | Kembata Tembaro | Angacha | Agri | Czech University of Life Science |
| 2014-2016 | Support of farmers and agriculture education in Halaba Special Woreda SNNPR, Ethiopia | Halaba | Halaba | Agri | People in Need |
| 2014-2016 | Long-term access to water in Halaba Special Woreda | Halaba | Halaba | NRM/ WASH | People in Need |
| 2014-2017 | Effective irrigation for sustainable agriculture production in the Kembata Tembare Zone | Kembata Tembaro | Angacha Kacha Bira | NRM | Mendel University in Brno |
| 2014-2016 | Degraded lands sanitation and reclamation as a base of sustainable management of natural resources in Hawassa Zuriya Woreda | Sidama | Hawassa Zuria | NRM | Mendel University in Brno |

| TIME FRAME | NAME OF THE PROJECT | TARGETED AREA | WOREDA | TYPE | IMPLEMENTED BY |
|---|---|---|---|---|---|
| 2015-2018 | Study of natural hazards harmful to agriculture production in selected areas of SNNPR | Sidama | Dilla, Mejo | NRM | Czech Geological Survey |
| 2016 - 2018 | Increased ecological stability of Dijo and Bilate Watersheds | Halaba & Sankura | Halaba, Sankura | NRM | People in Need |
| 2016 - 2017<br>2018 - 2019 | Implementation of holistic management and Climate Smart Agriculture in the Baso River catchment, Arba Minch Zuria Woreda | Arba Minch | Arba Mich Zuria | NRM | Mendel University in Brno |
| 2017 - 2020 | Participatory development of productive landscapes | Sidama | Loka Abaya, Aleta Chuko | NRM | People in Need |
| 2017 - 2020 | Support of agriculture consultancy development in Ethiopia | Sidama, Halaba | Aleta Chuko | Agri | People in Need |
| 2019 - 2020 | Extended Implementation of holistic management and Climate Smart Agriculture in Arba Minch Zuria Woreda | Arba Minch | Arba Minch Zuria | Agri | Mendel University in Brno |
| 2019 - 2021 | Support to community management of natural resources for development of sustainable livelihoods in Sankura and Halaba | Halaba, Sankura | Sankura, Halaba | NRM | People in Need |
| 2019 - 2021 | Support to farmers in ensuring the access to food and increased community resilience in selected kebeles of Kembata Tembaro Zone | Kembata Tembaro | Angacha Kacha Bira | Agri | Geotest |
| 2019 - 2022 | Introduction of the principles of sustainable management of the landscape in the vicinity of Hawassa lake | Hawassa | Hawassa, Hawassa Zuria | Agri | Mendel University in Brno |

**PEOPLE IN NEED**
**www.peopleinneed.cz**

**People in Need is a Czech, non-governmental organisation (NGO) that has been providing aid in troubled regions and supporting respect for human rights since 1992. People in Need has since grown to become one of the largest NGOs in Central Europe. Today, its work focuses on relief and development aid, advocacy for human rights and democratic freedom, field social work, and education, awareness and information.**

**CZECH DEVELOPMENT AGENCY**
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**The Czech Development Agency is a state organisation under the authority of the Ministry of Foreign Affairs of the Czech Republic and an implementing body of the development cooperation of the Czech Republic. The main aims of the Czech Development Agency include reducing poverty, improving quality of life and supporting sustainable development. The Czech Development Agency connects three groups of actors: state sector and local authorities, non-profit sector with universities and private sector.**