



## Climate Risks and Development Projects

### Assessment Report for a Community-Level Project in Guduru, Oromiya, Ethiopia

Marius Keller

*Bread for all*, November 2009

*Bread for all* is the Swiss Protestant Churches' development agency. It supports 400 development projects and programmes in 57 countries in Africa, Asia and Latin America. It also participates in development policy activities aimed at achieving more equitable international socio-economic structures, protecting "Creation" and building peace.

## I. Executive Summary

Climate change affects poor people in particular, because of their weak adaptive capacities. Development projects of all kinds can strengthen or weaken those capacities. At the same time, they can influence greenhouse gas emissions, the main cause of climate change, positively or negatively. It is therefore important to evaluate the impacts of development projects on adaptive capacities and climate change mitigation, in order to find measures to improve projects in the face of climate change.

This Assessment Report presents the results and the lessons learned from the climate proofing of a community-level rural development project in the districts of Guduru and Hababo-Guduru, Oromiya, Ethiopia. The analysis was conducted with the Climate Proofing Tool from HEKS and Bread for All. The analysed project is run by the local NGO Gurmuu, and financed by HEKS.

Beneficiaries of the project suffer from late rain, droughts, crops pests, malaria and water-borne diseases, as the evaluation shows. Droughts and higher variability of rainfall are a consequence of climate change. Future global warming will increase these risks, and add hazards that have been less important in the past, such as floods. The local population has many functioning coping strategies, but they cannot reduce their vulnerability sufficiently, particularly with a view to ongoing climate change.

The screened project activities have a positive impact on those livelihood resources endangered by climatic risks. Yet more actions need to be taken, and more people in the area should benefit from them, to render the population resilient. Among other things, natural resources should be strengthened further, financial incomes need to be diversified, and health services need to be improved in the face of spreading malaria and other diseases. The reduction of rapid population growth could also ease pressure on the environment and thereby reduce vulnerability.

Gurmuu's activities also contribute positively to reducing greenhouse gases in the atmosphere, through afforestation, agroforestry, soil improvement, the use of manure as fertiliser, and the planned introduction of fuel efficient stoves. These activities all have synergies with adaptation. If they can be scaled up, carbon credits might be obtained for some of them. However, carbon markets are very weak in Ethiopia, but new prospective finance mechanisms might improve the situation.

Further lessons were learned during this third test application of the Climate Proofing Tool. The suitability of the guide in different environments was confirmed. It paid off to use more time for stakeholder consultations. The newly introduced exercises for these consultations allowed participants to engage in a learning process themselves. Coordinators of the screened project said they had learned a lot, too. Finally, this third test brought for health issues as a consequence of climate change to the forefront for the first time.

## II. Acknowledgements

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- The NGO Gurmuu, for their warm welcome and support in organizing stakeholder consultations.
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- Jonas Bhend, from *Bread for all*, for the information on climate change in Ethiopia.
- The developers of CRiSTAL, a tool which forms the basis of the HEKS and Bread for All Climate Proofing Tool, and the CARE Climate Vulnerability and Capacity Analysis (CVCA) Handbook, from which many of the exercises used in stakeholder consultations were drawn.

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## 1. Introduction

Climate change and development are highly intertwined: The risks of global warming could jeopardise decades of development efforts, particularly in the poorest regions of our planet. It is therefore vital to ensure that development projects strengthen their beneficiaries' capacities to confront climate change. It is also important to make sure that the same projects do not lead to excessive emissions of greenhouse gases.

HEKS supports community-level projects in rural areas in poor countries across the planet. Many of their beneficiaries are heavily threatened by climatic risks, mainly because of their high economic, social, environmental vulnerabilities. Even though HEKS does engage in specific climate change projects, it has grasped the need to consider those threats and the related vulnerabilities.

In order to gain experience for HEKS as a whole, Marius Keller, a consultant, carries out climate analyses in community-level projects supported by HEKS in various countries. In November 2009, he visited Ethiopia and evaluated a rural development project in the Guduru and Hababo-Guduru districts, in the region of Oromiya (see Figure 1). The following assessment shows that beneficiaries are very vulnerable to climate change.



Figure 1: Map of Ethiopia and the Project Area of Gurmuu (Source: CIA 2009).

The analysis was executed with the HEKS and Bread for All Climate Proofing Tool, which is based on CRiSTAL, a tool jointly developed by the International Institute for Sustainable Development (IISD), Intercooperation, the International Union for the Conservation of Nature (IUCN), and the Stockholm Environment Institute (SEI).

This report is organised as follows. First, the project and its context will be briefly described. Then, the climate context in Ethiopia is discussed. Third, the assessment results for the project will be presented, following the structure of the Climate

Proofing Tool. The last section discusses some lessons learned from the application of the Climate Proofing Tool.

## 2. The Project and its Context

The analysed project aims at improving natural resources management skills and livelihoods of the marginalized people of five Kebeles (the lowest governmental units) of the Guduru and Hababo-Guduru districts, an area situated in Horo-Guduru-Wallaga zone of the region of Oromiya, Ethiopia. The project is solely financed by HEKS. HEKS and other donors finance further Gurmuu projects.

The following activities are meant to contribute to achieving the overall objective:

- To increase community knowledge and skills on natural resources management:
  - Strengthening nurseries which help the community to adopt multipurpose, forage and fruit plants.
  - Establishment of seven environmental management committees.
  - Training for 240 model farmers on land preparation, tree planting and watering.
  - Introduction of fuel efficient stoves
  - Promote improved forage production and utilization among 15 model farmers through providing training and planting forage trees on backyards for livestock feed purpose.
- To improve the physical learning environment in rural primary schools that meets the physiological and psychological needs of children:
  - Capacity support to two formal primary schools in rural areas of Guduru through furnishing with desks.
  - Capacitate one ABE centre (Jarso community managed alternative basic education center) through organizing refresher trainings for the management committee, facilitators, and giving furniture and text book materials.
- To enhance agricultural and income diversification of the community:
  - Promote potential and income generating non-farm activities such as: improved beekeeping among the poor and landless farmers in the locality (capacitate 40 organized local beekeepers with refresher trainings).
  - Promote the introduction of agro-ecologically suitable marketable crops such as: Soya Beans and Haricot Beans in the area through utilizing 15 model farmer demonstration plots. However, this activity has not been put in place due to negative feedback on the suitability of soy and haricot beans from other organisations.

## The Project and its Context

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- Encourage and train 15 model households who have traditional backyard hand dug-well (Biirii) in planting fruit trees and generating income.
- To increase women awareness on their rights and improve their socio-economic status:
  - Promote six women self-help groups initiatives (each group comprising 10 to 20 members) through provision of capacity building trainings on: self-help approach, basic business skills and entrepreneurship development.
  - Train and recruit three local animators who will technically support self-help group formation and follow-up their activities.
- To improve project management capacity:
  - Recruit a project office staff to closely implement and support the running and management of the envisaged project activities in the area.
  - Arrange capacity building training and experience sharing opportunities to improve the implementation skill of the project staff.

The project has a two year plan from 2008 to 2009. The annual budget is about 550'000 birr (some 50'000 Swiss Francs). HEKS has been supporting Gurmuu since its beginning in 2006. The analysed project has some 1000 beneficiaries: 416 tree seedling adopters, 40 bee keepers, 406 children in basic education and 3 women self-help groups with a total of 56 members. All Gurmuu activities together have some 16'000 direct and indirect beneficiaries.

No other NGOs are operating in the area, but Gurmuu has a number of other projects with various partners: Further tree nurseries are financed by Bread For All; construction of primary schools is supported by the Japanese embassy; a girls education promotion programme and women self-help groups are financed by Kinder-nothilfe, Germany; the Swiss embassy supports spring development and sanitation; and the German Foundation for World Population (DSW) finances adolescent sexual and reproductive health education.

The government is present in the area through Implementing Sector Offices in each district. There are offices relating to agriculture and rural development, water, health, education as well as women and children's affairs. The district administrator is the head of all the Implementing sector offices. Gurmuu works in close collaboration with these sector offices, and receives support from them in technical aspects. Gurmuu also hands over some of its programmes to those offices. Project coordinators of Gurmuu said that the collaboration with them goes well, and that they basically have the same agenda. Local government institutions exist in the form of an elected assembly on the district level, yet they have little more than symbolic decision power.

An existing government institution under the Agricultural and Rural Development Office deals with disaster prevention and preparedness. It is more effective on regional level, but is less present on the local level. Nevertheless, government help in times of need seems to work fairly well according to Gurmuu project coordinators.

Further organisations present in the zone include the farmer's union, which is government affiliated and provides agricultural input (although allegedly in a corrupt manner), religious institutions (mainly orthodox and protestant churches) and a number of community-based groups: IDDIR, which are groups established for mutual support during funerals, accidents, and other particular event; DABO, which are groups for labour-sharing; MAHIBER, which are interest groups, normally for people of the same religion, but sometimes separated according to gender, that meet on weekends for mutual support; IKUB, traditional savings groups; and the JARSUMA, elders groups which help to mediate conflicts.

People earn their lives mainly through subsistence farming, yet they can earn some income through sales of cereals, dairy products, some petty trade, little handicraft, pottery activities, carpentry and other small businesses. Demographic growth in the zone is rapid, and stands currently at around 3% per year in the Oromiya Region. Currently, the Guduru and Hababo-Guduru districts count some 145'000 inhabitants.

Ecologically, the zone belongs to low- to mid altitudes. The year can be separated into dry and rainy seasons. Rain used to begin in April and end in August, yet now it varies much: In recent years it started only mid-June, and ended as before in August. Monthly mean temperatures are between 15 and 19°C in the mid-highlands, and higher in the lowlands. Yearly average rainfall is around 1600mm.

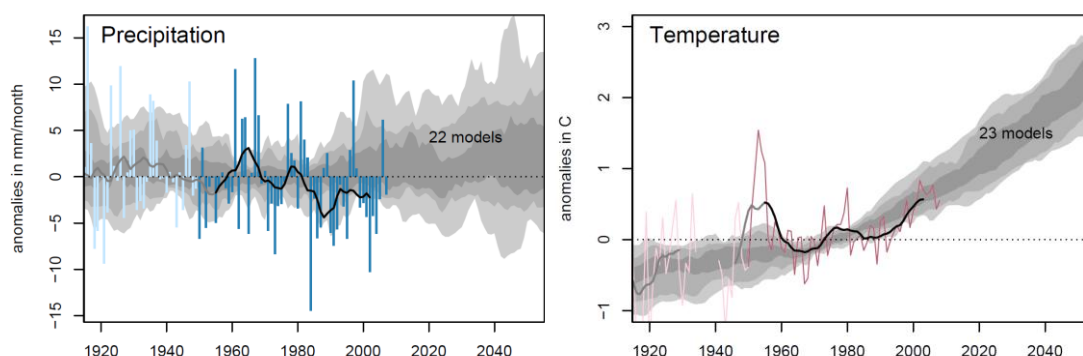
### 3. Ethiopia and Climate Change

#### 3.1. The Impacts of Climate Change in Ethiopia

Climate change is already taking place now, thus past and present changes help to indicate possible future changes. Over the last decades, the temperature in Ethiopia increased at about 0.2° C per decade. The increase in minimum temperatures is more pronounced with roughly 0.4° C per decade. Precipitation, on the other hand, remained fairly stable over the last 50 years when averaged over the country. However, the spatial and temporal variability of precipitation is high (see Figure 2), thus large-scale trends do not necessarily reflect local conditions.

The future changes in precipitation and temperature as projected by various global climate models are summarized in Figure 2. Most of the global climate models project an increase in precipitation in both the dry and wet seasons. Studies with more detailed regional climate models, however, indicate that the sign of the expected precipitation change is uncertain. The temperature will very likely continue to increase for the next few decades with the rate of change as observed.





*Figure 2: Observed precipitation (Schneider et al. 2008) and temperature (Brohan et al. 2006) changes in Ethiopia (annual averages) along with simulated changes by 22/23 global climate models (IPCC, 2007). The observed changes are likely flawed by network density changes and measurement errors in the first half of the 20th century (light colours).*

The projected increases in the interannual variability of precipitation in combination with the warming will likely lead to increases in the occurrence of droughts. Furthermore, heavy rains and floods are projected to increase as well.

Detrimental and beneficial impacts of the ongoing and projected climate change and variability are widespread in both socio-economic and natural systems. These impacts include:

- Agriculture, Food Security: The increasing year-to-year variability and increases in both droughts and heavy precipitation events lowers agricultural production with corresponding negative effects on food security.
- Water: The availability of clean drinking water is likely to decrease due to the increasing evaporation and the increasing variability of rainfall events.
- Health: Incidences of malaria in areas of the highlands where malaria was previously not endemic. The warming is further expected to cause an increase in cardio-respiratory and infectious diseases.
- Ecosystems, Biodiversity: Climate change but also human drivers such as forest fires threaten forest ecosystems. Furthermore, a large number of plant and animal species is threatened by extinction, as climate conditions are changing too quickly for them to adapt.
- Infrastructure: Heavy rainfall events and floods cause damages to roads and buildings.

It is important to notice, however, that other factors threaten the livelihoods of Ethiopian communities as well. For example resource degradation and the overexploitation of natural resources such as fire wood is one of the key issues in association with the environmental decline.

### 3.2. Ethiopia's Contribution to Climate Change

The GHG emissions per capita in 1994 totalled to 900 kg CO<sub>2</sub> equivalent per capita and year. Compared to other countries, Ethiopia's emissions are very low (e.g. the U.S. emissions amount to 23.7 tonnes CO<sub>2</sub> equivalent per capita and year in 1994).

Sectorwise, Ethiopia's GHG emissions are dominated by agriculture, which contributes 80% of the total GHG emissions. This reflects the fact that livestock farming goes together with high methane emissions. The dominant position of livestock farming in Ethiopia's economy also influences the relative contribution of GHG to the total emissions (see Figure 3). These are dominated by methane emissions, which account for 80% of the warming potential.

In addition to agriculture, the energy sector (heating, cooking, and transport) contributes to the total GHG emissions with 15%. 95% of the energy consumption is satisfied by biomass sources (mainly wood); petroleum and electricity are of minor importance.

Ethiopia's GHG emissions are closely linked to basic needs of the population: Food production (through livestock farming) and heating. Therefore, the future GHG emissions will likely increase with the projected increase in population.

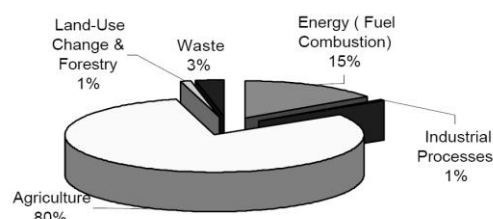


Figure 3: Total greenhouse gas emissions by sectors in 1994, (FIRST, 2001)

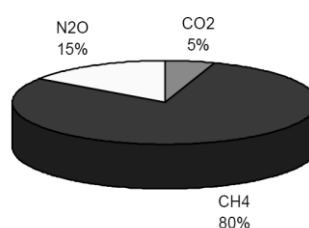


Figure 4: Relative contribution of individual greenhouse gases to aggregated emission (FIRST, 2001)

## 4. Assessment of Activities in Gurmuu

This section presents the results of the analysis on climate change conducted in November 2009. The presentation follows the structure of the Climate Proofing Tool which was used for the analysis. First, the project specific climate context is analysed. Second, current coping strategies are identified, followed by an analysis of livelihoods in the climate context. Then, the project's impact on adaptive capacities

and on greenhouse gas emissions is evaluated. The last section looks at possible project revisions.

#### 4.1. Climate Context

##### *Scientific information*

Chapter 3 has already dealt with the impacts of climate change on a regional and national level. Scientific information on a more local level is not available. Therefore, the results of consultations with project representatives and beneficiaries as presented below have to help to identify the consequences of climate change on a local scale.

##### *Information from Stakeholder Consultations*

The information on the impacts of climate change was collected during two one-day workshops with the local population, one with women and another with men. The workshops took place on 3 and 4 November 2009. The main natural risks identified in both workshops were late rain (which means a shorter rainy season), droughts and crop pests. Malaria was mentioned by both groups, but emphasized as very important by men. Water-borne diseases were only mentioned by women.

In an exercise on the impacts of those risks, participants identified the following consequences.

The *late rain and droughts* lead to:

- Crop loss
- Decreased productivity or loss of livestock
- Water shortage
- Soil erosion
- Reduced income from agricultural production
- Food insecurity/famines
- Decreased ability to meet other basic needs

The impacts of droughts are generally more intense.

*Crop pests* lead to:

- Reduced soil productivity/crop loss
- Reduced livestock feed
- Loss of livestock
- Food insecurity

There are different pests, including armyworms and weed. They have, however, similar consequences.

*Malaria* leads to:

- Death and illness
- Increased family health expenses
- Reduced productivity

*Water-borne diseases* lead to:

- Increased health expenses
- Reduced production
- Death

Generally, women mentioned more risks and impacts related to water and health, presumably because these tend to be their domains. Men mentioned more details on crop pests. Overall, however, the results were largely overlapping. No contradictions were found between the results of both groups.

The increasing occurrence of late rains and droughts is consistent with scientific assessments on the impacts of climate change in Ethiopia. Droughts can be associated with higher temperatures and consequential higher evaporation rates. Increased variability of rains is consistent with changes in local rainfall patterns. Predictions of future temperatures rise and ever increasing rainfall variability mean that both droughts and late rains will probably become more pronounced in the coming decades.

In addition, scientific assessment point to increasing occurrence of heavy rains and floods, both phenomena also mentioned in the stakeholder consultations, but considered less important than other risks. It is worth considering these risks in future project work concerning adaptation to climate change.

Crop pests can be related to drought conditions. Many worms, such as the armyworm mentioned in the men's workshops, proliferate in hot and dry conditions. A connection between climate change-induced droughts and crop pests is therefore probable.

Malaria is related to climate change, as the presence of mosquitoes is mainly a question of temperatures and humidity. Increased temperatures allow mosquitoes to reach higher altitudes. This is exactly what people said in the consultations: Earlier, malaria only occurred in the lower parts of the project area, now it often reaches the mid- to high-lands.

Water-borne diseases are partly a result of droughts, as these lead to more standing waters, which lead to more contaminated water. However, the main cause of these diseases is a general lack of hygiene.

Overall, the risks experienced by the people in Guduru and Hababo-Guduru are reinforced by ongoing climate change. Adaptation will become ever more important.

A protocol of the stakeholder consultations including more detailed information can be found in the annex to this report.

#### 4.2. Current Coping Strategies

In the same workshops mentioned above, participants were asked to explain how they react currently to the impacts listed above.

Regarding the impacts of *late rain and droughts*, participants identified the following coping strategies:

- Crop diversification as a reaction to reduced productivity. This strategy was not considered very sustainable or efficient, as it can only help marginally.
- Fallowing, as a reaction to reduced productivity of soils. This is sustainable, but requires sufficient possession of land.
- Using crop residues, Grow and store herbs and straw for animals, as a reaction to reduced fodder availability. It is sustainable and works mostly.
- Water harvesting (retention and storage measures, terracing) as a reaction to water shortage. This strategy was considered to work well and being sustainable, as it can also increase groundwater levels.
- Well digging as a reaction to water shortage. Women, who mentioned this strategy, said it works and is sustainable. However, women mentioned also that water tables are declining and that well digging is not feasible anymore in all areas.
- Constructing ponds against water shortage. This is sustainable, but not very efficient.
- Planting trees, as a measure against soil erosion. This is sustainable and quite efficient.
- Diversification of incomes through livestock, bees and poultry, against reduced incomes. This is sustainable, but not very effective, as these activities are difficult to put in place.
- Petty trade (grain and other sales), as a reaction to reduced incomes. This strategy was considered efficient and sustainable.
- Reduction of expenses, as reaction to reduced incomes. It is not sustainable, except for some social expenses such as funerals. It works partly.
- Reduction of food consumption a general reaction to food insecurity. It works (as it almost has to), but it is not sustainable and dangerous.
- Saving and borrowing, as a strategy against famines/droughts works, but only if not everyone is affected. It is not sustainable.

- Sale of livestock, as a reaction to reduced incomes. This is neither sustainable nor particularly efficient, as in times of food insecurity, animal prices are lower.

Regarding the impacts of crop pests, the strategies identified by the participants were similar to those mentioned above, since the consequences of crop pests are comparable to the consequences of droughts and late rain.

Regarding the impacts of *malaria*, participants identified the following coping strategies:

- Drain and clean surroundings, to avoid malaria being spread. This is sustainable and somehow efficient.
- Go to health centre, to cure malaria. This is not sustainable, but quite efficient. It requires money, however, and increased expenses were deliberately indicated as one negative consequence of malaria.
- Traditional medicine, such as garlic. It is rather sustainable, but even according to participants not very efficient. It tends to serve as a preventive measure, but not as a cure.

Regarding the impacts of water-borne diseases, participants identified the following coping strategies:

- Boiling water, to prevent contaminated water from causing diseases. This is sustainable, and it works. However, most people don't practice it (sufficiently), due to lack of knowledge and time.
- Environmental sanitation (e.g. building latrines), against water contamination is sustainable and it works. Most people do it.

There is a wide array of strategies currently employed by the population of the districts of Guduru and Hababo-Guduru. Many of them are sustainable, and many actually work. Nevertheless, the population lack sufficient long-term adaptation strategies, particularly when considering the worsening climate outlooks. Considering the almost complete dependence on agricultural productivity, the local population is very vulnerable. Interestingly, men listed more unsustainable responses than women. Overall, however, many of the strategies were very similar, and none of the answers are contradicting.



*Figure 5: Stakeholder consultation with a women's group (Photo: Marius Keller).*

### 4.3. Livelihood Resources

This section first presents the most important resources for the local populations' livelihoods. In a second step, the impact of climate hazards on those resources are analysed, and in a third step, their importance for the current coping strategies is evaluated. The results of this section were identified by project beneficiaries in the workshops mentioned above.

#### *Identifying Livelihood Resources*

Participants of the two workshops identified the following resources as their most important livelihoods. The categorization into five different types was undertaken during the workshops:

- *Natural resources*: Land/soils, water and forests were identified as the most important natural resources by both women and men.
- *Physical resources*: Schools and health centres were identified by both groups. Roads were mentioned by men, whereas women considered water supply systems as a third very important physical structure.
- *Financial resources*: The most important income sources were considered to be sales of farming products, sales of livestock and small trade activities (sales of local produce, carpentry, handicrafts, and other).
- *Human resources*: Unskilled labour (by both groups) and health (by men) were identified here.
- *Social resources*: Both groups mentioned religious institutions and a number of local self-help groups: In this category, both mentioned the IDDIR, local groups mostly active in case of death of a family member, men also mentioned the JARSUMA, the elders group, whereas women mentioned the self-help group for women, which provides, among other things, small loans.

#### *Impacts of Climatic Risks on Livelihoods*

In the same workshops mentioned above, participants were asked how the different risks identified above influence their livelihoods.

- *Natural resources* are very much affected by the identified risks. Late rains and droughts affect land, water and forests massively. Crop pests affect land and water slightly, and forests very much (the parasites eat up leaves).
- *Physical resources* are completely unaffected by those risks considered very important. However, floods can affect parts of the physical structure, particularly roads. Floods are not so important now, but could become more important due to ongoing climate change.
- *Financial resources* are very much at risk by almost all natural hazards. This is because on the one hand income generating activities depend almost entirely on natural resources, and on the other hand they require healthy people

executing them. Diseases weaken people, and therefore also financial activities.

- *Human resources* can be massively affected by droughts (at least men said this), and by diseases.
- *Social resources* are relatively resilient, except against water-borne diseases. This is because local groups might function less well if people are sick or are too busy with other stressful situations.

In sum, natural resources and financial incomes are most at risk from natural hazards. Human resources are affected by illnesses such as malaria, water-borne diseases and to some extent by droughts. Social resources are relatively resilient. The physical structure is virtually safe, but long-term development such as more frequent floods should be kept in mind.

### *Importance of Livelihood Resources for Coping Strategies*

The importance of resources for coping strategies was also evaluated in the stakeholder consultations.

All *Natural resources* are important for many coping strategies, such as crop diversification, water harvesting or environmental sanitation.

- *Physical resources* were hardly mentioned during the discussions on coping strategies. Yet health centres, schools and water supply systems seem to be important for some strategies. Health centres, for instance, to deal with malaria and water-borne diseases. Schools can be useful to educate people on things like environmental sanitation or doing trade. Water supply systems are important to counter droughts and to protect from water-borne diseases.
- *Financial resources* are needed for only a few coping strategies, namely trade, well digging and malaria treatment.
- *Human resources* are needed for almost every coping strategy.
- *Social resources* were not often mentioned, but they should be considered important to dealing with some impacts, as they facilitate many strategies such as saving and borrowing.

In short, almost all resources are needed to deal with the impacts of climate change and other risks. The most important ones are natural and human resources.

## 4.4. The Project and Adaptive Capacities

This section analyses the impact of the project on livelihood resources that are considered either heavily affected by natural risks or very important for current coping strategies, in order to evaluate the projects influence on adaptive capacity of its beneficiaries. In the present case, all resources were considered to be relevant. The analysis was conducted in a meeting with project coordinators.



*Impact of the Activity "Increase Community Knowledge and Skills on Natural Resources Management"*

- All *natural resources* are directly strengthened by this activity, for example through model farms, tree nurseries, or environmental management committees.
- *Physical resources* receive some support through increased timber production from tree nurseries. Timber is used in many buildings, including schools and health centres.
- *Financial resources* are strengthened through better agricultural and livestock productivity, timber production and the corresponding increase in commercial opportunities.
- *Human resources* benefit through better and more diverse food and better working environment thanks to reforestation.
- *Social resources* are not strengthened by this activity.

*Impact of the Activity "Improve the Physical Learning Environment in Rural Primary Schools"*

- The activity has some impact on *natural resources* through increased environmental awareness thanks to education.
- Among the *physical resources*, schools benefit in the form of desks and furniture.
- *Financial resources* are not strengthened by this activity.
- *Human resources* are somewhat improved through education itself and through better health for children thanks to functioning schools (protection and education).
- *Social resources* are not strengthened by this activity.

*Impact of the Activity "Agricultural and Income Diversification"*

- *Natural resources* are strengthened mainly in the form of trees and land thanks to fruit tree planting.
- *Financial resources* also benefit thanks to new incomes from honey and fruits.
- Other resources are not affected by this activity.

*Impact of the Activity "Increase Women Awareness on their Rights and Improve their Socioeconomic Status"*

- *Financial resources* are strengthened through fostering business skills and entrepreneurship development.
- *Social resources* are strengthened, as the self help groups themselves are a social resource.

- Other resources are not affected by this activity.

*Impact of the Activity “Improve Project Management Capacity”*

This activity strengthens the capacities of the NGO itself, and has only very indirect effects on people’s livelihoods.

*Evaluation of the Overall Impact on Adaptation*

The analysis shows that almost all resources are positively affected by Gurmuu’s activities. Particular support is given to natural resources. Other resources benefit mainly indirectly, except for some support to financial resources and social resources. No negative impacts have been discovered. There is, however, a lot of room for further strengthening. On the one hand, the project’s impact on many resources is low. On the other hand, only some 1000 out of 150’000 people in the area are affected, with no other NGOs working there.

#### 4.5. The Project and Mitigation

This section deals with the project’s impact on greenhouse gas emissions, and essentially consists of looking at some potential sources or sinks for greenhouse gases, and analysing what the project’s impact on those sources is. The evaluation is purely qualitative, as no emissions or sink measurements have been conducted. The analysis has been conducted through a meeting with project coordinators.

The project appears to be influencing the greenhouse gas balance of the zone as follows:

- A few *NGO vehicles*, including a car and two motorcycles, emit some CO<sub>2</sub> from gasoline combustion.
- Planned *fuel efficient stoves* in households will save firewood, and thereby reduce emissions from deforestation.
- Environmental education on *increasing soil fertility* through compost and the *use of manure* as a fertilizer improve soil quality, which improves their carbon sink potential, and they reduce the use of chemical fertiliser, which decreases emissions of nitric oxide.
- *Tree nurseries* encourage reforestation and afforestation, and they also encourage agroforestry, for example through mixed plantations of coffee and trees.

The project does not have any impact on electricity, use of biomass, animals, or waste. It has hardly any negative impacts, the NGO vehicles being both negligible and unavoidable.

In sum, the project has a positive impact on emissions and sinks of greenhouse gases, even though not a very large one. Yet it is important to take those effects into account, particularly in view of a possible extension of some activities that are beneficial to mitigation, such as reforestation or soil improvement measures.

The emissions overview above reflects the national emission balance, which notes that 80% of emissions are from land use and forestry. The local situation shows that there are in fact mitigation opportunities regarding the improvement of natural carbon sinks.

### 4.6. Project Revision

Based on the previous two sections on the project's impact on adaptive capacities and mitigation, this section seeks to identify areas where this impact could be improved by means of project revisions or the design of new activities. The analysis according to the project revision cycle provided in the Climate Proofing Tool is not discussed here, as it has been left to the project managers to decide how to move on regarding new or revised activities.

#### *Suggestions for Improvements Regarding Adaptive Capacities*

In spite of the above mentioned positive effects on adaptive capacities, a lot more can be done to render populations more resilient against natural risks. The following list proposes a number of activities which could reinforce those capacities.

- *Natural resources* are the main focus of the screened project, yet to render people resilient they need further protection, particularly in the light of ongoing climate change, which is likely to bring more intense droughts and variation in rainfall. Useful drought-resistant crops should be considered, for instance. Regarding water, retention mechanisms need to be strengthened. Apparently average rainfall is very high, with 1600mm per year. The main problem is therefore the distribution over the year. Measures to retain more water can build on existing coping strategies. Water retention can also be improved through afforestation. Different measures to increase the forest cover, including the already existing nurseries and planned fuel efficient stoves could be extended. Furthermore, animal husbandry could be supported through increasing quality of livestock, which can make people less dependent on certain crops. Another important factor behind the vulnerability of the population is demographic growth. Measures to reduce that growth of currently around 3% could help ease the pressure on almost natural resources. Finally, an up-scaling of Gurmuu's services, from which only a small part of the local population benefit today, would have significant adaptation benefits in general.
- *Physical resources* are hardly affected by Gurmuu's work so far, except for supporting a few schools with desks and furniture and through timber production. Since they are not affected by the main risks, and not particularly impor-

tant for coping, they should not be the main focus of Gurmuu's work from an adaptation point of view. However, increased floods, as predicted in scientific reports on climate change in Ethiopia, could threaten roads and buildings in the longer run, so the physical infrastructure should not be left out completely.

- *Financial resources* are very affected because they depend almost entirely on natural resources. Measures that could improve the situation include improved linkages to national and international markets, stimulating the processing of agricultural or livestock products, and the diversification of incomes into activities that are less threatened by the main risks, such as handicrafts or carpentry.
- *Human resources* require strengthening, particularly regarding health. Malaria is spreading in the area, which means people need mosquito nets or other effective protection measures. Water-borne diseases can probably best be fought through better sanitation and the respective education in hygiene.
- *Social resources* need probably less strengthening, as the population seems to have established a number of good self-help mechanisms. Still, some strengthening might be required when implementing some of the measures mentioned above.

Gender aspects should be considered when elaborating new or revised measures. The analysis showed that women place more emphasis on water and health issues. How this translates into differences in vulnerabilities is, however, not clear from this report.

Note that measures should as far as possible build on existing local coping strategies, as the population seems to be quite proactive concerning such measures.

Also note that these suggestions can be used for advocacy work. The government can be asked to offer some of the services, as it has a duty to protect its citizens from the effects of climate change and other risks.

### *Suggestions for Improvements Regarding Mitigation*

The reduction of greenhouse gas emissions or the improvement of sinks is not the primary concern of the rural poor, as they are only minor emitters of greenhouse gases. Yet it is still worth considering emissions reducing or sink improving measures, for two main reasons. First, they could benefit from high synergies of mitigation and adaptation measures. Second they could become part of a mitigation project obtaining carbon credits on the international market. Thanks to this, adaptation measures with strong synergies in mitigation could be financed by carbon credits.

In the area of Guduru and Hababo-Guduru, reforestation and afforestation activities, if executed on a sufficiently large scale, could obtain carbon credits. Unfortunately, Ethiopia and Africa in general have hardly attracted any carbon credit projects so far. However, it is possible that this will change in the future, since the UN is developing a system through which it will be easier to establish projects against

deforestation or land degradation, as well as less market-based finance mechanisms, since these tend to direct few financial flows to Africa.

### 4.7. Conclusions

The analysis of a project run by the NGO Gurmuu in the districts of Guduru and Hababo-Guduru, in Ethiopia, showed that the population is vulnerable to a number of risks, the most important being late rain, droughts, crop pests, malaria and water-borne diseases. All of those risks can to varying extents be associated with climate change, most prominently droughts and varying rain seasons.

The local population has a number of sustainable coping strategies, yet considering their heavy dependence on natural resources, they lack sufficient adaptive capacities. The project's activities undoubtedly strengthen those capacities, yet further measures are needed, particularly considering the ongoing climate change, which will tend to increase existing risks and bring about risks that were less important so far, such as floods. Further measures should do more to protect and reinforce natural resources, improve and diversify financial resources, and protect human health, among other things.

Mitigation programmes aiming at reforestation and possibly soil conservation activities would have strong synergies in adaptation and could bring in the needed finance for adaptation precisely because mitigation has a value on international carbon markets and in new programmes on reduced emissions from deforestation and soil degradation.

The analysis of climate risks, vulnerability and adaptive capacities in the districts of Guduru and Hababo-Guduru shows that natural hazards can and must be confronted. Climate Change will only increase risks, but if intelligent and locally adapted measures are taken to make the population more resilient, their impact can be lessened.

## 5. Lessons learned from the Application of the Tool

The climate change analysis presented in this report is the third one conducted with the HEKS and Bread for All Climate Proofing Tool. Besides evaluating a specific project, the application of the tool also aimed at testing and improving it. The following lessons were drawn:

- The experience in the third country worldwide and in the second one on the African continent confirms the suitability of the tool in very different environments.
- The newly applied concept of using more time for the analysis in the field pays off. In particular, it was helpful to have an entire day for the consultations

with each group of beneficiaries, namely men and women. This allows people to discuss answers with less stress, and helps them to voice their opinions. This strengthens not only the results of the analysis, but also the self-learning process among participants.

- This learning process was also supported by introducing new exercises in the stakeholder consultations, namely the hazard map and historical timelines.
- The concept of two separate workshops for men and women works well, and should be pursued in other assessments if possible.
- Coordinators were very happy with the process, too, and looked at it as capacity building for themselves. They thought it will help them to stimulate future project developments.
- In terms of results, this is the first time that increasing occurrence of malaria has been observed as a risk. This extends the range of usual risks which normally relate to droughts, changes in rainy seasons and floods.

## IV. References

- Brohan et al. 2006: Uncertainty estimates in regional and global observed temperature changes: A new data set from 1850. *Journal of Geophysical Research Atmospheres*, 111, D12106.
- CIA, 2009. CIA Factbook, available online: <https://www.cia.gov/library/publications/the-world-factbook/>
- GHF, 2009: *Human Impact Report: Climate Change – The Anatomy of a Silent Crisis*. Global Humanitarian Forum, Genève, Suisse. ISBN: 978-2-8399-0553-4
- IPCC, 2007: *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. IPCC, Geneva, Switzerland, 104 pp.
- Schneider et al. 2008: *Global precipitation analysis products of the GPCC*. Technical report, Global Precipitation Climatology Centre (GPCC), Deutscher Wetterdienst.
- FIRST, 2001: *Initial National Communication of Ethiopia to the United Nations Framework Convention on Climate Change (UNFCCC)*. Report of the Federal Democratic Republic of Ethiopia, Ministry of Water Resources, National Meteorological Services Agency.
- NAPA, 2007: *Climate Change National Adaptation Programme of Action (NAPA) of Ethiopia*. Report of the Federal Democratic Republic of Ethiopia, Ministry of Water Resources, National Meteorological Services Agency.

## V. Annex

Minutes from Workshops in Kombolcha, Guduru

Day 1, 3 November 2009, Men's group

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### *Exercise 1: Hazard Map*

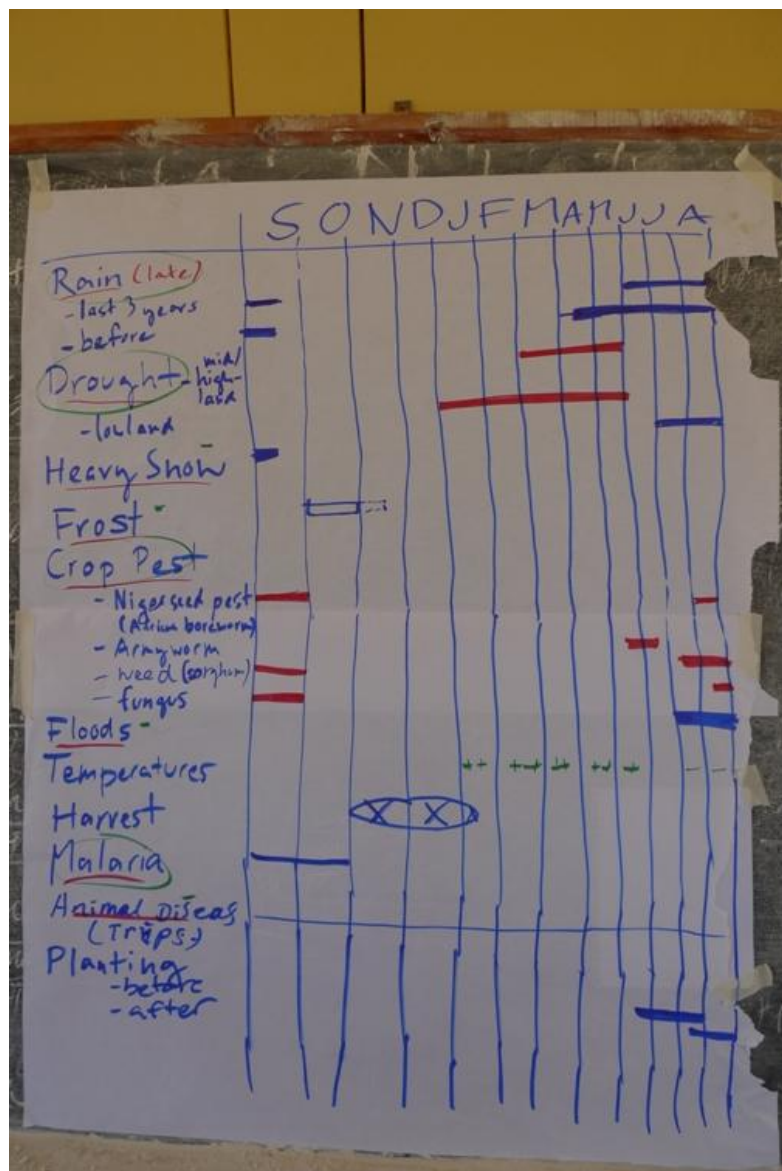


#### Notes:

- The map displays the whole districts of Guduru and Hababo-Guduru.
- Drought and the lack of rain can occur everywhere. So does heavy snow, but this is less often.



## Exercise 2: Seasonal Calendar



Notes:

- Most important risks:
- Late rain: occurs every year
- Drought: every year, but increasing in intensity over years; apparently some years with very bad drought (see historical timeline)
- Crop pests: in some areas every year, now expanding into other areas

- Malaria: occurs every year now
- Rain is now expected in June, whereas before it normally began in April. This change has been gradual.

### Exercise 3: Historical Timeline

HISTORY of GUDURU district	
2007	Two kebeles in lowlands stricken by drought - rather areas
2005	National elections: conflict community - government; loss of life & assets; people still detained
2002-3	Great drought: loss of life; (lowlands more affected)
since 2002	Agric inputs/industrial products more expensive, but food prices ↓ → food insecurity
~1985	Big drought - famine Oppression during derg regime

### Notes:

- People also noted slow changes such as the emergence of HIV/AIDS, deforestation and adaptations such as changes in the crops (e.g. wheat)

#### Exercise 4: Vulnerability Matrix

Livelihood Resources	Late Rain	Drought	Crop pests	Malaria
Land/soil	3	3	1	0
Forest	2	3	3	0
Water	3	3	1	0
Health center	0	0	0	0
Schools	0	0	0	0
Roads	0	0	0	0
Crop farming	3	3	3	0
Sales of livestock	3	3	2	0
Small trade	2	3	2	0
Unskilled labour	1	2	0	3
Health	2	3	1	3
religious institutions	0	1	0	1
IDDIR	0	1	0	1
JARSUMA	0	1	0	1

#### Notes

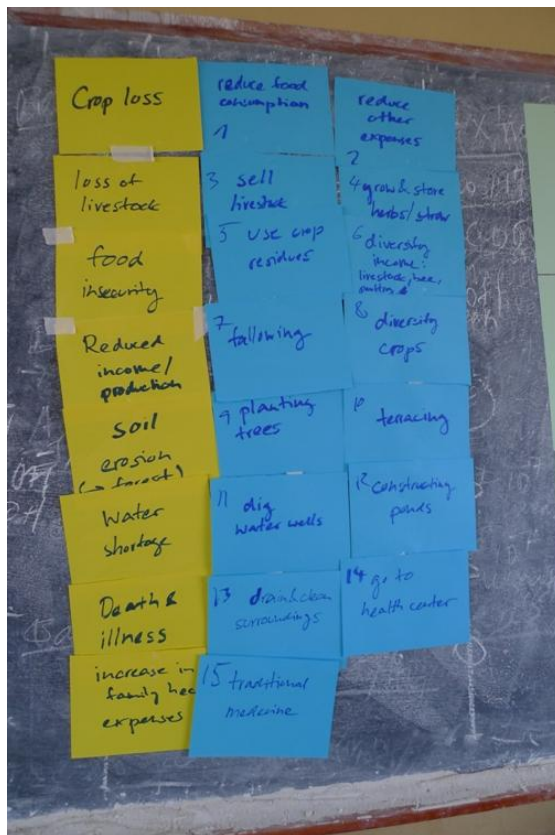
- The impact of crop pests on land/soil is both positive and negative, as termites also improve soil quality
- The impact of crop pests on water is negative because termites destroy wells and contaminate water

### Exercise 5: Risks, Impacts and Coping Strategies

The first picture shows risks and associated impacts:



Second map shows impacts and associated coping strategies:



Notes regarding coping strategies:

- Reduction of food consumption: not sustainable
- Reduction of other expenses: not sustainable, except for some social expenses such as funerals)
- Sale of livestock: neither sustainable nor particularly efficient (low price in these times)
- Grow and store herbs and straw for animals: is sustainable, no very efficient though; requires land and water to be put in place
- Use crop residues: Sustainable and it works; requires human labour
- Diversification of incomes through livestock, bees and poultry: is sustainable, not very efficient; requires land, forest, water
- Fallowing: sustainable, but requires sufficient possession of land
- Diversify crops: sustainable, not too efficient; requires land and water
- Planting trees: sustainable, quite efficient, requires land and water
- Terracing: efficient and sustainable; requires labour and land
- Dig deep water wells: sustainable and feasible; requires labour and financial resources

- Constructing ponds: sustainable, but not efficient; requires labour and trees
- Drain and clean surroundings: sustainable and somehow efficient; requires labour and land
- Go to health center; not sustainable, quite efficient; requires health center and financial resources
- Traditional medicine: rather sustainable, not very efficient; more preventive but does not completely cure malaria

Day 2, 4 November 2009, Women's group

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### *Exercise 1: Hazard Map*



#### **Notes:**

- Red "worms" indicate zones where crop pest can hit
- Identified risks:
- Short rainy season/ late rain/ Rainy season fluctuation (summarized as "late rain")



- Drought
- Crop pests
- Water-borne diseases
- Malaria
- Heavy rain/ storms/ snow
- The first four risks were considered most important
- Other mentioned problems included price hikes for agricultural inputs, difficult access to health centers, water shortage, and the destruction of roads due to heavy rain. They were not registered as risks because they are consequences of such risks or not related to climate
- Water-borne diseases are itself in part a consequence of unclean water, but due to the high importance and partial relation to droughts and the caused standing water they were still considered as a risk in the subsequent analysis
- Center of the map is Kombolcha village

### Exercise 2: Seasonal Calendar



Notes:

- Droughts occur almost every year, yet the intensity varies much
- The length of the rainy season has decreased gradually
- Water-borne diseases occur all year, but most pronounced during water shortage period which is related to drought
- Food insecurity is most pronounced before harvesting, not during drought – it's a matter of using up food stocks, and during planting season there is a competition between eating or sowing grains.

### Exercise 3: Historical Timeline

<u>Historical Timeline</u>	
2005	Conflict with government → separation in 2 districts
2002 → 92-93 90-91	long Drought/rain shortage Transition Regime: conflict, death, rape, high instability
84-85 during Dey	Big Drought oppression, particularly women

### Notes:

- After the 2005 conflict, the government split up Guduru district into two (Guduru and Hababo-Guduru), and provided better roads, electricity, health centers, and a new school building to calm down the population.



#### Exercise 4: Vulnerability Matrix

Resources	Late Rain	Drought	Crop pests	Water-borne diseases
Land/soil	3	3	0	0
Water	3	3	1	2
Forest	2	3	2	0
Water supply	0	0	0	0
Schools	0	0	0	0
Health center	0	0	0	0
Crop farming	3	3	3	3
Small trade	2	2	2	3
Livestock	3	3	2	3
Labour (unskilled)	0	1	0	3
IDDIR	0	2	1	3
SHG (for women)	0	1	1	3
Religious Institutions	0	1	0	3

#### Notes:

- SHG (Self-help groups) for women were established by the government initially, but are also supported by Gurmuu, so they can operate in smaller, more homogeneous groups
- Small trade includes production and sales of local beer and liquids, grains, carpentry, and handicrafts
- The effect of droughts on social resources, particularly IDDIRs can be explained by the fact that people can't attend meetings because of health issues and workload.
- Groundwater levels have decreased from 15m in the past to 25m now in some areas. Where this is the case, wells can no longer be dug, as it is dangerous to dig so deep

### Exercise 5: Risks, Impacts and Coping



#### Notes:

- All the impacts of late rain are also impacts of droughts, just more intense.
- Notes regarding coping strategies:
- Crop diversification was not considered very effective or sustainable, because it can only be done on a small scale. But it can be done year after year. People need water, finance and land for this strategy
- Petty trade (grain and other sales) was considered efficient and sustainable. It depends on microfinance institutions
- Water harvesting (retention and storage measures) was considered to work well and being sustainable, as it can also increase groundwater levels. This strategy requires land, soil, water and trees
- Well digging works and is sustainable (but consider problems with declining water tables mentioned above!). It requires labour, finance and water
- Saving and borrowing against famines/droughts works if not everyone is affected (otherwise they need government support). It is not sustainable. It requires self-help groups and IDDIRs (the latter are mainly active regarding funerals)

- Crop residues/hay/straw collection is considered to be working and sustainable: requires labour forests, soils and water
- Boiling water is sustainable against water-borne diseases, and it works. However, most people don't practice it (sufficiently), due to lack of knowledge and time. It requires fire wood (therefore forests) and water
- Environmental sanitation (e.g. building latrines) is sustainable and it works. Most people do it. Requires forest and labour