# ETHIOPIA

# Soil Conservation and Rehabilitation for Food Security

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## Final Baseline Report

AHT GROUP AG
Management & Engineering

ICON INSTITUT

VÉTÉRINAIRES SANS FRONTIÈRES GERMANY

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## List of Abbreviations and Acronyms

| | |
|---|---|
| AHT | AHT GROUP AG, Essen / Germany |
| APDA | Afar Pastoralist Development Association |
| ASRP | Afar Soil Rehabilitation Project |
| BoFED | Bureau of Finance and Economic Development |
| BoPAD | Bureau of Pastoral and Agricultural Development, Semera / Ethiopia |
| CAPI | Computer-Assisted Personal Interview |
| CSA | Central Statistical Agency, Addis Ababa / Ethiopia |
| DA | Development Agent |
| DEC | Data Entry Clerk |
| FDG | Focus Group Discussions |
| FHH | Female-Headed Household |
| GIZ | *Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH* / German Society for International Cooperation |
| HH | Household |
| ICON | ICON INSTITUT Private Sector GmbH |
| IGA | Income-Generating Activities |
| M&E | Monitoring and Evaluation |
| MHH | Male-Headed Household |
| MoANR | Ministry of Agriculture and Natural Resources |
| MoWR | Ministry of Water Resources |
| NERDU | North-East Rangeland Development Unit |
| NRM | Natural Resource Management |
| NGO | Non-Governmental Organisation |
| NSTL | National Survey Team Leader |
| PADO | Pastoral Development Office |
| PRA | Participatory Rural Appraisal |
| PILLAR | Preparedness Improves Livelihoods and Resilience |
| PTC | Pastoral Training Centre |

| | |
|---|---|
| PSNP | Productive Safety Net Program |
| SDR ASAL | Strengthening Drought Resilience in Arid and Semi-Arid Lands |
| SSD | Support for Sustainable Development, Afar / Ethiopia |
| SWC | Soil and Water Conservation |
| TL | Team Leader |
| TLDP | Third Livestock Development Project |
| ToR | Terms of Reference |
| VSF-G | Vétérinaires Sans Frontières Germany, Nairobi / Kenya and Addis Ababa / Ethiopia |
| WSW | Water-Spreading Weir |

# 1 Introduction

## 1.1 Context and objectives of the baseline survey

In September 2015, GIZ contracted the consortium consisting of AHT GROUP AG (AHT), ICON INSTITUT Private Sector GmbH (ICON) and Vétérinaires Sans Frontières – Germany (VSF-G) to design and undertake a baseline survey in the context of two GIZ projects currently being implemented in the Afar Region of Ethiopia:

- Capacity Development for Strengthening Drought Resilience of the (Agro-) Pastoral Population in the arid and semi-arid lands of Ethiopia (SDR-ASAL) and
- Afar Soil Rehabilitation Project (ASRP), Country Package within the Global Program on Soil Conservation and Rehabilitation for Food Security

The lead executing agency of both projects at national level is the Natural Resources Management (NRM) directorate within the Ministry of Agriculture and Natural Resources (MoANR). Partner for implementation at regional level is the Bureau for Pastoral and Agro-pastoral Development (BoPAD) and its downstream authorities at woreda level.

Different project interventions have already been implemented or are planned in Zone 1 and 4 of Afar Region (Figure 1) covering all woredas of Zone 4 (Awra, Ewa, Gulina, Teru, Yallo) and three woredas of Zone 1 (Chifra, Kori, Mille). Target groups are (agro-) pastoralists residing in and/or using the natural resources of these areas.

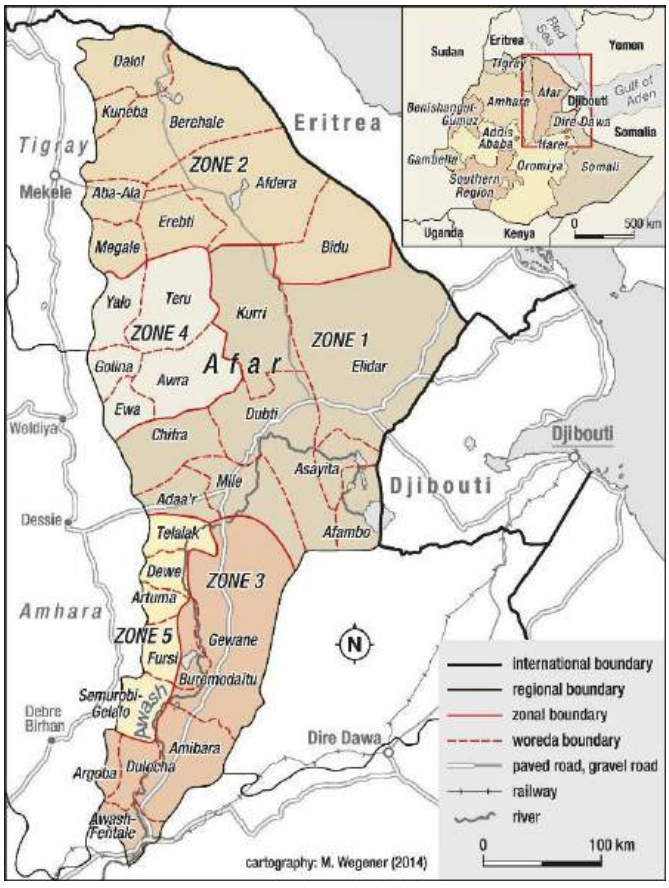


Figure 1: Overview of the target woredas within Afar National Regional State

The aim of both projects is to 'help to strengthen village and other self-help groups[1], which improve their basis for production through improved pasture management, erosion control on pastureland and cropland and improved water management in the valleys, and receive support in securing their land-use rights' (Terms of Reference (ToR), page 17).

The planned and already implemented project interventions focus mainly on:

i) construction of water retention infrastructure like water-spreading weirs,

ii) rangeland rehabilitation, and

iii) income generation.

As both projects cooperate closely there is a need to harmonise the country components' Monitoring and Evaluation (M&E) systems in order to have compatible data at global level for accountability and reporting. Against this background, the core objectives of the baseline survey are as follows:

- Development of a common baseline for the above mentioned target areas through the collection and analysis of data related to the project indicators (including a verification and adaptation of base and endline values) as specified in the Terms of Reference (ToR) and
- A well-documented appropriate gender-sensitive methodology for future project monitoring and evaluation.

The baseline, which is subject of this report, refers to the following indicators:

1) 2,500 (agro-) pastoralists (at least X of whom are women) apply sustainable climate-adapted cropping and production methods which are new for them to increase and diversify the fodder - and food crop production.

   Baseline 2013: 0; target value 2018: 2,500 X of whom are women.

2) 800 women have taken up income-generating activities such as the production, processing and marketing of fodder - and food produce or fattening and trading livestock.

   Baseline 2013: 0; target value 2018: 800.

4) The yields of the principal crops are W% higher on the protected or rehabilitated land than they are on untreated reference land.

   Baseline value: The average yield (2010-2013) for

   (A) water-spreading weirs is: crop 1 A kg/ha;

   (B) cropland: sorghum 300 kg grain/ha;

   (C) pasture land: fodder biomass 300 kg/ha;

   Target value: A + 100%, B + 30%, C + 20%;

[1] The term 'village' will be partly replaced in the following with the term 'settlement'. The latter seems to be the more appropriate term for most settlements visited. Villages a) are generally defines as having between 500 and 2,500 inhabitants which does not apply to all the surveyed settlements and b) are typically characterized by a spatial structure where its inhabitants live clustered around a central space. With some exceptions like e.g. Mesgid in Chifra Woreda this does not apply to most settlements whose inhabitants live scattered over a larger area. Most importantly, the common understanding of term 'village' implies a sedentary way of life where farming plays an important role. This was certainly not the case in the majority of the visited sites. Furthermore, within the study region there is no concrete local term for village. People use the terms *tabia*, *gote*, and *awda.* One of the most commonly used terms, *tabia*, refers to a place where a group of people settles together. In most cases settlements consist of several compounds, each consisting of multiple huts, where related households of the same *dahla* (sub-clan) live together.

Project indicator 3) refers to the size of land to rehabilitated or placed under protection. Determining the baseline value and verifying the endline value of 5,700 ha requires a methodological approach that could not be realized within the scope of the present baseline study. As agreed during the kick-off meeting, the Consultant did not verify the size of land to be rehabilitated and did not make suggestions concerning the feasibility of the end line value of 5,700 ha.

## 1.2 Methodology

The methodological design of the baseline survey builds on triangulation, the combination of different data sources and methods. This is partly a complementary approach as qualitative and quantitative methods focus on different aspects of the empirical word, and partly serves to cross-check data and increases the validity of the research results.

The empirical methods combined during the field phase of the survey included:

- A quantitative household survey of in total 709 households in all eight target woredas (19% of the total number of households in the surveyed villages and 0.8% of all households in the target woredas) based on a standardized questionnaire;
- Focus Group Discussions (FGDs) with women and men at different sites including mobile pastoralists and agro-pastoralists;
- Qualitative expert/ key informant interviews, e.g. with local authorities or other individuals with specific knowledge on certain aspects

In addition to the collection of primary data during a six-week field survey the Consultant's team reviewed available secondary data (administrative data, internal reports) available at stakeholder level (GIZ, NGOs, Governmental authorities at regional and woreda level). For this as, well as for the preparation of the field survey, a close collaboration with the GIZ Regional Project Team, the Regional Bureau of Pastoral and Agricultural Development (BoPAD) in Semera and political authorities at woreda and village level was essential. Several meetings were held with representatives from GIZ, BoPAD and BoFED (Bureau of Finance and Economic Development) during the preparatory phase of the survey.

### 1.2.1 The Household Survey

Preparation phase

A standardized questionnaire was used for the collection of quantitative data on household level. The data needs specified in the ToR and the Initial Profile, provided by the program's M&E Consultant, were the basic reference points for the development of the questionnaire. Several Initial Profiles had previously been conducted by the M&E Consultant in selected sites where water-spreading weirs (WSWs) are planned. These profiles were based on FGDs including quantitative and qualitative questions, which were taken up in the baseline study either in the questionnaire or in the FGDs.

Contents of the questionnaire revolve around data on the livelihood portfolio including information concerning livestock, agriculture, nutrition, income, organizational issues, the current status of natural resources as perceived by the respondents and locally-applied techniques for natural resource management (see Annex VI). The pre-tested household questionnaire consists of eight modules relating to the most important monitoring and planning aspects for the two GIZ projects in Afar:

A Basic Data

B Household Profile

C Livestock and Access to Pastures

D Crop Production

E Availability and Access to Water and Wood

F Nutrition

G Income Sources

H Institutions

An essential factor for the successful implementation of the survey was the recruitment of well-trained enumerators and supervisors of Afar origin who knew the culturally appropriate approach of communication and conduct. This allowed the team to easily access the Afar households within the settlements. In order to familiarize the enumerators with the questionnaire as their basic work instrument and with their tasks in the field, a four-day training was held in Semera. The training consisted of a thorough study of the questionnaire, an analysis of its contents question by question, translation of the questions into Afar language, clarification of meaning and creation of common understanding among the team members. The training concluded with a pre-test of the questionnaire in the rural kebele of Eyrolaf in Dubti Woreda.

The final household questionnaire can be found in Annex VI.

Field survey and sampling

The Consultant noted that the sample design suggested in the ToR and the technical proposal did not match with the conditions in the field. Thus, it was agreed during the kick-off meeting in Semera, to modify the sample design in such a way that the baseline study finally selected up to five settlements in each woreda that differ in terms of extent of intervention as indicated:

- Three to four settlements which will benefit directly from the planned GIZ interventions (including the construction of water spreading weirs, rangeland management interventions and/or income-generating activities, IGAs) and
- One to two control villages. The selection of these villages depended on two criteria:
  i) sufficient distance to intervention site: high probability that people will not be affected by future development interventions, and
  ii) socio-ecological comparability of livelihoods with the beneficiary settlements.

The concrete number of settlements to be monitored was not pre-determined, as the current number of inhabited settlements around the planned intervention sites was uncertain. The Consultant conducted interviews in 36 settlements, which were located in 20 different kebeles of the eight target woredas (see Figure 2 and Table 6 and Table 7Annex V.I).

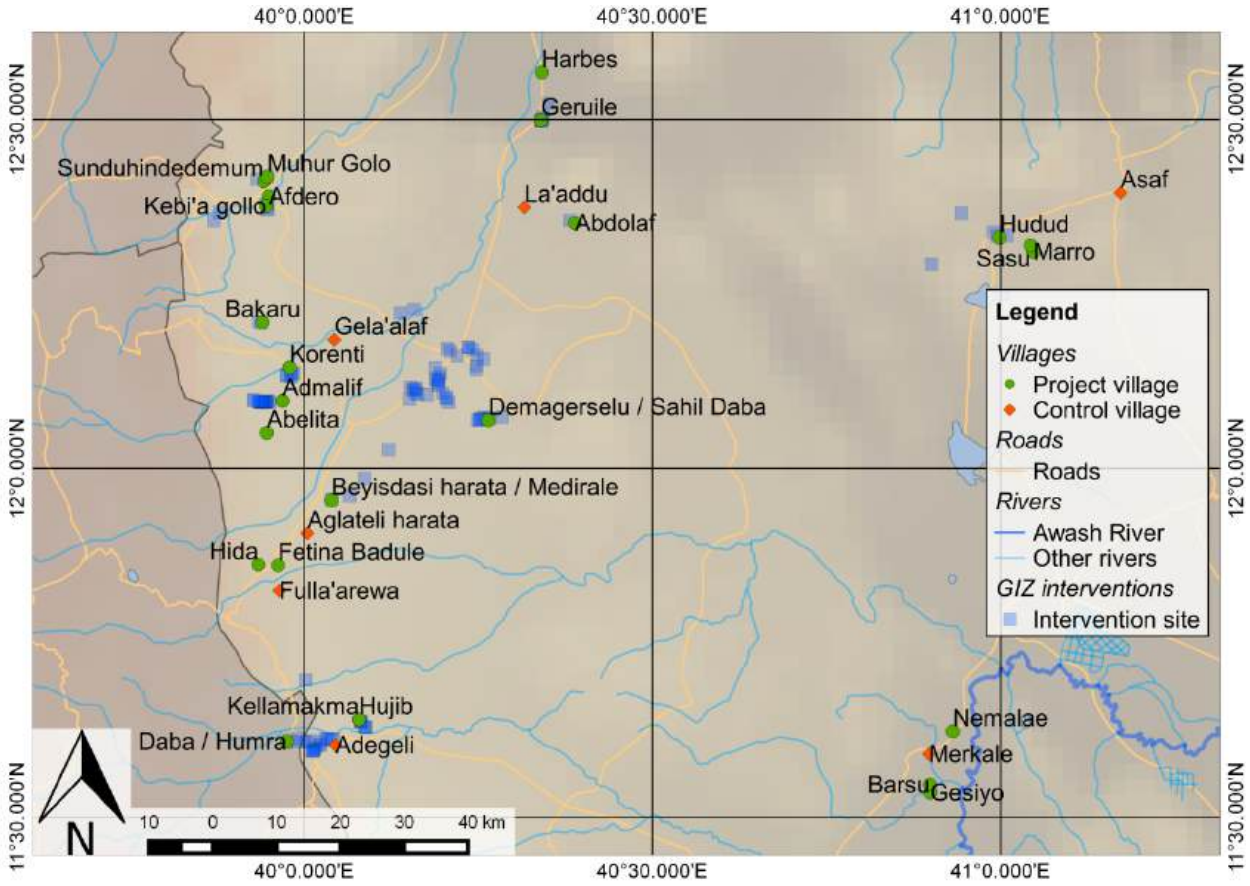


Figure 2: Location of surveyed villages and (planned) GIZ intervention sites

On average 89 standardized household interviews were held in each woreda, with the lowest number of interviews in Mille (66) and the highest number in Chifra (105). Within the settlements, households which were present during the time of the survey were selected randomly. On average 20 households were interviewed per settlement. Depending on the availability of people to be interviewed and the size of the village, the number of interviewed households per settlement varied between ten and 25. In a few sites in Teru, Kori and Mille it finding an adequate number of households (HHs) for the survey proved to be challenging as many people had left to dry season drought retreats.

After the pre-test and final modifications to the questionnaire, the Consultant programmed a data entry mask using the freeware software EpiData Entry. The software is widely used by organizations and individuals for simple or programmed data entry and data documentation.

The majority of interviews (659) was conducted using traditional paper-based questionnaires. In addition, the Consultant set up a Computer-Assisted Personal Interview (CAPI) system using the Survey Solutions package developed by the World Bank (see Annex IV for a detailed description of the CAPI methodology). Four enumerators were trained to use the Survey Solutions Interviewer app on tablet computers (HUAWEI MediaPad X2). A total of 50 interviews interviews in Kori and Mille woredas were done using the CAPI method. The development, training and evaluation of the CAPI method was supported by special backstopping support from the AHT Project Director.

The field survey was conducted for six weeks from the end of October until early December 2015 with a team consisting of an International Study Team Leader (TL), a National Survey Team Leader (NSTL), six enumerators, and two field supervisors.

Data entry and analysis

After four weeks of field work, four Data Entry Clerks (DECs) began manually entering the answers from the paper-based questionnaires into a data entry mask (created with EpiData Entry). Data entry started parallel to the implementation of the household survey in order to ensure a minimal time lag between data collection and entry. This ensured that data were ready for analysis and interpretation shortly after the completion of the survey. The data entry mask created in EpiData is attached to this document in Annex VII.

The CAPI data which were already entered during the interview was transferred by online connection (when available) to the study server directly after each interview.

The copmlete data set in .xlsx-format is attached to this report in Annex IX.

Data analysis was done using the RStudio, an integrated development environment for R, a programming language for statistical computing and graphics.

### 1.2.2 Qualitative Interviews

Qualitative methods, i.e. FGDs and key informant interviews, were used in order to contextualize the quantitative information collected in the household survey. The openness as main principle of qualitative approaches gives the target group more communicative power as they can voice topics that they find important and relevant instead of only responding to externally pre-conceptualized and -structured questionnaires. The qualitative interview situation is characterized by a dialogue concept between interviewer and interviewee in which the researcher takes the position of somebody who wants to learn and who knows less than his/her interviewee about the topic of investigation.

FGDs were held in each woreda in selected sites (Annex I). They provide a forum for a group of local people to discuss certain pre-defined topics of interests and help elicit common perceptions, opinions and dominant discourses which will be important for future project planning. It involved gathering and talking to different social groups (elders, women) whose perceptions and interests might diverge due to gender-specific needs.

Openly formulated guiding questions revolved about the following topics:

- Environmental history and current challenges;
- Land tenure and governance;
- Conflict (forms and causes);
- Mobility patterns;
- Agriculture and livestock;
- Food security and coping strategies; and
- Interaction with the governmental services.

Some of these topics were deepened in expert interviews with individual key informants (e.g. a kebele spokeswoman in Gulina, a clan leader in Teru). Additionally Participatory Rural Appraisal (PRA) methods like transect walks and resource mapping were used to get a better understanding of environmental conditions in their spatial context, especially the distribution of water and pasture resources. PRA describes a range of methods and tools that help to enable rural stakeholders to share, enhance and analyse their knowledge of their own life and rural living conditions.

Most group discussions and expert interviews were recorded using a digital recording device (Zoom H2N Handy Recorder). In order to lose as little information as possible and to remain as close as possible to the original remarks of the respondents, the recorded group discussions and expert interviews were transcribed by the supervisor who also did the translation during the time of the interview.

The International Team Leader and National Survey Team Leader facilitated all qualitative interviews. The number of qualitative interviews conducted was not pre-determined as the aim of a qualitative approach is the discovery of new, unknown structures and relations and the understanding of complexity and multiple perspectives. This does not depend on a certain numbers of interviews but on the degree of diversity that can be discovered with each new interview. The process ends when nothing new seems to come up. In total, 19 qualitative interviews, covering all of the surveyed woredas, were translated and transcribed (Annex II). They included FGDs and expert interviews in which gender, age and the dominant livelihood system varied. The outcome of other interviews, transect walks and resource maps were documented in field logs.

### 1.2.3 Challenges of the Survey

Obtaining quantitative data on woreda and kebele level turned out to be challenging during the course of the survey. With the exception of Chifra Woreda, little quantitative data on land cover and use, extension services, etc. could be availed by officials from the Pastoral Development Office (PADO) to the Consultant. Due to other commitments (training in Assayta), the GIZ focal persons in the woredas were not available to facilitate data access. Therefore, information presented concerning woreda level stems mainly from the available secondary data sources.

Information on village level concerning the total number of households and number of female-headed households (FHHs) and male-headed households (MHHs) is based on oral information by the respective kebele chairmen and elders. Local authorities had sometimes difficulties to assess the number of settlements and the number of households within these settlements, especially in sites where people live highly dispersed and keep moving quite often.

Due to the severe drought at the time of the survey, a large number of people, sometimes even entire households, had moved to other places to look for water and pastures for their animals. It was therefore crucial to ask for the number of households who currently lived in a particular settlement or location as well as for the number of those households who had left but would (in non-drought years) stay in those settlements. It should be noted that, to a large degree, the households interviewed for this study represented those who had stayed behind in the settlement areas accessible by car which also often have a basic educational infrastructure.

# 2 Background of the Afar Region

## 2.1 Topography, Climate and Natural Resources

The Afar Regional State is one of nine administrative regions of Ethiopia. It is located within the north-eastern lowlands of the country, bordering Djibouti to the east and Eritrea to the north. Geologically, the Afar region is part of the Afar Triangle, also known as Afar Depression, where the East African Rift Valley extends towards the Red Sea. The area is known for its tectonic activity, with recurrent earthquakes and volcanic activity. The extremely harsh climate averages temperatures between 25 and 48°C; annual rainfall ranges from 700 mm (adjacent to the western Ethiopian highlands) to less than 100 mm in the most north-eastern parts. Its topography is marked by lava fields, volcanoes, deep faults, salt lakes and stone deserts. The amount of rainfall varies extremely between the two dry and two rainy seasons. This seasonal variation is characterized by a high spatial and temporal variability so that recurrent droughts and phases of acute food insecurity are a normal part of life for Afar pastoralists.

Under conditions of low and highly variable rainfall, the Awash River, which traverses the southern part of Afar, serves as the most important perennial water source for pastoral livelihoods. The river originates at an altitude of 3,000 m above sea level in the humid regions of the Ethiopian highlands and drains into a chain of connected lakes along the border with Djibouti at an altitude of 250 m. Several perennial tributaries coming from the Western escarpment, i.e. Ewa River and Mille River, drain into the Awash River. Areas further north drain into the relatively water-scarce Danakil Basin, i.e. the intermittent Awra and Gulina Rivers discharge into the Teru Depression (see Figure 3), which is known as an important dry season grazing area and drought retreat next to the flood plains along the Awash River (Baadu/ Zone 3 and Kallo/ Zone 1).

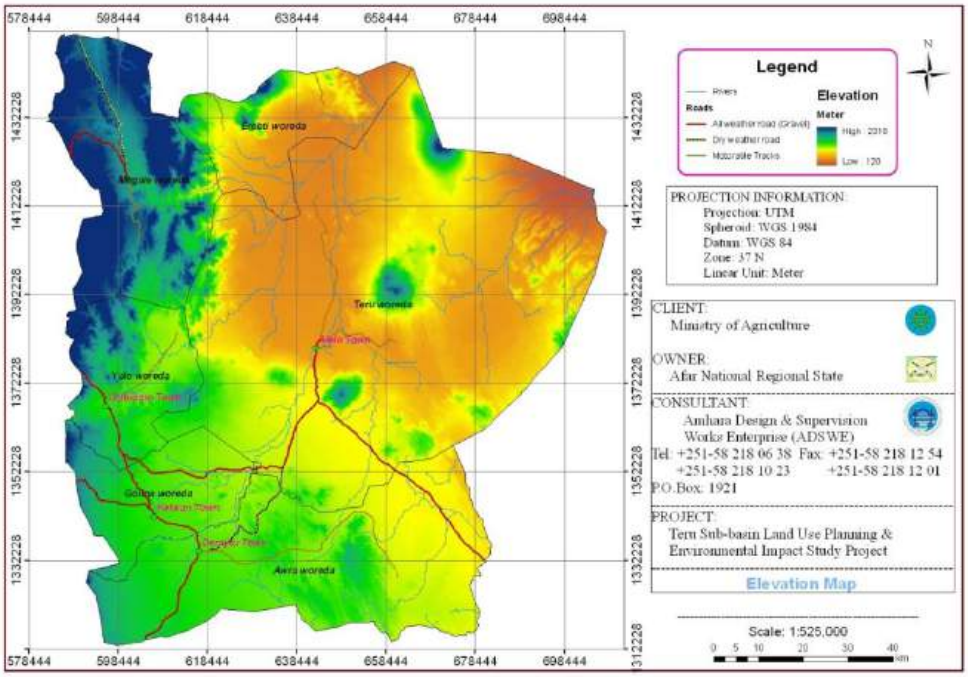


Figure 3: Map or northern Afar Region

*Source: ANRS 2011*

The seasonal inundations of the rivers provide abundant grazing for pastoralists during dry season and drought; at the same time, the water provides opportunities for household consumption and irrigated agriculture. The target areas of the GIZ projects which are subject of this baseline study are located in both basins:

- Yallo, Gulina, and Teru are part of the Danakil Basin;
- Chifra, Kori and Mille are part of the Awash Basin;
- Awra and Ewa woreda drain into both basins.

In general, altitude, rainfall and density of vegetation decrease from west to east while temperatures rise within the target areas. The most western areas of Gulina, Ewa and Chifra lie above the 900 m contour line and receive 700-900 mm of rainfall per year whereas the average annual rainfall in the eastern parts of Teru, Awra and Mille and all of Kori is less than 300 mm per year (Figure 4). The most water-scarce areas are those with average annual rainfall below 700mm and no perennial rivers: Kori, Yallo and Teru woreda as well as the eastern parts of Awra.

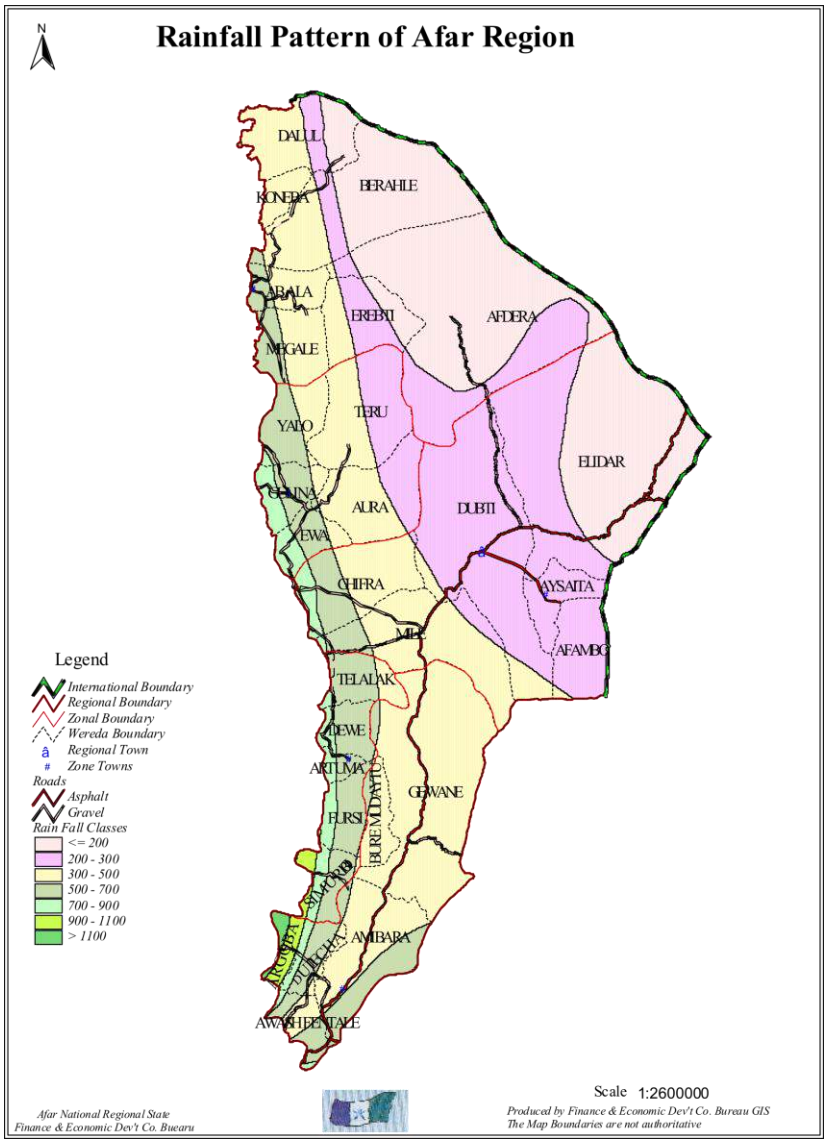


Figure 4: Map of Afar Region with isohyets

*Source: Afar Regional Atlas 2006*

According to the 'Strategic Framework for Managed Groundwater Development' published by the Ethiopian Ministry of Water Resources (MoWR) in 2011, groundwater availability in the Afar region is assessed as good in most parts due to the accessibility of shallow aquifers. However, groundwater salinity poses a problem in many areas. This assessment is in the line with pastoralists' perceptions. During the survey pastoralists complained about salty water from wells. Moreover, so far groundwater quality or groundwater levels are not monitored systematically which is the reason why no data on these factors could be obtained regional level. In spite of the current uncertainties, the areas where most substantial unused groundwater is suspected and partly already explored are in the lowlands of Amhara, Tigray, Afar and Somalia. High groundwater potential is expected in Western Afar including most of the target woredas of Zone 4 and Chifra (MoWR 2011).

The still existing knowledge gaps concerning groundwater resources in Afar are partly being addressed by a governmental groundwater assessment that was ongoing in Afar Region during the time of the baseline study's field work. According to a geo-hydrologist involved in the assessment in Zone 4, groundwater yields range between 46 and 74 litre/second with water levels in the range from 28 to 220 m. Most aquifers in Zone 4 are confined-leaky aquifers. In Gulina and Awra Woredas, more groundwater wells are available both for water supply and wells for irrigation purposes. Some part of Teru (Digdiga Kebele) has a high potential (70 liter/second) and another part (Teru Town) has medium groundwater potential with 15 liter/second with a deep water level 220 m from the surface.

In Zone 1, relatively more groundwater wells are available in Dubti Woreda and Logya and Semera town that give 60 up to 69 litre/second yield with water levels from 23 up to 32 m. In Chifra, Mile and Ewa Woredas, however, there is a relative lack of groundwater wells. Even though the availability is relatively low, some drilled wells show water level in the range of 24 to 170 m with discharge groundwater yields in the range from 10 to 54 litre/second with both confined and unconfined aquifer types.

## 2.2 Demography

The total population of the Afar region is estimated at 1.72 million people, out of which 0.54 million live in Zone 1 and another 0.29 million live in Zone 4 (CSA 2015).

There is a considerable difference in the relation of rural and urban population, with the urban population within Zone 1 being significantly higher (around 20%) compared to Zone 4, where only 5% of the population live in urban areas. Most urban centers within the target areas like Chifra, Loggia and Mille town are located along the main roads connecting the ports of the Red Sea with the Ethiopian highlands. Population density is lowest in Kori Woreda and highest in Chifra, reflecting also the different agro-ecological potentials (see Table 1).

Table 1: Population within target woredas

| Woreda | **Yallo** | **Gulina** | **Teru** | **Awra** | **Ewa** | **Chifra** | **Kori** | **Mille** | **Total** |
|---|---|---|---|---|---|---|---|---|---|
| Zone | 4 | | | | | 1 | | | |
| Area (km²) | 822 | 805 | 5,793 | 2,318 | 1,464 | 1,519 | 2,870 | 5,346 | 20,937 |
| **2015** | | | | | | | | | |
| Population* | 55,127 | 59,429 | 79,013 | 40,791 | 55,088 | 109,741 | 35,384 | 111,856 | 546,429 |
| Households*** | 8,481 | 9,143 | 12,156 | 6,276 | 8,475 | 16,883 | 5,444 | 17,209 | 84,067 |
| Population density* | 67.0 | 73.8 | 13.6 | 17.6 | 37.6 | 72.2 | 12.3 | 20.9 | 26.1 |
| **2007** | | | | | | | | | |
| Population** | 47,468 | 49,794 | 67,753 | 34,604 | 47,203 | 91,080 | 30,652 | 90,673 | 459,227 |
| Households** | 7,914 | 6,989 | 10,133 | 6,111 | 7,872 | 13,413 | 5,254 | 12,635 | 70,321 |
| Population density** | 57.7 | 61.9 | 11.7 | 14.9 | 32.2 | 60.0 | 10.7 | 17.0 | 21.9 |

**Source: CSA 2015 (available under: http://www.csa.gov.et/index.php/2013-02-20-13-43-35/national-statistics-abstract/141-population, accessed 24 January 2016)*
***Source: CSA 2007 (available under http://www.csa.gov.et/index.php/2013-02-20-14-51-51/2013-04-01-11-53-00/census-2007, accessed 24 January 2016)*
**** Estimate based on household size from 2007 census*

Rural population densities in Afar tend to be relatively high along the foothills of the highlands and in the surroundings of the seasonally flooded areas along the Awash River. These areas offer better conditions for the availability of rich fodder resources and serve as important dry and wet season grazing areas. It is these valuable well-watered grazing areas that have become bones of contestation since they have been increasingly appropriated by external investors and Government for irrigation agriculture.

The population within the surveyed kebeles belongs entirely to the ethnic group of Afar who live spread all over the Afar Triangle, covering north-eastern Ethiopia, southern Eritrea and northern Djibouti. Islam is the predominant religion of Afar people, even though in a culturally adapted form (Rettberg 2013).

## 2.3 Land Use: Dominance of Pastoralism

Under conditions of low and highly erratic rainfall mobile pastoralism is the dominant land use system within Afar Region. It has been argued, that the extensive and opportunistic use of communally held land resources is the economically most efficient and ecologically best-adapted land use system in arid lowlands (Behnke and Kerven 2013). The resilience and high adaptive capacity of Afar pastoralists depends on the combination of two key factors: Firs, a high spatial mobility in order to access the few spatially dispersed preferential rangelands which offer seasonally differentiated fodder and water resources and water access; and secondly, functional institutions of resource management in which collective agency is of major importance (Little and McPeak 2014).

Most Afar pastoralists depend on mixed stocks of camels, cattle, sheep and goats even though there are significant differences in terms of number of animals, herd composition, market

integration as well as types and relevance of livelihood diversification. The different livelihood pathways among Afar pastoralists vary spatially and temporally and are related to heterogeneous agro-ecological conditions, access to knowledge, financial resources, social capital and labor (Müller-Mahn et al. 2010).

Small-scale irrigation agriculture historically only played a role in the Sultanate of Aussa, located within the lower reaches of the Awash River in Zone 1 (Assayta and Afambo Woredas). The practice of irrigated agriculture along perennial rivers in target woredas along the escarpment of Zone 1 and 4 (especially in Chifra, Ewa, Awra) is a rather recent phenomenon and can be explained by the increasing impoverishment among pastoralists who are forced to search for additional non-pastoral livelihood opportunities. Table 2 summarizes how many kebeles in the target woredas as classified as having a predominantly pastoral, agro-pastoral, or urban land use system. Moreover, it summarizes the total area of developed farmland in each woreda (irrigated and rainfed).

Table 2: Land use classification and developed farmland of surveyed woredas in Zone 1 and 4

| Zone | Woreda | No of kebeles by land use classification | | | | Developed farmland (ha) | | |
|---|---|---|---|---|---|---|---|---|
| | | pastoral | agro-pastoral | town | total | irrigated | rain fed | total |
| 1 | Chifra | 5 | 13 | 1 | 19 | 624 | 125 | 749 |
| | Kori | 15 | 0 | 0 | 15 | 0 | 0 | 0 |
| | Mille | 3 | 7 | 1 | 11 | 624 | 0 | 624 |
| 4 | Awra | 6 | 3 | 1 | 10 | 945 | 0 | 945 |
| | Ewa | 5 | 5 | 1 | 11 | 228 | 0 | 228 |
| | Gulina | 5 | 2 | 1 | 8 | 0 | 125 | 125 |
| | Teru | 11 | 0 | 1 | 12 | 0 | 0 | 0 |
| | Yallo | 6 | 2 | 1 | 9 | 0 | 55 | 55 |

*Source: BoPAD 2014*

As can be seen in Table 2, agro-pastoral land use plays a role in 13 out of 19 kebeles of Chifra, making it the woreda where agricultural practices are most widespread within the study region. In Mille the number of agro-pastoral kebeles is relatively high due to the location of many kebeles along the Awash River. This is the case despite the fact that, previous agricultural activities have been affected by the construction of the Tendaho Dam and the subsequent back flooding which destroyed the cropland of many agro-pastoralists.

Best grasslands with only few shrubs and bushes are found in Ewa, Chifra and western Awra. These large plains offer the most beneficial rangelands and at the same time the highest irrigation potential due to the better availability of surface as well as groundwater resources. This provides a potential for land use conflicts between agricultural and pastoral land users. Recurrent sabotages of water pipelines and deep water wells in Ewa and Awra indicate local opposition of some pastoralists towards ongoing governmental projects. The current governmental efforts for voluntary resettlement[2] around Sunnunta in Ewa Woreda are seen with skepticism among parts of the population as the ongoing establishment of 2000 ha of irrigated farmland (to be distributed to agro-pastoralists) is assumed to have negative consequences on

[2] Governmental programme (Millennium Development Goal Project) for the settlement of pastoralists in permanent sites to facilitate access to social infrastructure (education, health, potable water supply, etc.) and introduce irrigated agriculture

their livestock holdings. Animals are losing their dry season fodder base and partly also access to the river water. The land cover does not allow the pastoralists simply to shift to other areas with their herds as large part of the land, especially towards the arid north-east, is devoid of vegetation and consists mainly of exposed rocks. In these arid areas it is isolated patches of ecologically preferential grazing areas like Musle plain in Kori or Teru plain which provide important grazing resources for short periods of the year.

## 2.4 Indigenous Institutions for Natural Resource Management

### 2.4.1 Customary Laws and Institutions

The Afar share a common language (Afar) and origin, a common religion (Islam) and common customary institutions. Social identity rests foremost on the belonging to a certain clan, understood as a patrilineal group claiming a clearly defined clan territory (*dinto*), moving together between dry and rainy season areas and sharing political power (Getachew 2001). The socio-political structure of the Afar is characterized by segmentary clan societies, the political power being shared in an egalitarian manner between different clans with no central power or hierarchy. Decisions are made on a collective basis by clan authorities, consisting of the clan leaders (*kedo abbas*) and the elders (*idalto*). The clan leaders represent the interests of their clan to the outside and implement the indigenous Afars' jurisdiction (*maada*). Clans vary considerably in size.

Customary institutions, which stress reciprocity, collective action and solidarity, are of major importance for the management of natural resources and for coping with drought or flood induced destitution of some clan members. Land is communally owned and rangelands and forest reserves have long been governed by the sultanate of Aussa (Zone 1) and clan-based institutions in all other areas of the Afar region. Each clan claims certain territories which can only be accessed by other clans through prior mutual consent.

Regular mobility between dry and wet season grazing areas has been one of the main institutional features which secured the regeneration of pastures and prevented overgrazing. Another institution of major importance is *desso*, which literally means 'the denial of access to property' (Parker 1985). It refers to restricted areas which are reserved for dry season grazing or when drought looms. The Afar employ two types of restricted grazing (d*esso*): One relates to dry season grazing in the vicinity of the Awash River which is closed during the wet season for all users regardless of clan identity. The other type relates to boundary restrictions defined by several clans unless special permission is granted (e.g. in Teru/ Zone 4 and Baadu/ Zone 3).

Hand-dug deep wells (*elas*), dry season pastures and water are considered as clan property while no clan-specific claims are made for surface water sources and rainy season pastures. For example, although external clans might use wells, they will be punished in case of mismanagement and have to pay compensation (animals) to the clan leaders of the clan who dug the well. Such kinds of conflicts over land and water are negotiated in a court-like assembly of clan leaders and elders (*mablo*) where judgments are taken according to the Afar law (*maada*). The *maada* also prohibits the cutting of trees and allows for the clan-based reserve of certain grazing areas (*desso*) in the case of drought. Decisions taken in *mablo* meetings are executed by the *fiima* (Figure 5), an association of peers for the execution of the law, defense and punishments, headed by the *fiima-abba*.

> *"As the government punishes wrongdoers we also have madaa punishment. Water is a very expensive commodity here, so every individual has the responsibility to guard the ponds. We don't allow people to go inside and wash using soap…We don't have a committee but everybody is responsible. If somebody breaks the rule we will punish him."*

(Elder during group interview in Musle, Kori Woreda, 2013)

These customary institutions for the management of natural resources have come under pressure with the increasing influence of formal governmental institutions.

*"We had some arrangement in the past. If there was rain, we talked to each other to utilize first the faraway grazing areas and to return to our settlement areas later. However, since the government was established in this area we did not discuss and agree how to utilize resources. These days we send our animals where we want without discussing; this is a kind of opportunistic grazing… These arrangements are crucial to avoid overgrazing but also to preserve the seed bank. When there is rain, the seed bank starts to regenerate. We know all that but nobody wants to follow that rule."*

(Elder during FGD in Musle, Kori Woreda, 2013)

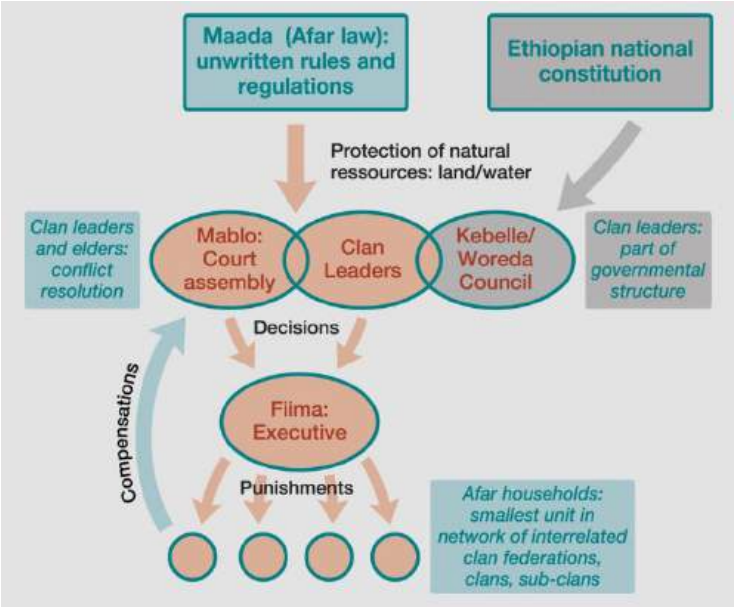


Figure 5: Customary institutions for natural resource management

*Source: AHT GROUP AG*

Some of the clan leaders are nowadays also appointed as kebele chairmen. This makes them loose their neutrality as they receive a governmental salary so that they are not free to speak up for the interests of their clan. Local authorities and institutions like *mablo* have been weakened in the process.

### 2.4.2 Historical Context and Governmental Regulations

Until the middle of the 20th century the Afar, led by the Sultanate of Aussa, were able to resist political and cultural subordination and to defend their political autonomy against the Abyssinian Christian power holders. Since then, the Ethiopian state increased its efforts to consolidate its power over the peripheral lowlands through appropriation of land along the Awash River for the establishment of large-scale irrigation farms for cotton production and sugar cane (Ayele Gebre-Mariam 1994; Magnun Gamaledin 1993), through administrative restructuring, taxation, and by co-opting of local authorities, with the effect that traditional authorities and institutions were increasingly weakened (Cossins 1972; Hagmann and Mulugeta 2008). Most of the past governmental interventions and policies neglected pastoralism as a viable way of life and productive livelihood system resulting in the socio-political marginalization of the Afar and fostering resistance and distrust (Müller-Mahn et al. 2010).

The Federal Rural Land Administration and Use Proclamation (Proclamation 89/1997) enables regional governments to make laws to manage and administer their lands. The new land use policy and proclamation (2008) of the Afar Regional State provides for transaction of land use titles to individuals for land use of 0.5 and 5 ha. In 2013, 4,000 land utilization certificates were issued to the woredas of Awash Fentale, Amibara, Buremodaytou, Gewane (Zone 3), Assayta, Afambo, Dubti, Chifra (Zone 1), Ewa, Awra (Zone 4) and Dalifage, Argoba (Zone 5) all of which are woredas with a high agricultural potential. The current process of land titling is linked to the MDG project with its voluntary resettlement scheme. Currently, in nine out of these twelve woredas the resettlement scheme/ water-centered development program is implemented. Overall eight thousand households have already been re-settled. During discussions with elders and community members, the impression emerged that land certificates are perceived as a threat to communally owned land rights rather than a lawful right. This issue bears a potential for future conflict.

## 2.5 Policies and Interventions Regarding the Management of Natural Resources

The governmental extension service requests three development agents (DAs) per kebele who should cover the following fields:

- Livestock production and animal health,
- Crop and fruit production, and
- Natural resource management (NRM).

The DAs should live within the kebele in order to follow up ongoing activities and give advice if necessary. The de facto situation of extension services in the surveyed woredas often looks different. Extension was severely hampered due to the following facts:

- DAs are mostly from highland areas and are more familiar with farming than with pastoral livelihoods. In addition, they are often not familiar with Afar culture.
- In most cases, the DAs live in the small urban settlements like Alele Sublula, Kalewan, Awra, Chifra where they have access to basic infrastructure (electricity, water, health). Apart from visits on request, depending on the availability of means of transportation, the DAs visits the kebeles regularly. Sunnunta in Ewa is an exception in that DAs are ordered to live in the rural areas in spite of the lacking facilities.
- Extension services are severely understaffed.

Table 3: Extension and nurseries in target woredas

| Zone | Woreda | No of DAs | | | Nurseries (governmental, NGOs) | No of tree seedlings distributed | No of pastoral training centres |
|---|---|---|---|---|---|---|---|
| | | male | female | fields | | | |
| 1 | Chifra | 24 | 8 | Crop: 2<br>NRM: 2<br>Livestock: 3<br>Animal health: 25 | 1 (functional) | 15,000 | 3 |
| | Mille | 22 | 5 | Crop: 2<br>NRM: 1<br>Livestock: 7<br>Animal health: 17 | 1 (not functional) | 30,000 | 1 |
| | Kori | 1 | 1 | Animal health: 2 | 0 | 0 | 0 |
| 4 | Awra | 16 | 2 | Crop: 3<br>NRM: 1<br>Livestock: 3<br>Animal health: 11 | 2 (not functional) | 0 | 1 |
| | Ewa | 21 | 3 | Crop: 7<br>NRM: 5<br>Livestock: 7<br>Animal health: 5 | 2 (partly functional) | 0 | 1 |
| | Gulina | 26 | 4 | Crop: 3<br>NRM: 5<br>Livestock: 4<br>Animal health: 18 | 1 (not functional) | 0 | 1 |
| | Teru | 15 | 2 | Crop: 4<br>NRM: 2<br>Livestock: 5<br>Animal health: 8 | 0 | 0 | 0 |
| | Yallo | 5 | 0 | NRM: 1<br>Livestock: 1<br>Animal health: 3 | 0 | 0 | 1 |

*Source: BoPAD, Planning Department, 2014, Baseline Survey 2015*

The only functional nursery site within the study sites is found in the woredas of Chifra and Ewa. This is reflected in the results of the survey, as Chifra is the only woreda with significant activities of tree planting. In Mille a nursery site was active until recently but remains currently without funding (phasing out of Mille Dirma project which paid people engaged in the nursery) so that activities stopped in 2015. In Awra, two nurseries established by the NGO Support for Sustainable Development (SSD), were handed over to PADO. Another governmental nursery was taken over by the local community.

Various Pastoral Training Centers (PTCs) have been established but many of them are currently not functional. PTCs tend to be modelled after the Farmer Training Centers in the highlands and as such do not always deliver the specific services, which suit the specific conditions in pastoral lowlands.

In general, the picture emerged that the main activity of DAs is the management and provision of the Productive Safety Net Programme (PSNP), a form of 'food for work' and one of the Ethiopian Government's Flagship Programmes for food insecure regions. All NRM activities

within the woredas (establishment of soil bunds and stone bunds) depend on PSNP, which lasts for six months of the year (January to June). Soil and Water Conservation (SWC) activities under PSNP are constrained due to two main reasons: First of all, many people are absent during dry season so that food is partly distributed without any work being done, and secondly, there is a lack of maintenance of conservation structures by the communities.

# 3 Results

## 3.1 Potential Beneficiaries

The total population within the surveyed kebeles varied significantly due to the different amount of settlements and the number of people living in them. In general, there are more men than women due women's higher mortality rate and lower life expectancy. According to CSA population estimates from 2015, Afar's sex ratio currently stands at 1:1.2 against the Ethiopian national average of 1:1.01 (CSA 2015). Women face more health risks due to their culturally induced marginalization, indicated by less and qualitatively poorer food intake, widespread female genital mutilation and higher workload compared to men.

Political stakeholders on regional and woreda level classify kebeles into two types of land use: pastoral and agro-pastoral. In six out of the 22 kebeles where interviews were conducted part of the population practices agriculture. The two planned sites for WSWs in Chifra (Geriro and Mesgid) as well as the control village are located in agro-pastoral kebeles where agriculture already plays an important role for local livelihoods. The same is true for 1st Badule in Ewa where parts of the population have become involved in agricultural activities initiated by the NGO SSD or the Government (villagization). In Awra, it is people from Lekora and from the control village in Hida Kebele, who moved towards agro-pastoralism after intervention from SSD. Major clans currently involved in agriculture are Arapta (the dominant clan in Chifra Woreda who also lives in parts of Mille), Kiuk Henkeba and Haisanto. Their clan territories comprise the land around the main perennial rivers (Mille and Ewa) currently used for irrigated agriculture.

Table 4: Population and land use within surveyed kebeles

| Woreda | Survey kebele | Population | | | Main land use | Main clan/s |
|---|---|---|---|---|---|---|
| | | total | male | female | | |
| Awra | Finto na Asala | 4,777 | 2,657 | 2,120 | Pastoral | Hadermo |
| | Lekora | 1,555 | 983 | 572 | Agro-pastoral | Haisanto, Walwalo |
| | Hida* | 8,438 | 4,632 | 3,806 | Agro-pastoral | Haisanto |
| Chifra | Geriro | 4,489 | 2,484 | 2,005 | Agro-pastoral | Arapta |
| | Mesgid | 3,285 | 1,641 | 1,644 | Agro-pastoral | Arapta |
| | Tegri* | 3,852 | 2,202 | 1,650 | Agro-pastoral | - |
| Ewa | 1st Badule | 5,771 | 3,296 | 2,475 | Agro-pastoral | Kiuk Henkeba |
| | Bolotoma* | 5,813 | 3,399 | 2,414 | Pastoral | Naser ke Aghini |
| Gulina | Kelwan | 3,682 | 2,058 | 1,624 | Pastoral | Aina Mela |
| | Wanasa & Harigerbo | 10,244 | 5,565 | 4,679 | Pastoral | Madroli (part of Hadermo) |
| | Galikoma* | 2,684 | 1,566 | 1,118 | Pastoral | - |
| Kori | Musle | - | - | - | Pastoral | Walwallo, Hadermo |
| | Guyah Ela | 3,086 | 1,628 | 1,118 | Pastoral | - |
| Mille | Gasiyo na la'as | 3,751 | 2,006 | 1,740 | Pastoral | Arapta |
| | Harsis* | 2,473 | 1,247 | 1,220 | Pastoral | Arapta |
| Teru | Debahu | 7,663 | 4,505 | 3,158 | Pastoral | Adali ke Haysanto, Bokorre |
| | Digdiga | 6,622 | 4,137 | 2,485 | Pastoral | - |
| Yallo | Walae' | 4,044 | 2,410 | 1,634 | Pastoral | Laghina |
| | Koli na Gaboli | 5,023 | 2,860 | 2,163 | Pastoral | Laghina |
| | Uddayile * | 3,513 | 1,976 | 1,537 | Pastoral | - |

**survey in control village*
*Source: CSA 2007, Baseline Study 2015*

A village or settlement (compare footnote 1 on page 1) mostly represents a group of related people who belong to the same clan and who claim territory around their settlement area communally. These people living together mostly belong to the same *daala*, groups of close relatives. An elder from Geriro Kebele in Chifra Woreda reports:

*"The two major Daalas of Arapata who live here are Hadoda and Barhisso. We are relatives and marry one another. Hence, we use the land communally. We share all the resources we have.*

*Even when other clans come from other areas, they use our resources with us as long as they make peace with us."*

Due to voluntary resettlement scheme, this clan based settlement structure might be changing if people from different clans settle together in one place. The spatial characteristics as well as the population size of villages visited during the survey differed greatly (see Table 6 and Table 7 in Annex V.I). The number of households living within the survey villages varied between 24people (village in Wala'e Kebele in Yallo Woreda) and 299 (dispersed settlement area in Finto Na Asala Kebele in Awra Woreda).

It remains uncertain which settlements will finally benefit from the planned project interventions. It can be assumed that not only the settlements closest to the planed intervention sites will benefit. Clans usually share their resources internally among themselves. In times of resource scarcity (e.g. during a drought) resources are also shared with other clans and with people from other areas. Rehabilitated land has the potential to attract people and clans from other areas.

## 3.2 Household Structure

### 3.2.1 Sex, Age and Marital Status of Household Heads

All of the interviewed households belonged to the ethnic group of Afar people. Respondents belonged to different age groups out of which those between 20-40 and 41-60 dominated the sample (see Table 8 in Annex V.II).

**Definition: Female household head**

There are different definitions of the term female-headed household and who a female household head is. This study defines a female household head as:

*A woman who makes the main economic decisions concerning the well-being of the household and who defines herself as head of the household.*

In line with the above-stated definition, 30% of all interviewed were headed by women at the time of the survey (Figure 6). This figure is higher than the number of female-headed households as estimated by kebele chairmen and elders (see Table 6 and Table 7 in Annex V.I for an overview of the share of male- and female headed households per site and woreda).

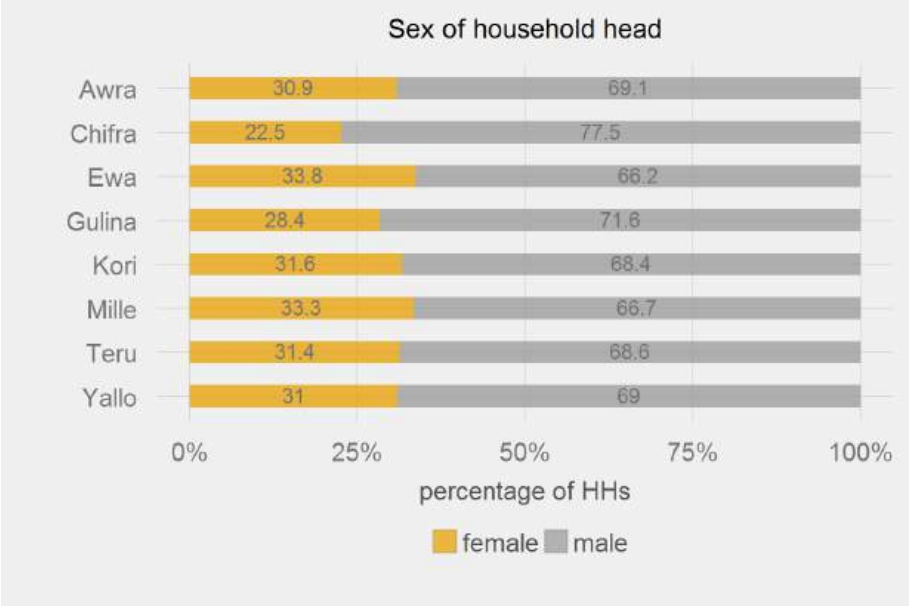


Figure 6: Sex of household head per woreda.

Out of all female household heads, 77% were married while 23% fall under the *de jure* female-headed household categories of widows, divorced or single women (Figure 7 and Table 9 in Annex V.II). Most female household heads are therefore *de facto* heading the household as the husband is absent (polygamy, migration) or not able/willing to manage the household due to age, illness, irresponsibility.

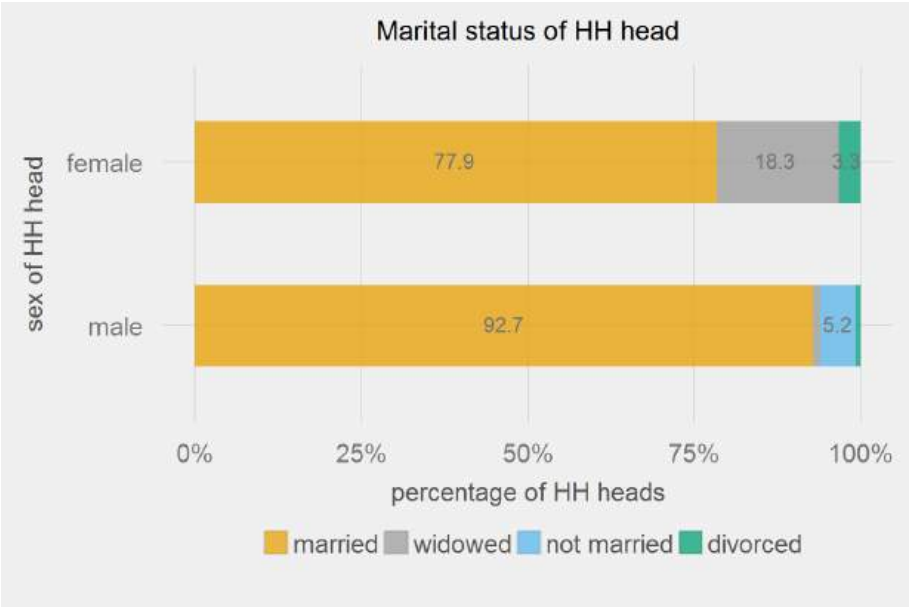


Figure 7: Marital status of household heads

The large majority of male household heads (92.7%) were married during the time of the survey, as men in Afar culture tend to marry immediately after a divorce or the death of their wife. Even though men can marry up to four wives under Islamic law, only very few men interviewed were married to three or four wives (3.4%). 63.1% of all male household heads were married to one wife and 23.1% to two wives.

### 3.2.2 Household Size and Migration

The average size of the surveyed households (Afar: *inki bura*) was 7.2 persons (minimum 1 person, maximum 34 persons) with no significant difference between woredas or female and male-headed households (see Table 10 and Table 11 in Annex V.II).

An overview of household composition can be found in Table 12 and Table 13 in Annex V.II.

During the time of the survey, 15.4% of all interviewees stated that members of their households are currently staying outside their settlement for various reasons (Table 14 in Annex V.II). In general more men than women had temporarily or permanently migrated (men had left in 11.7% of households whereas only 3.7% of households had female household members who had migrated).

The two main reasons for the temporal migration of people were the herding of livestock herds on distant pastures (49.5% of households with absent members) and the attendance of schools (36.7%). In the past, formal education was not highly regarded by pastoralists as it entailed a degree of sedentarization and their animals provided them with anything they needed. Nowadays impoverished pastoralists see the potential benefits of education but also the necessity to keep on moving with the remaining animals in order to feed their families. Against this background, an increasing number of children (especially younger ones) are send to schools while the oldest sons generally tend the animals.

A detailed overview of migration reasons for men and women can be found in Table 15, Table 16 and Table 17 in Annex V.II.

## 3.3 Mobility Patterns

### 3.3.1 Changes in Mobility Patterns

Movement of animals and people is not carried out haphazardly but is regulated by well-developed institutions. The decision to move is based on information of scouts concerning the availability of pasture and security conditions. The Afar divide grazing land into wet season (*alta*) and dry season grazing areas (*kalo*). During the dry season, they make use of rangeland resources around perennial rivers or, if these are not available, deep *elas*. In the wet season they tend to move away from the rivers which overflow and also pose risks due to water-borne diseases and malaria.

The migration patterns of clans living in Zone 4 and 1 are highly interconnected as they share many of the same pastures during their grazing movements. The grassy plains situated along the escarpment in Zone 4 (Chifra, Ewa, Awra) constitute the grazing heartland for a large number of Afar clans during the rainy season when clans from the eastern regions of Zone 1 (i.e. Assayta, Afambo, Dubti, and Mille) move there with their herds. This is done since the grazing areas around the Awash River are partly flooded and need regeneration.

The floodplains become key grazing resources for resident clans as well as for clans from Teru, Ewa, Awra, Yallo (Zone 4), and Kori (Zone 1) during dry season and drought. Especially during drought, clans move to higher-lying areas further into the mountains of Tigray and Amhara while others move to the depression of Teru, rich in fodder due to the floods from the nearby escarpment. Figure 8 shows the main grazing areas and mobility patterns of Afar pastoralists in Zone 1 and Zone 4 of Afar Regional State.

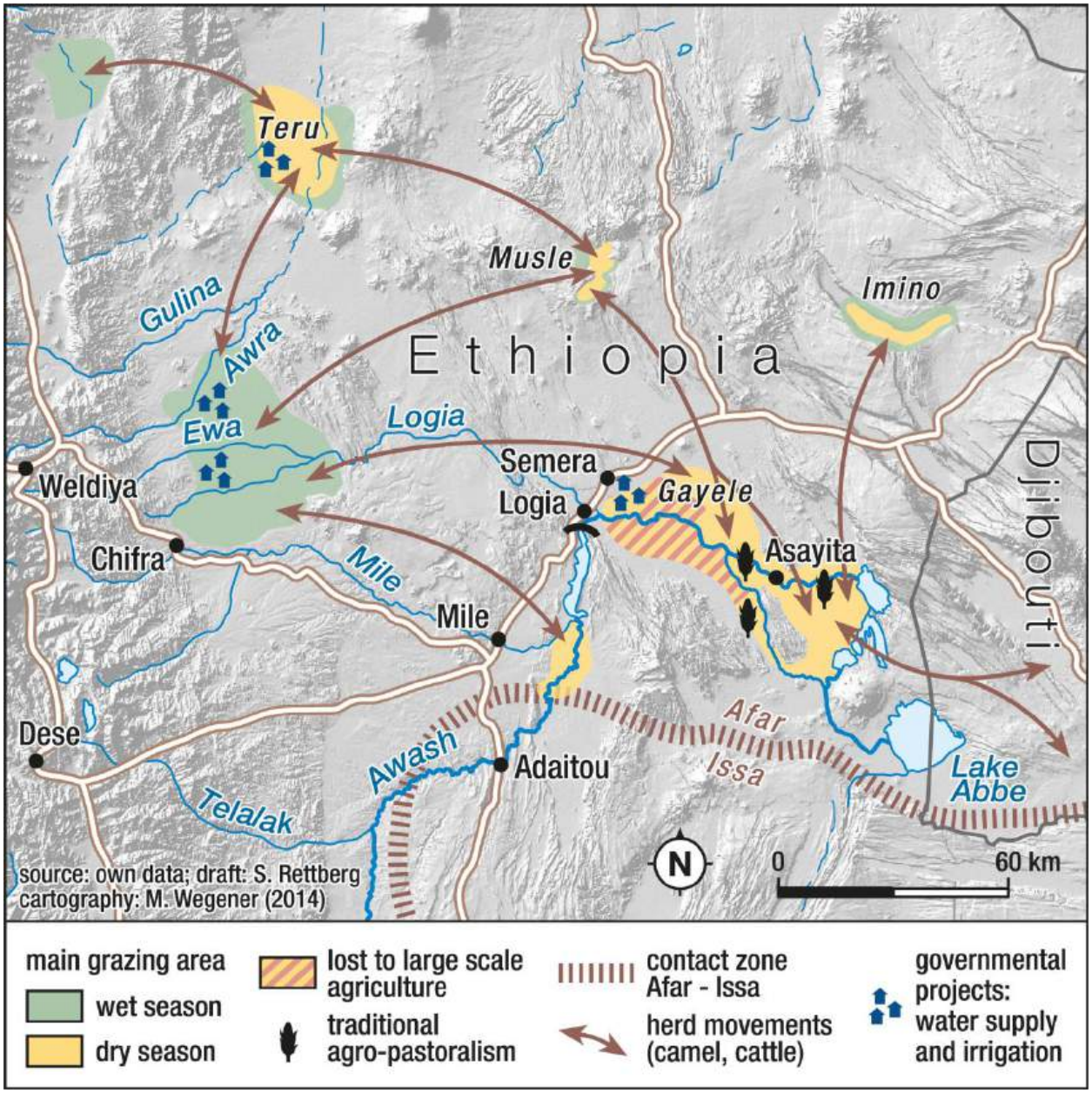


Figure 8: Main grazing areas and mobility patterns of Afar pastoralists in Zone 1 and Zone 4 of Afar Regional State

The duration that people stay away from their home settlement area varies from year to year depending on the availability of water and fodder. The overall trend in all target areas (with a few exceptions) is that the period during which people move away from the residential area has increased. While seasonal migrations lasted few months in the past people repeatedly reported that they have not seen their animals for more than a whole year.

At the same time, sedentarization has increased as the government increased its incentives to settle people by constructing schools, health posts and water points and as many have lost their animals.

> *"Compared to the past, people become more sedentary now because there is not much livestock to talk about. Only the young men and able-bodied people go with the animals. We are becoming more sedentary, but our animals go further than in the past."*
>
> (Male pastoralist, Ewa Woreda, 2014)

As the above quote shows, the distance of herd movements has increased too, as people keep looking for pasture. In most cases, only young men migrate with their animals; in other cases, whole households decide to move in search for grass and water, especially during drought and in resource scarce areas like Kori. Pastoralists repeatedly reported that those who stay behind in the main settlement area are mostly the weak (old and sick household members), those who have children in school, pregnant women and the poor who depend on access to food aid. In the past whole families kept moving with their animals due to the availability of milk on far pastures when there were grazing grounds that were considered good.

> *"It is only the people who tend the animals who leave this place and move to other areas. Not the entire family migrates. Why should the entire family follow the cattle as they did in the past? Now, animals do not have enough milk."*
>
> (Kebele spokeswoman, Bakaru, Gulina, 2015)

An overview showing during which time of the year (all year, only during dry season, or only during wet season) per woreda and per site can be found in Table 18 and Table 19 in Annex V.III, respectively.

### 3.3.2 Regional differences

Chifra

During the dry season, people from Geriro used to go to Amhara region (Wakalu, Dehdahiyo, Galdid) and to places between Chifra, Ewa and Mille such as Gurra ale and Sunnunta. They also went to the Awash River but have since stopped going there. Pastoralists from these regions stated that their migration has become less extensive as many areas that were previously rich in fodder are now without pasture.

> *"Our mobility has decreased because all places are the same, there is no grass anywhere. Plus, in the past, as we migrate from place to place, we used to find grass for our animals along the way between our starting point and the destination area. Now, there is no grass along the way and we don't move much because if we do, our animals will die in between. Hence, our mobility has decreased."*
>
> (Elder, Geriro Kebele, Chifra, 2015)

With exception of the clans from Kallo (Aussa Sultanate), all other clans usually visit the rangelands around Geriro and Mesgid during the rainy season. The area lacks vast grassy plains but it is perceived to be especially good for camels and goats due to its various trees and shrubs. Interviewed pastoralists stated that the number of incoming clans searching for fodder is increasing. This carries the potential for increasing conflict.

> *"Conflict is inevitable. Some people rape young girls, some steal camels, some others engage in fights against people of another clan, some people cut trees for different purposes, for commerce, to feed their animals, to construct a shed for their animals. In addition, cutting trees is a forbidden act among Afar. There are many sources of conflict... Concerning conflicts that arise over natural resources, it is always the newcomers (clans who come from other place for grazing) who start the conflict because when they come, they are cutting trees along their way and they also settle in any part of our land without asking for our permission to settle or feed their animals on. And those areas where they settle without our permission can be grazing areas preserved by us for dry season."*
>
> (Elder during FGD, Geriro, Chifra, 2015)

Thea above quote indicates close links between a strong pressure on natural resources, changing mobility patterns, a weakening of indigenous regulations (reserved grazing areas, prohibition of cutting of trees) and (partly violent) conflict. It can be assumed that resource scarcity and pressure on available natural resources, as well widespread destitution contribute to the increasing ignorance of customary regulations which served as essential tools to prevent deforestation and overgrazing in the past.

Ewa

During dry season and drought, the clans move with cattle and camel towards higher lying areas of Amhara and Tigray regions and sometimes towards Kallo (Zone 1). In the wet season, clans from Ewa move between nearby pastures like Magenta/Chifra, Sunnunta/Ewa (now under pressure due to resettlement) and Sahel (As Mequina) where they find good pasture resources. Pastoralists report that, in the past, the animals did not move much as the plains had abundant grasses even when there was no rain. During rainy season, the Ewa grass plains have always attracted lots of Afar from other areas as well as people from Amhara region. Clans in Kallo started losing their dry season pastures along the Awash River with the expansion of agriculture since the 1970s. Since then, more people tend to come to Ewa, staying there for a longer time.

> *"The Afar from Zone 1 come here in* karma *to graze. In the past, their livestock didn't have to come as often as now. There was no need because they had enough grazing areas of their own. Only few who are related to the clans in this area used to come."*
>
> (Elder from Ewa, 2015)

In recent years, people from Amhara come less to these areas, as the available rangeland resources are not sufficient to even sustain the Afars' livestock. Pastoralists in Ewa mentioned that the Haysanto clan from Ewa clashed with Gura'a people of Amhara. In Ewa, another conflict was reported between pastoralists and agro-pastoralists along the Ewa River as pastoralists could not cross the river due to agricultural activities there.

During focus group discussions in Ewa, participants stated that the high number of animals coming to Afar from other areas of the country has led to overgrazing, followed by the formation of gullies and the increased growth of invasive species like *Goronto*. At the time of the survey, at lot of animals from areas like Gulina, Yallo and Teru were coming to Ewa as the woreda had received relatively better rainfall. Because of this development, pastures in Ewa were quickly depleted and pastoralists with camels, moved to Amhara with their animals.

Awra

People from Finto and Lekora reported that they did not move far in the past, as there was always sufficient grass available for their animals.

> *"In the past, we had water and grass within our locality and never migrated. Even at times when we experienced shortage of rain, we had grass on the ground. That is why we didn't migrate in the past."*
>
> (Elder from Finto, 2015)

However, this situation has changed in the past decades. During times of drought pastoralits from Awra regularly move as far Cheffa Valley in the Amhara region. Due to the recently established peace with the Issa, a Somali clan that whose members live in Djibouti, Somalia, Ethiopia's Somali region and parts of Afar, they also go to Adaytou now (Awash River, Mille Woreda) and some go as far as Kallo (Dubti, etc.) during the dry season. While Kallo offers good grazing grounds for cattle, people with camels tend to go to Amhara. Conversely, during the rainy season clans from Kallo come to Awra with their animals.

Gulina

The current movement pattern shifts between the settlement area (rainy season) and towards the North (e.g. Dabayra) and South (e.g. Awra, Ewa, Chifra and Mille) during the dry season. In the past, people did not move long distances as pastures were easily available in surrounding areas; however, only for a short period of time (two to three months a year). Clans from Teru and Yallo sometimes move to Gulina for to graze their animals there. At time of the current drought, however, most people and their animals had moved elsewhere. Cattleholders went to places in the woredas of Awra, Ewa, Chifra, Dubti and Mille while people with camels went to Amhara with their animals. Again, people reported that movements have become more extensive in terms of distance and duration compared to the past.

Yallo

Herd movements shift between the plain grasslands of the settlement area where people and animals stay during the rainy season, and the mountainous areas of Yallo (Ad koma, Dabayra) during the dry season. During times of drought, people move further up into the mountains of Tigray (Marfata, Gorriso) and nearby places of Alamata Woreda. The movement pattern changed in so far as people tend to move out for longer duration (from three to four months to one year and more). Other clans stopped coming to their area because of lack of available pastures.

Teru

In general, the clans from Teru never moved long distances. Previously, people shifted their settlements between the lower lying, seasonally inundated plains of Teru during dry season and times of drought, and the surrounding higher lying areas (wet season grazing land or *alta*) like Digdiga, Badolita, Ergalita where large plains offered good grazing grounds during the rainy season. Key natural resources in Terua are located in Barantu, Marama and Awidi.

Mille

In the past, clans stayed on clan base along the river during dry season and moved to other areas like Chifra and Kemise during the rainy season. During the dry season, people from Chifra and Zone 4 (Ewa, Awra) would come to Mille to graze their animals, too. With the establishment of the Tendaho dam in 2009, clans from Mille lost their dry season grazing areas and had to change their migration patterns. These days, they stay in Mille during wet season and move to Chifra, Ewa, Magenta, Kallo during dry season.

People who are engaged in fishing reduced their mobility as they stay near the lake. As many people are now involved in other activities (fishing, sale of firewood, small-scale trade along road, collecting stones to be sold to construction companies, etc.) less people are moving nowadays.

Kori

Pastoralists from Kori move far distances during dry season and drought. At time of the survey, pastoralists had moved with their camels and cattle had to rangelands in Assayta, Afambo, Dubti and Teru. Some also moved further towards the southern Tigray Mountains behind Yallo. Animals from Kori that had been moved to Teru in 2014 have not returned to Kori for a year. Movements towards Zone 4 have increased relatively, as pastures in Kallo have become less accessible.

*"Since the plantation of sugarcane started we stopped going to Kallo. Especially, our camels and cattle do not go there. It is only shoats that we send for grazing. This is because Kallo doesn't have as much grass as it used to have before the beginning of the sugar project. Plus, it is forbidden to go to Kallo because they have the* desso *practice for their sugarcane agriculture."*

(Elder in Musle, Kori, 2015)

## 3.4 Environmental Challenges

### 3.4.1 Rangeland Degradation

One of the main drivers for the reported changes in migration patterns has been the loss and severe degradation of rangelands due to a combination of anthropogenic and climatic changes. The most commonly observed forms of soil degradation are different forms of water erosion (sheet, rill, gully and bank erosion) which remove the top soil and create gullies leading to a loss of soil nutrients and a reduced water infiltration on the rangelands as water is channelled in the gullies. According to the perception of interviewees, droughts and flash floods have intensified and rainfall has become more irregular.

The invasive spread of native and introduced plant species presents and additional challenge. Pastoralists in Ewa Woreda stress the increasing soil degradation on the highly fertile plains of Ewa, which were previously covered by abundant grasses like *malif* (*Andropogon canaliculatus)*. All these areas have now become dry and barren or they are covered by native species like *Acacia nubica* (locally known as *goronto*) which started to invade the pasturelands.

*"Now the land has become barren. Grasses that used to exist don't grow here anymore. The area which is now covered by* goronto*, there* malif *grass used to be so high that you couldn't see animals in it. But now, I don't know, probably there is no seed in the soil, even if it rains grass doesn't grow anymore….And then the frequency of rain has changed. If it rains in* sughum *it doesn't rain in* karma *and the other way around. Now, because the land became dry, the rains started to create gullies. The land is being eroded. Now even livestock stopped producing milk. In the past, one camel used to give enough milk to satisfy one household. We don't know why but now one camel can't even support its own baby camel… The reason we didn't have gully erosion in the past was due to grass. When there is grass, the soil is intact. The grass was preventing erosion. When* malif*, which was holding the soil, was gone, the rainwater started washing away everything. We think it is the end of the world that is approaching."*

(Pastoralist, Ewa, 2014)

People link the increasing dryness of the land and the lack of grasses to the creation of gullies. They are aware of the importance of grasses to stabilize the soils and prevent erosion. The central impact of these changes on local livelihoods is the decreased milk production as pasture resources have severely diminished, especially for cattle, but also for camel. In Bolotoma (Ewa Woreda), elders mentioned that they previously got up to six litres of milk per cow and day. Now they get the same amount from six cows together. Next to the increasing temporal irregularity of rainfall, people also noticed an increasing spatial fragmentation. Only few patches of land tend to receive enough rain currently. They see this as main contributing factor for overgrazing.

*"In the past if it rained only once starting from Baadu (Zone 3) all the way to Kilbat (Zone 2), the rain of one night was enough and the pattern of rain was uniform. Now if it rains here, it doesn't rain in the next village, if it rains in Kallo (Zone 1) it doesn't rain here. Now, if it rains*

*here and some grasses grow all livestock come here and feed on that. They go and eat up everything."*

(Elder in Ewa, 2013)

This quote shows that the loss of pastures is tightly linked to a change of adaptation strategies, which reinforce environmental problems. As mentioned earlier, people now move everywhere without asking for consent of hosting clans and regulations on rangeland management have broken down to a large extent.

The previously most important rangelands for many clans, the vast grassy plains with species like *moussa* (*Brachiaria eruciformis)* and *malif* (*Andropogon cannaliculatus)*, are now degraded due to gullies, overgrazing and/or the replacement of native grasses with less palatable plant species. Signs of severe degradation are visible on the vast plains located in Ewa, Awra (i.e. Duba, Hayukeli and Muli grazing areas) and Gulina. But also on the seasonally inundated plains surrounded by hilly terrain like the sites in Yallo, Kori and some sites in Teru suffer from similar problems.

*"Around here, there are places like Sunnunta and Duba of Ewa, Muli of Gulina, Hayukeli of Awra, Wakriedde and Amo ado of Yallo. Those places are now overgrazed, devoid of grass and have been invaded by invasive trees like* goronto*. The land has been turned into gullies. The worst affected of all in terms of gullies is Duba which is located in Ewa."*

(Elder in Ewa, Bolotoma, 2015)

### 3.4.2 Invasive Species

*"We don't know how it (*Prosopis juliflora*) came to our land and we don't also know what to do with it."*

(Elder during group discussion in Afdero village, Yallo)

Spatial Distribution of Invasive Species

The invasive spread of certain plant species has been observed in all woredas, but with significant spatial differences (see Figure 9). 63.8% of the surveyed households stated that rangelands in their area are affected by invasive species. In general, the least affected survey sites are located within Musle Kebele, Kori Woreda, which is at the same time the most water scarce region with least influx from potential carriers of seeds of invasive species (water flows, livestock coming from invaded areas). Here only 32.5% perceived rangelands threatened by invasive species. Hot spots of invasion are the surveyed kebeles located within Yallo (91%) and Ewa (82.5%).

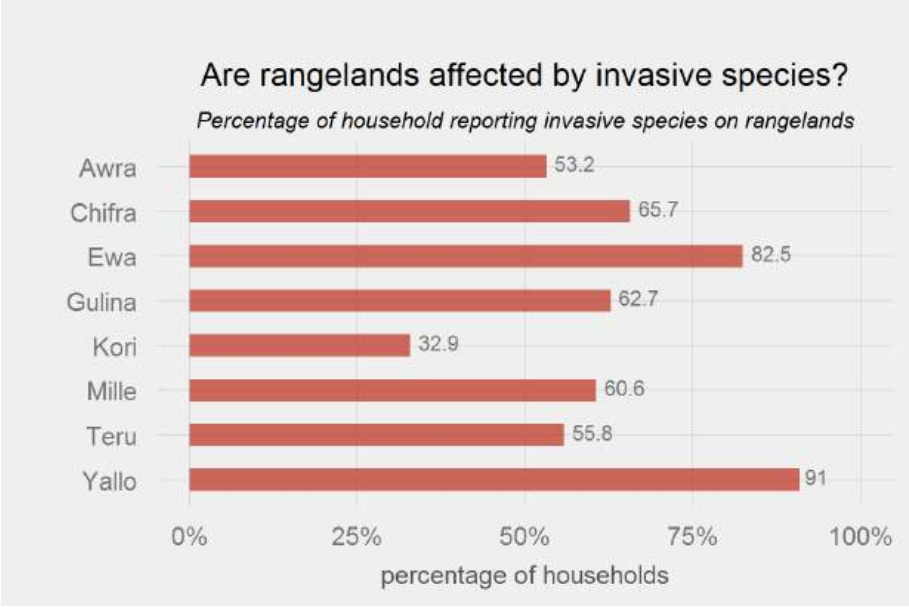


Figure 9: Rangelands affected by invasive species per woreda

The most common invasive species in those regions are *Prosopis juliflora* (local name: *woyane*), *Acacia nubica* (local name: *goronto*) and *Parthenium hysterophorus* (local name: *democracy* or *congress weed*). While g*oronto* is a native plant well known to pastoralists and valued for its potential to serve as fodder for camels, *woyane* and *democracy* are invasive species with little perceived use for the pastoralists.

In Yallo, there has been a severe invasion of *P. juliflora* in the last five years in both surveyed kebeles (Walae', Koli na Gaboli). Both kebeles are close to each other within a plain valley bottom surrounded by hilly terrain, the source of seasonal floodwaters. Some interviewees claim that the seeds came with the floodwaters from Tigray highlands (Bala District) which discharge into the valley. In Bala, *Prosopis* was planted in the surroundings of a cotton plantation during the *Derg* regime to stop degradation. Nowadays, large areas in Bala are covered by *Prosopis*. Others blame livestock coming from Assayta to be sold on Yallo livestock market for spreading the seeds, since the lower Awash Valley around Assayta is highly affected by Prosopis.

*Acacia nubica*, which started to out-compete other plants within the last ten years, especially grasses, increasingly covers the rangelands of Ewa, especially in Fantena Badule Kebele. Pastoralists relate this to repeated droughts, which left the soil without grass and as such easily susceptible to *Acacia*. Agricultural lands near the river are affected by *Parthenium* and people assume that it was livestock from Amhara, which spread the seeds through their dung in the area. The spread of *A. nubica* is attributed instead to the increasing loss of grass cover.

> *"In the past,* goronto *was not spreading like now because grass used to grow in the area which is now occupied by it. Grass prevented it from spreading by occupying the land... Cutting is the only solution. We tried to stop it from spreading but it didn't work as we wanted it to. Through the safety net programme 30 men of our community spent some time in the field cutting it in order to destroy it. They cut a good amount and put it on one place. However, it grew back and became worse."*
>
> (Discussion with men and women in Ewa, 2015)

For a detailed overview of sites in which rangelands are affected by invasive species as well as an overview of techniques applied a further spread of invasive species, please see Table 20 and Table 21 in Annex V.IV.

Techniques Prevent Spreading of Invasive Species

Uprooting and cutting is the most common strategy to deal with invasive plants even though respondents reported that it does not help to effectively control those plant species. 41.4% said that they tried this in order to protect their land from further spread, but even more people (57.7%) did not do anything as they felt helpless and all their trials for eradication have failed so far. See Figure 10 for the percentage of households that have applied different techniques to prevent the spread of invasive species on their rangelands for each woreda.

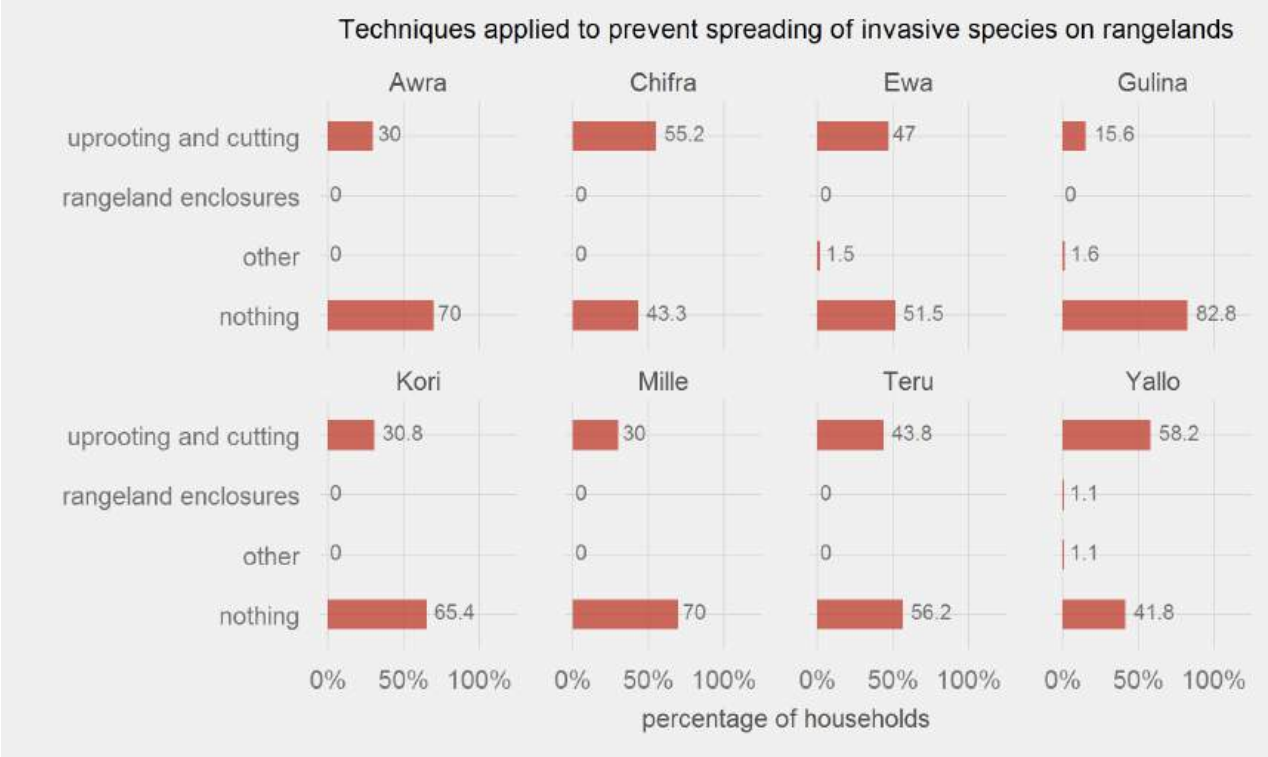


Figure 10: Techniques applied to prevent the spread of invasive species on rangelands per woreda

For a detailed overview of sites in which rangelands are affected by invasive species as well as an overview of techniques applied a further spread of invasive species, please see Table 20 and Table 21 in Annex V.IV.

### 3.4.3 Deforestation

According to interviewees, logging has become a severe problem for project sites in Gulina, Chifra and Yallo where native tall trees play an important role as fodder resource for animals, as food resource for humans and as shade. The additional value of trees for stabilizing and nurturing soils is known among Afar people. Afar law (*maada*) prohibits the cutting of trees. When deemed necessary, branches are collected as feed for emaciated animals or lactating cows. This is done in a way that ensures the regenerative capacity of the plants.

Due to the increasing impoverishment of many pastoralists and the fact that many of them stay outside their clan territories with their animals for longer periods, the pressure on the remaining forest resources has increase. At the same time, the respect for local institutions and laws is

eroding. In all woredas, interview partners claimed that the practice of *desso*[3] has recently been prohibited by the government.

> *"The government ordered us not to chase away people who come from other area to feed their animals. They told us that all Afars are the same and people should be free to feed their animals wherever they go in Afar. They said it is their democratic right to move anywhere and feed their animals... People who come from other areas usually cut our trees to feed their animals. Their animals graze with our animals and the owners usually cut trees. We can't stop them from doing so because they argue with us saying that it is their democratic right to use the resources. When the locals see people from other clans cutting trees, they too are encourage to cut trees so that they would get their fair share of the local resources. This kind of competition contributes to the degradation of vegetation in our area."*
>
> (Elder during FGD, Admalif, Gulina, 2015)

It is likely, that the limitation of *desso*, for the sake of peaceful cohabitation, contributed to an increasing pressure on remaining pasture resources in general and aggravated the problem of overgrazing in particular.

### 3.4.4 Access to Water and Pastures

Access to Pastures

The survey took place during the dry season, which eventually turned out to be the most serious drought since the 1980s with up to 18 million people in need of food aid in Ethiopia (8 million under PSNP and additional 10 million people in need of food aid). It is therefore hardly surprising that at the time of the survey, access to water and pastures were severely hampered. The dry season always presents a time of extreme scarcity especially in terms of pasture. However, during the survey only few of the areas previously grazed during the dry season had remained with some grass.

Almost all of the interviewed households reported that they could not sufficient pastures during the current dry season. However, respondents in some of the surveyed sites assessed pasture availability as sufficient for some animal species (Figure 11). The few households who indicated to currently find enough pastures were located in survey sites in Chifra (Geriro and Mesgid).

[3] Exclusive territorial claims of clans over key grazing resources in order to regulate the grazing intensity and secure access to fodder during dry season.

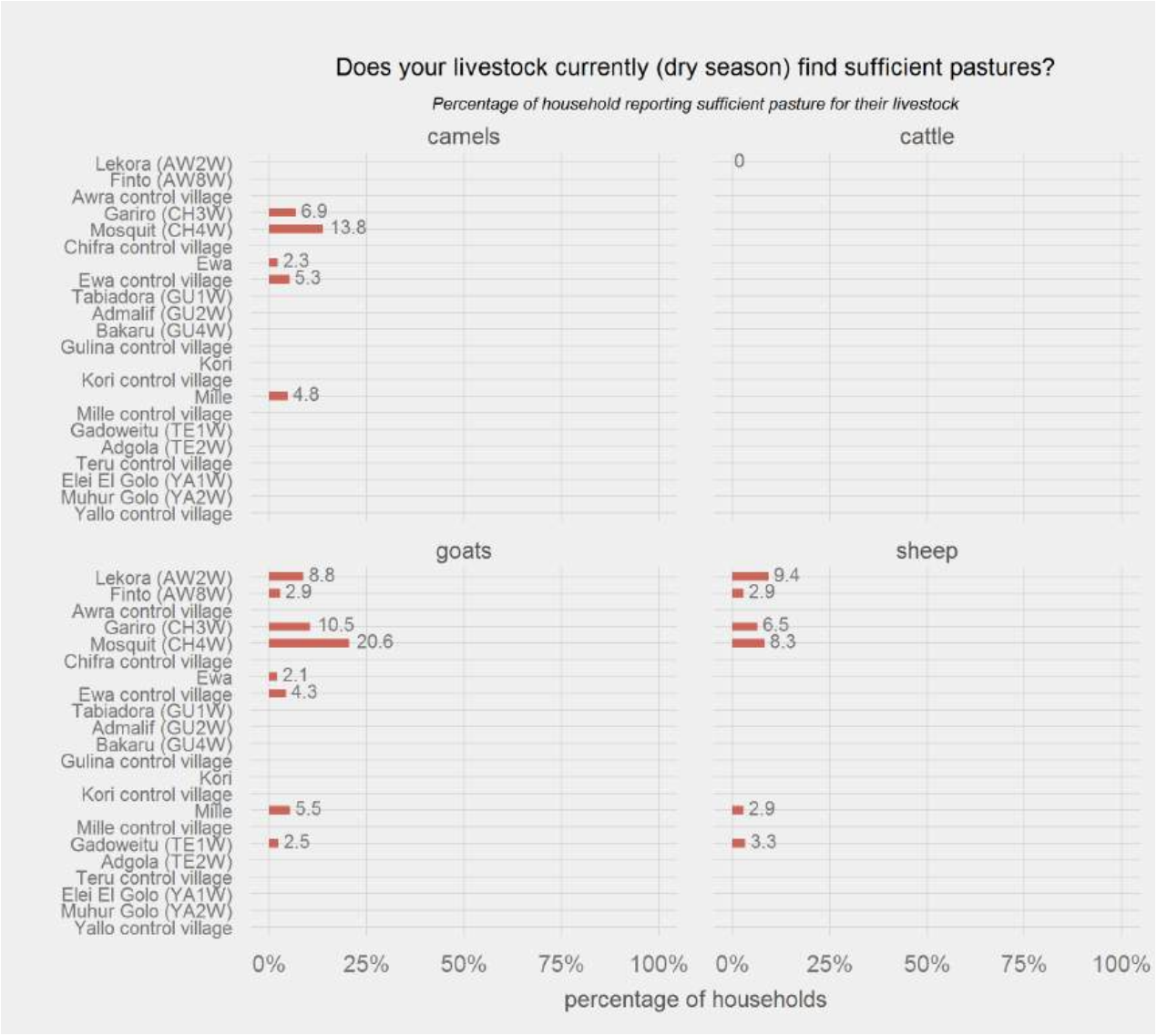


Figure 11: Pasture availability at GIZ intervention sites and control villages

A detailed overview of interviewees' perception of pasture availability per woreda and per site can be found in Table 22 and Table 23 in Annex V.IV.

Techniques to Prevent Pasture Degradation

Observations and interviewees' responses indicate pasturelands are suffering from soil erosion and other types of degrdatation. However, even though pastoralists perceive the problem of pasture degradation to be worsening and notice that more gullies are forming, most respondents have not applied any techniques to halt the degradation of the pastures they are using (76.4% of households have not taken any action to halt the degradation of pastures). Constructing stone and soil bunds was relatively more common in Chifra and Ewa, were 45% and 31.3% respectively, of respondents reported to have constructed them.

Detailed data on techniques applied to prevent degradation of pastures can be found in Table 24 and Table 25 in Annex V.IV.

Access to Water

Current water availability was perceived to be more positive than pasture availability. However, around 70% of all households reported that they could not sufficient amounts of water for their

livestock. In addition, there is a very pronounced spatial variation with regard to the access to sufficient water for livestock. Most people who have access to sufficient water for their livestock live in survey sites of Chifra (Geriro and Mesgid) and Ewa close to perennial rivers, and in Mille, where they have access to water from the Tendaho Reservoir. According to respondents, these permanent water sources are essential during dry season and drought times (survey). Please see Figure 12 for overview of water availability at site level.

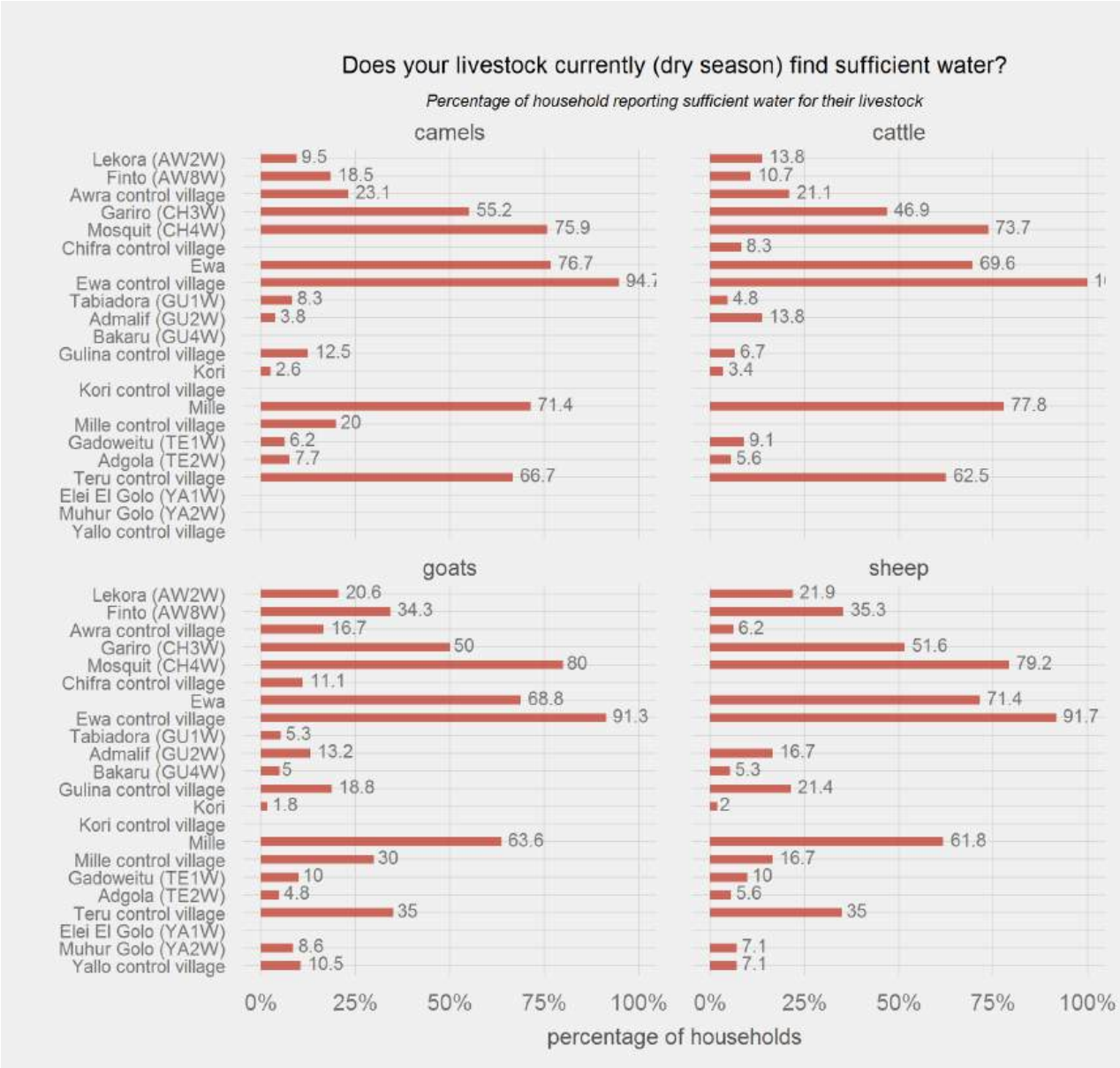


Figure 12: Water availability at GIZ intervention sites and control villages

Detailed data on water availability for livestock at woreda and site level can be found in Table 26 and Table 27 in Annex V.IV. An overview of the answers to the questions how much time respondents needed to reach the nearest water source for their livestock can be found in Table 28 in Annex V.IV.

## Types of Water Sources

Pastoralists rely on various ground- and surface water resources, which they use depending on their seasonal availability, use rights, purpose (irrigation water, water for human consumption, watering of animals) and costs involved (financial and labour).

### Water Sources for Farming

Water from rivers constitute the main water source for farming in the three woredas in which agriculture plays a significant role in people's livelihoods, namely Awra, Chifra and Ewa (Figure 13).

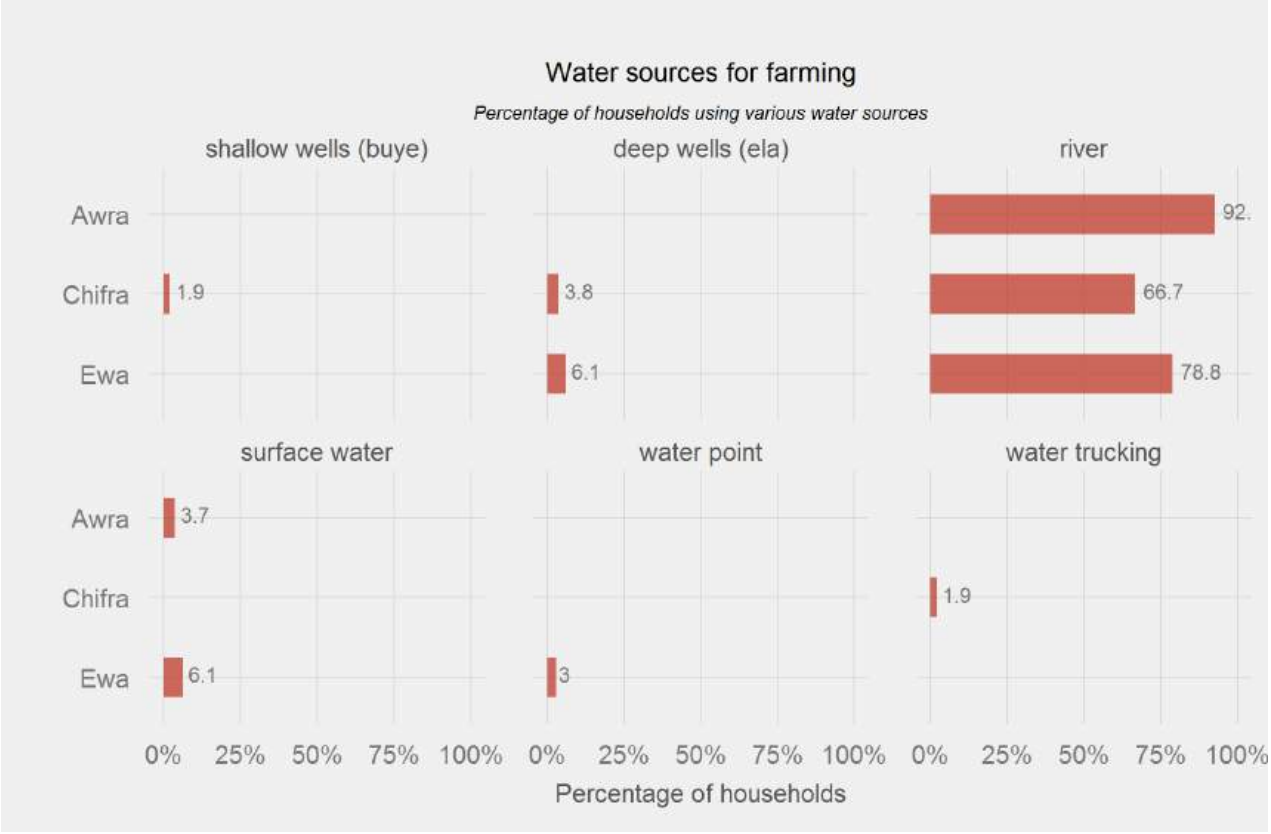


Figure 13: Water sources for farming per woreda

Table 29 (irrespective of season) and Table 30 (disaggregated by season) in Annex V.IV summarise which water sources surveyed households in all eight woredas are using for irrigation purposes.

### Water Sources for Household Consumption

For household consumption, the most commonly used water sources are externally constructed water points (especially in Teru and Yallo), rivers (especially in Chifra and Ewa). Surface water (like in ponds) and water trucking are the main water sources in Kori and shallow wells (*buyes*) play an important role in Mille. Hand-dug deep wells (*elas*), which can be up to 15 m deep, play a significant role during the dry season in all sites except in those where there are perennial rivers (namely Chifra and Ewa). Figure 14 shows water sources for household consumption per woreda.

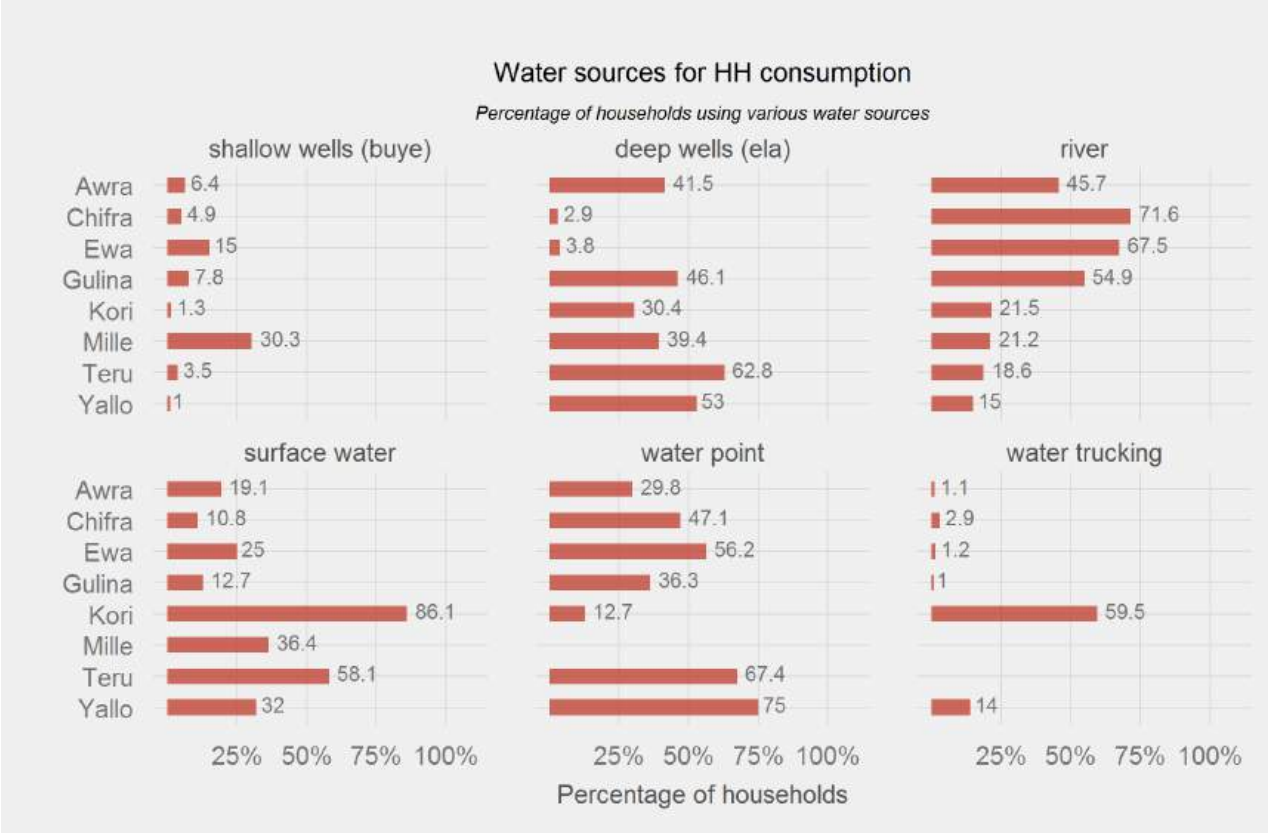


Figure 14: Percentage of water sources for HH consumption

Table 31 (irrespective of season) and Table 32 (disaggregated by season) in Annex V.IV summarise which water sources surveyed households in all eight woredas are using.

### Water Sources for Livestock

The main water sources for livestock differ to a certain degree as the relevance of water points (hand pumps or mechanical pumps) decreases while the relevance of river water and deep wells increases. Figure 15 depicts the water sources used for livestock by the surveyed households in all eight woredas.

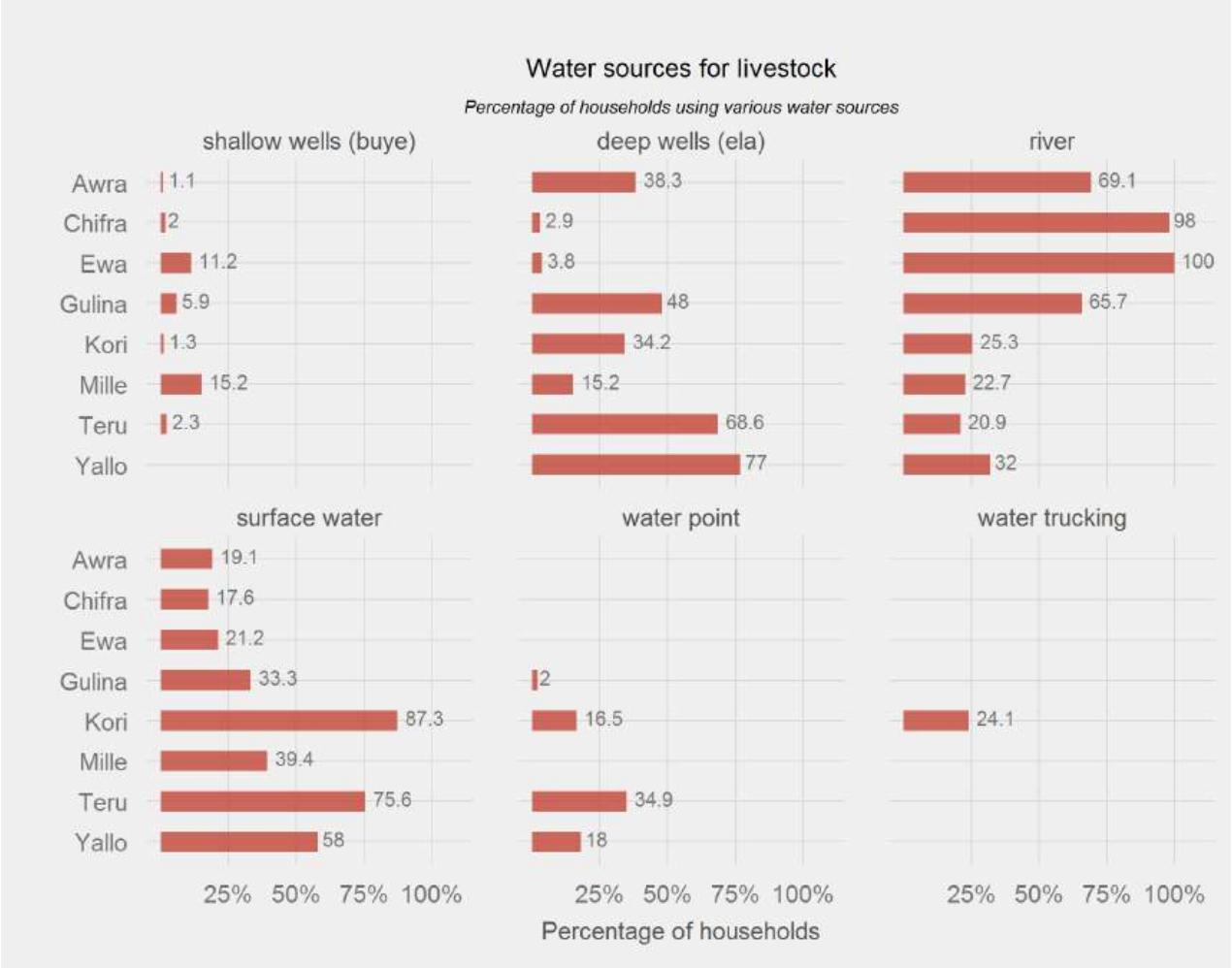


Figure 15: Water sources for livestock per woreda

Deep wells and surface water from ponds and cisterns, known in East Africa as *birkats*, play a major role in the water scarce areas of Teru, Yallo, Kori and in Finto kebele within Awra. Depending on the season and the respective availability of the different water sources people develop complex water use patterns.

> *"Our animals drink from* Li'in elas*, very deep* elas *where water is fetched by five or six people. In* Li'in ela*, there are several* elas*. For human consumption, we have a water pump. During dry season there is a pond built by the construction company and in the rainy season, we also use the nearby rivers and the* buyes *inside them."*
>
> (Elder during FGD, Yallo).

Table 33 (irrespective of season) and Table 34 (disaggregated by season) in Annex V.IV summarise which water sources surveyed households in all eight woredas are using to water their livestock.

Changes in Access to Water

In general, according to interviewees access to water for farming, household consumption and livestock has decreased in the last ten years. Teru presents an exception as access to water for farming and household consumption has increased for the majority of surveyed households due to the recent construction of a water pipeline (pumping of groundwater from Digdigsala/Teru over 95 km northwards). Improvements in access to water for household consumption in Ewa, Kori, and Yallo can be attributed to the governmental construction of water points (motorized pumps, hand pumps), *birkats* (underground cistern to store rainwater) and ponds. See Figure 16.

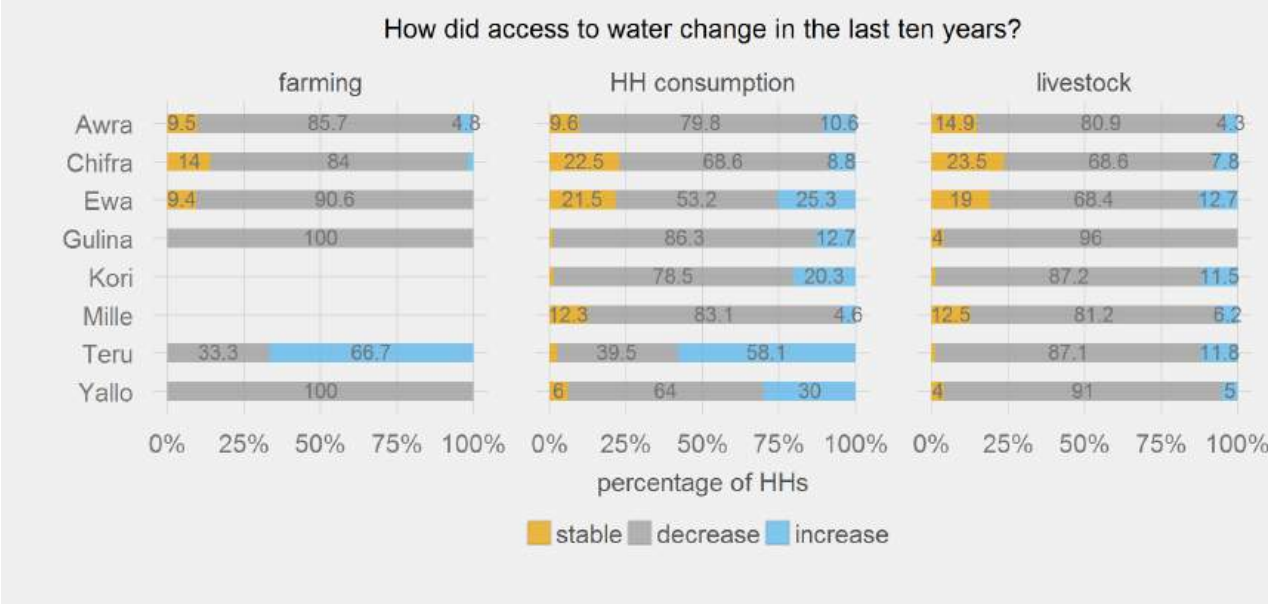


Figure 16: Change in access to water for farming, household consumption, and livestock per woreda

An expert from the Bureau of Water Resources noted that the last three years have been marked by an intensified construction of water points in large parts of Afar Region. This has been one of the main activities within the frame of the governmental water-led development strategy. However, the use of water points is limited to household consumption and watering of small numbers of sheep and goat. Larger animals, on the other hand, are watered mainly from rivers, ponds and *elas* where larger quantities of water are free of charge and where pastures for animals can be found nearby.

Additional challenges concerning the access to water become apparent by looking at the example of Teru. Before the construction of the pipeline in Teru, pastoralists mainly used deep *elas*, which were dug in the riverbed of the Awra River. These *elas* had to be dug anew every dry season. After the construction of the water pipeline, the woreda is split between settlements with improved access to water due to being in close proximity to the pipeline and settlements in which access to water remains a major challenge (information from FGD). For those who live near the pipeline, access to water for household consumption has partly improved, as long as they can afford to pay.

With the establishment of the water points and water pipelines water has become a commodity. Pastoralists have to pay for its use to the operator of the scheme who in turn hands over the money to the voluntary water user committee on village level. These committees use the collected funds for operation (fuel etc.) and maintenance. Often fuel is lacking due to missing funds or due to not being available in rural areas. Moreover, operators often lack the capacity to deal with technical matters. Therefore, many of the newly established water schemes were not yet functional during the time of the survey.

Water scarcity turned out to be a major challenge in all sites visited during the survey, even though it varied in severity. The sites in Kori are worst affected in terms of accessibility (several days of walking on food are necessary to reach deep *elas*) and water quality. Sites in Yallo suffered relatively more from severe water shortages and quality problems. Sites closest to perennial rivers (Chifra, Ewa, western Awra, Mille) assessed the accessibility of water relatively better as they do not depend on deep *elas* or rainwater collected in ponds and *birkats*. People in Mille do not use the Awash River water much neither for household consumption nor for watering of animals as they complain about the pollution of the river.

An overview of perceived change in access to water for farming, household consumption and livestock per woreda and per site can be found in Table 35 and Table 36 (farming), in Table 37 Table 38 (household consumption), and Table 39 and Table 40 (livestock) in Annex V.IV.

Changes in Groundwater Levels

Access to the traditional water sources like deep wells (*elas*) has become more difficult with decreasing groundwater levels. Changes in groundwater levels as perceived by interviewees (Figure 17) indicate that groundwater levels have dropped in all of the planned intervention sites. The figure also reflects the percentage of households who have access to water through digging (*elas* and *buyes*).

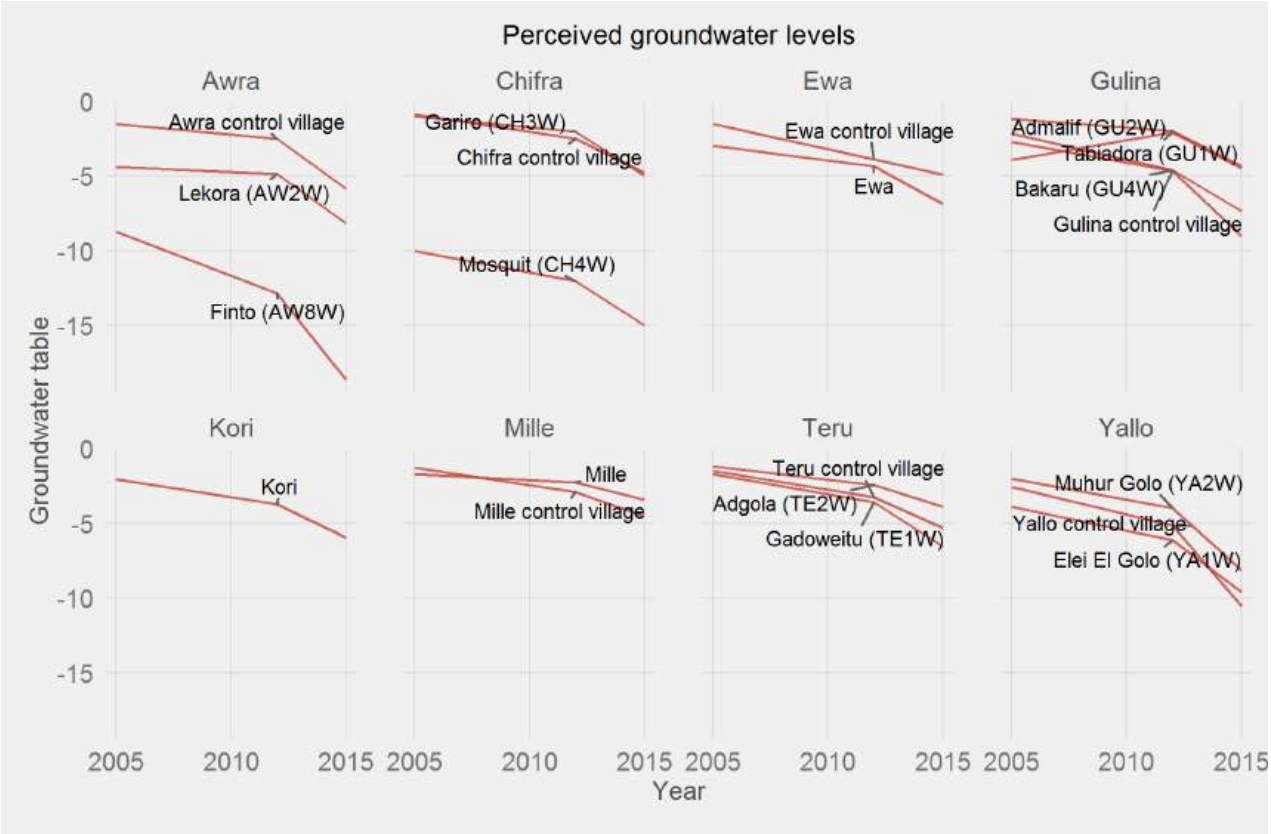


Figure 17: Perceived development of groundwater levels per site (2005-2015)

The perceived access to groundwater by digging as well as perceived groundwater levels for each woreda and site can be found in Table 41 and Table 42 in Annex V.IV.

## 3.5 Livestock Holdings and Wealth

Livestock Ownership and Average Livestock Numbers

Camels and cattle are the most important animals for milk production. Households in the study region own around three to five animals of each of these species. There are only small differences across sites. Results of the survey clearly show that goats and sheep dominate the multi-stock holdings in all sites. Here the pure pastoral settlements in Musle plain of Kori stand out with larger sheep and goat holdings. More than half of all interviewed households (57.8%) own camels (the highest share of households with camels is found in Ewa with 77.5% and the lowest in Teru with 37.2%). A similar share of households (58.2%) owned cattle (with 82.4% of households owning cattle, the surveyed households in Chifra have the highest rate of cattle ownership while households in Mille have the lowest rate in cattle ownership with 13.6%).

Figure 18 shows average livestock numbers per woreda. Table 43 and Table 44 in Annex V.V, respectively, show livestock ownership and mean, minimum and maximum livestock numbers per woreda.

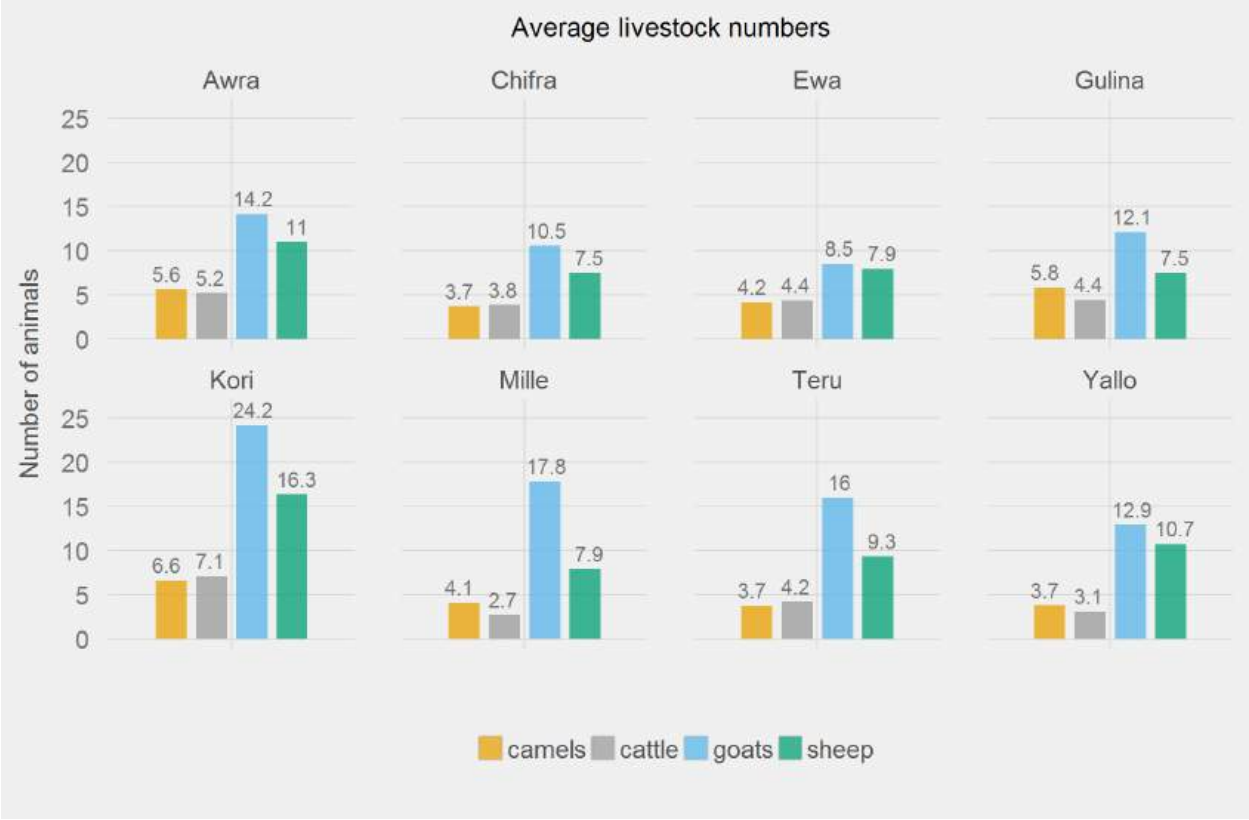


Figure 18: Average livestock numbers per household and woreda

Livestock Ownership and Wealth

The decline in the ratio of livestock to people has brought about increasing food insecurity and impoverishment. Throughout the study region, 24.5% of all interviewed households did not own either camels or cattle, which is an indicator of destitution in pastoral communities (in sites in Mille up to 50% of households owned neither camels nor cattle). More than 90% of all households reported a decline in livestock numbers, irrespective of the species. Current average livestock numbers per household are lower than in the past so that many households depend on food aid.

See Table 43 in Annex V.V for the percentage of households who possess neither camel nor cattle for all of the surveyed woredas.

Changes in the number of camels, cattle, goats and sheep in the past ten years can be found in Table 45, Table 46, Table 47 and Table 48, respectively, in Annex V.V

Related households manage animals collectively. The households move to pastures together and live together in the same compound. Despite the collective management of animals, ownership of animals is individual. Even though women tend to own less property than men do, e.g. due to discriminating heritage laws, they still own a significant amount of animals. They had owned an average share of 24.6% of all camels, 31.6% of all cattle, 36% of all shoats and 74.4% of donkeys.

See Table 49 in Annex V.V for the average share of animals owned by the wife of the household per woreda.

More than half (52.2%) of the surveyed households did not own any donkeys at all. The absence of donkeys serves as an indicator for destitution in many communities, as donkeys are essential for the provision of water for household consumption. Several times during the survey, women complained about the hardship to carry the jerry cans with water, sometimes for several hours, on their back, as they did not own any donkeys. The majority of those who have donkeys own one donkey only (72.8%) even though few households own up to four donkeys (see Table 50 in Annex V.V).

The number of animals, especially in camel and cattle, serves as major indicator of wealth among the Afar people. Traditionally the Afar differentiate between wealth groups. Due to the decline in livestock holdings people have adapted the indicators for ranking. The wealth classification in Kori (Table 5) serves as an example.

Table 5: Wealth ranking in Kori Woreda (Zone 1)

| wealth group | Number of livestock owned | | | Additional Wealth Indicators |
|---|---|---|---|---|
| | Camels | Cattle | Sheep/Goats | |
| Rich (*Gaddaali*) | Past: > 100<br>Today: > 5 | -- | Today: > 30 | • four kinds of animals |
| Middle to poor (*Tudagoyta*) | Past: Few cattle or camels, but enough to survive<br>Today: neither cattle nor camel, but enough shoats | | | • only two animal species:<br>• camel or cattle<br>• sheep or goats |
| Destitute (*Maskintu*) | none | none | Past: < 50 shoats<br>Today: few shoats | • no donkeys<br>• receive *Zakat** |

*religious payment in Islam, obligatory alms-giving

*Source: Rettberg 2013*

The most common statement in all survey sites was that nowadays it has become difficult to differentiate between wealth classes at all, since almost all households have lost animals and have become poor. Nowadays, only 1.6% of all households own more than 20 camels or 20 heads of cattle. A woman from Gulina states:

> *"Those who were rich at some point in time, now, they have nothing. The middle class people have also lost everything they had and turned poor. Almost all the* Gaddaali*, the middle class and the poor are in the same wealth status- all are poor. Hence, there is no rich among us for they have lost their animals because of the drought. We have lost our cattle*

*and now we are losing our sheep and goat. It has been eight years since we started to witness the death of our sheep and goats."*

(Kebele Spokeswoman, Bakaru Kebele, Gulina, 2015)

Livestock numbers should be regarded with some caution for multiple reasons: First, there is a risk that not all animals were reported by the interviewees during the survey (fear to be taxed, hope to receive support, etc.). Secondly, the numbers of animals tend to fluctuate significantly throughout the year and between years. The survey took place during a severe drought in which, as reported by interviewees, many animals had died. Third, many households, especially those with comparatively more animals, had moved to remote grazing areas due to the drought.

In spite of these uncertainties, concerning the preciseness of the total numbers all interviews confirmed a large loss of livestock within the last ten years, affecting all species. The impact of this is an existential threat for pastoralists as livestock is the only economic activity for most households surveyed (compare chapter 3.6).

Those animals who have remained roam around constantly looking for pasture. Under these strenuous conditions for the animals, milk production has significantly decreased. Many people reported that they did not milk their animals at all at the moment due to the drought while they were milking up to three times daily in the past with seasonal differences.

*"How can one think of milking his animals in such a drought ravaged environment where there is no grass at all? ...Before, during the rainy season, we milked the camels and cattle three times a day and twice of milking for the shoats. During the dry season, we milked all animals only twice a day, only in the morning and night times."*

(Elder from Ewa, Bolotoma, 2015)

Despite these difficulties people only 4.6% decided to shift their herd composition towards animal species that are more drought resistant (like camel) or less dependent on grass (like camel and goats). See Table 51 in Annex V.V for an overview of shifts in herd composition per woreda.

## 3.6 Livelihood Diversification and Income Generation

Pastoral Sources of Income

Almost all interviewed households generate income through the sale of animals (Figure 19 and Table 52 in Annex V.VI).

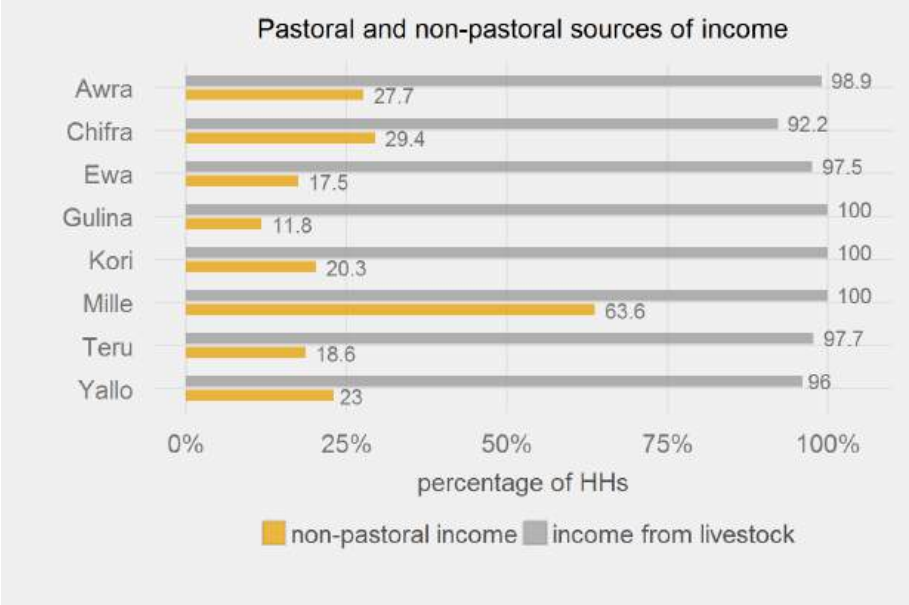


Figure 19: Pastoral and non-pastoral incomes per woreda

The decision about where to sell is based on a calculation which includes the attainable prices which vary between markets, the distance to the market, the availability of water and pasture on the way there and the vulnerability of the animals. Most households sell their cattle and camels on the weekly livestock markets in Chifra and Yallo. There is a tendency for people to sell their camel in Yallo while they prefer to sell cattle in Chifra. Pastoralists from Kori and Mille sell some of their animals in Assayta. Shoats are mainly sold in daily markets which are nearest to the settlement (e.g. for people from Ewa in Alele Subla or for people from Gulina in Kelewan).

A pastoralist from Bolotoma, Ewa Woreda, complained:

> *"We have problems of lack of market for our animals. Every time we take our animals to the market for sale, we don't find people who want to buy from us. We sometimes come home without selling even a single animal. Then, how can we meet our daily expenses for livelihood?"*
>
> (Elder during discussion Bolotoma, Ewa, 2015)

The number of livestock sold and prices achieved differed significantly between households and sites. The average number of animals sold within the last year per household is 1.4 for camels, 1.6 for cattle, and 12.8 for shoats. Most camels and cattle were sold in Gulina (2.1 and 2.2 animals per household and year), with sales varying between zero and seven sold animals. Average annual sales of camel and cattle were lowest in the sites in Kori, Mille and Teru. This can be partly explained by the far distance to the livestock markets for camel and cattle. Instead, in these woredas the average sales of shoats were relatively higher compared to other woredas (between 15.8 in Teru and 22.3 in Kori).

Table 53 in Annex V.VI summarises the mean, minimum and maximum number of animals sold in 2015 per woreda.

Differences on household level are most poignant in Awra, Ewa, and Chifra where the difference between average sales and maximum sales is highest. For example, even though the average number of cattle sold in Ewa was 1.6, the maximum number of animals sold per household was 20.

The average prices received for shoats varied between 410 ETB (Kori) and 610 ETB (Chifra). Those for cattle varied between 2300 ETB (Teru) and 3400 ETB (Awra) and those for camel between 4600 ETB (Teru and Chifra) and 6500 ETB (Mille).

Non-Pastoral Sources of Income

For most pastoralists, the sale of animals is the only source of income. Only a quarter of households have additional, non-pastoral, income sources. Non-pastoral income sources comprise the sale of firewood, governmental income, daily labour, the sale of fish and the sale of agricultural products. Out of the group of agro-pastoralists, only 24% generate income through the sale of a part of their harvest (including cereals, vegetables, fruit). More than half of all households (51.9%) of the agro-pastoralists from Awra, generate income with their agricultural produce while in Chifra this value is only 11.1%. In Ewa 30% of agro-pastoralists sell part of their produce, mainly fruits and vegetables. See Figure 20 and Table 54 in Annex V.VI.

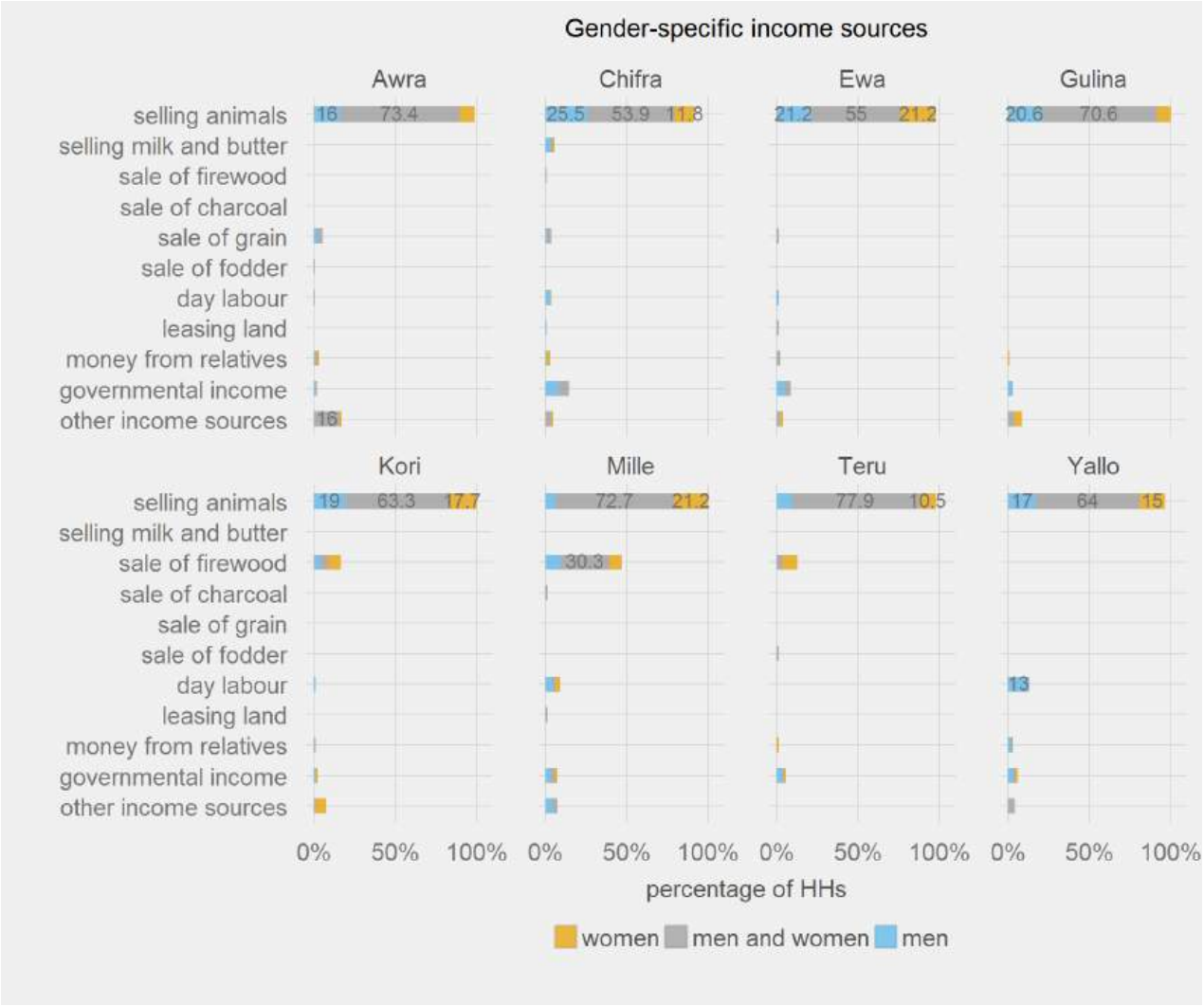


Figure 20: Gender-specific income sources per woreda

In general, most of IGAs are practiced by men as well as women within the same household. Few activities are only practiced by one or the other gender group. Women are engaged in non-

pastoral IGAs in 18% of all households. Male dominated non-pastoral sources of income are governmental employments and daily labour. Women tend to be relatively more involved in the collection and sale of firewood and petty trading.

The spatial comparison (Figure 19 and Figure 20) reveals that in sites in Yallo, Mille and Chifra relatively more people are engaged in non-pastoral IGAs. This can be contributed to the relatively short distances to towns and markets in Chifra, Logyia, and Harsis, and/or to the main road. In the survey sites in Mille, for example, 70% of the households are engaged in IGAs, mostly the sale of firewood (47%). On the contrary, in sites in Gulina, only about 11% of households are involved in non-pastoral IGAs, which can explain the relatively high number of cattle, and camels sold in this woreda (see above).

Household Expenditure

On average, the respondents spent 55.8% their income on food for household consumption (see Table 55 and Table 56 in Annex V.VI) mainly for cereals. Due to increasing scarcity of pastures, people have begun buying fodder for their livestock.

> *"Four years ago, we only bought food for our children. Nowadays we buy for goats, sheep and other animals. Fodder grass and maize are some of the food items we buy for our livestock."*
>
> (Woman from Mesgid Kebele, Chifra)

On average, about a fifth of the available income (17.9%) is spent on clothes. Again, regional differences were almost invisible. The only woreda where less than 50% was spent on food was Chifra with 47.5%. In general, there are variations in spending patterns in relation to wealth within the household. The poorer the household the more income is spent on food.

## 3.7 Relevance of Agriculture within Pastoral Livelihoods

Number of People Involved

One in five of all interviewed households are growing crops (17.6% or 125 households). Out of the 125 households, who practice agriculture the majority is headed by men (83.2%) while the share of female-headed households is relatively low (16.8%). Out of all female-headed households only 9.9% (21 households) are currently involved in agriculture, while 21% of all male-headed households (104 households) are engaged in agricultural activities. Most of these agro-pastoralists live in the survey sites in Awra, Chifra and Ewa. In Chifra, 52% of all households were involved in agriculture, in Awra 28.7% and in Ewa 41.2%. See Figure 21 and Table 57 and Table 58 in Annex V.VII.

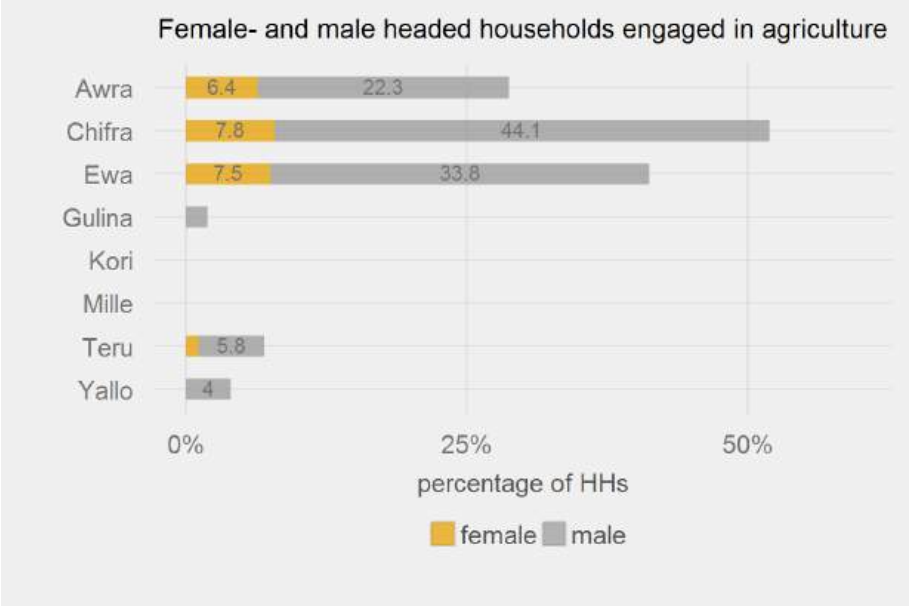


Figure 21: Crop-growing households per woreda

Many interviewees stated that they are interested in becoming farmers, as their decimated livestock holdings cannot sustain them anymore. In Yallo and Gulina, some people tried rain-fed agriculture but without success as the rains were not sufficient.

Main crops

Almost all (96 %) of the surveyed agro-pastoralists grow maize, most of them as the only crop. Only few farmers grow multiple crops. Teff is grown by 8% of the agro-pastoralists, mostly in Chifra and by three out of the four interviewed agropastoralists in Yallo. Vegetables (mainly tomatoes and onions) are only grown by 3.6% of households (mostly in Ewa and Teru), fodder grasses are grown even less, while fruits (banana, mango, papaya) are only produced in Ewa (21% agro-pastoralists of Ewa) due to a project intervention by SSD.

Reasons why people prefer to grow maize over other crops are multiple. One of them is the risk to lose the crops to animals.

> *"We cultivate maize, sesame. We don't want to cultivate other crops because birds will eat them. Even with maize, we have the problem of it being eaten by warthogs"*
>
> (FGD with men, Mesgid, Chifra)

A detailed overview of the crops grown by agro-pastoralist households in the surveyed settlements can be found in Table 59 and Table 60 in Annex V.VII

Intensity of Cultivation

With 0.87 ha, the average size of cultivated land per household is slightly smaller than the Ethiopian national average of 0.96 ha per household[4]. There is only little variation in the average size of cultivated land between sites and between female- and male-headed households (0.83 ha compared to 0.87 ha). A detailed overview of average farm sizes per woreda and for individual sites please see Table 61 and Table 62 in Annex V.VII.

[4] CSA 2014. Agriculture Statistics Abstract (available under: http://www.csa.gov.et/index.php/2013-02-20-13-43-35/national-statistics-abstract/129-2003-agriculture-statistics-abstract, accessed 26 January 2016)

Close to 60 % of households in Awra, Chifra and Ewa only cultivate one season of maize per year while slightly more than a third of households (37.5%) harvest twice a year. In Awra and Chifra, single harvests dominate, while in Ewa the number of those households who harvest once and those who harvest twice is almost equal. See Figure 22.

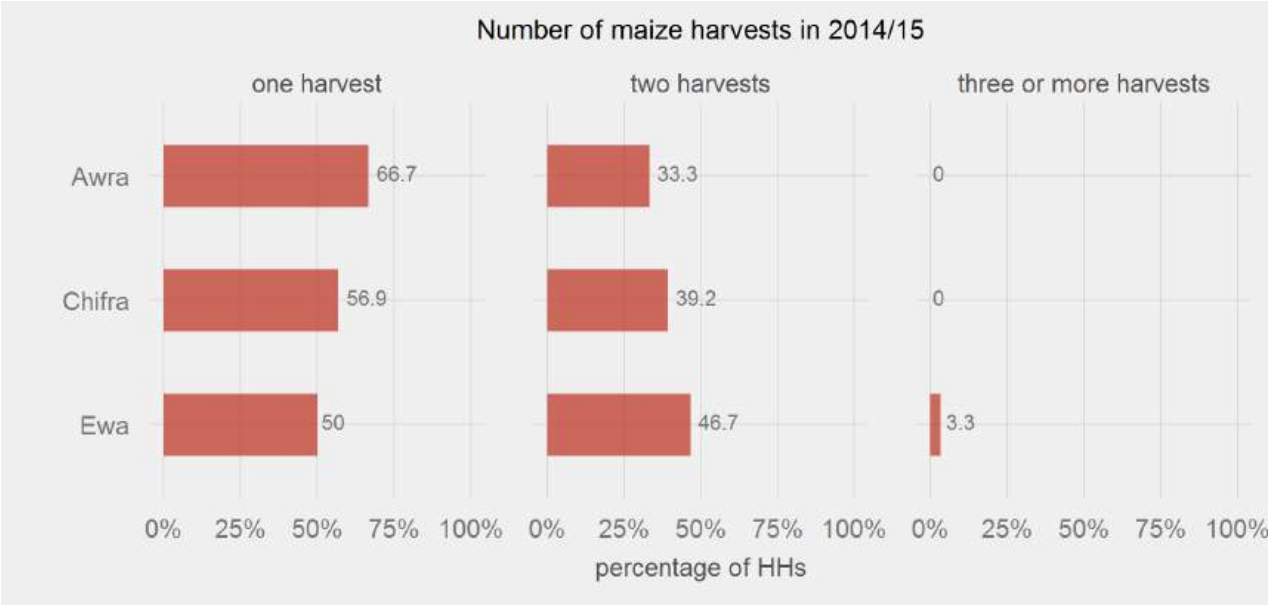


Figure 22: Number of maize harvests in 2014/2015

Agricultural practices: Techniques and inputs

**Irrigation**

The majority of agro-pastoralists (76.8%) practice gravity irrigation using the nearby perennial rivers of Mille, Ewa and Awra. Pump irrigation has been introduced only recently by the Regional Government in the context of its villagization efforts in Ewa. However, it was stated that mechanized pumps were generally not preferred as fuel was often not available and the pumps could not be repaired when damaged. Rainfed agriculture is mostly practiced in Chifra (more than 25 %), especially in Geriro (61.1% of agro-pastoralist households). See Figure 23 as well as Table 63 and Table 64 in Annex V.VII.

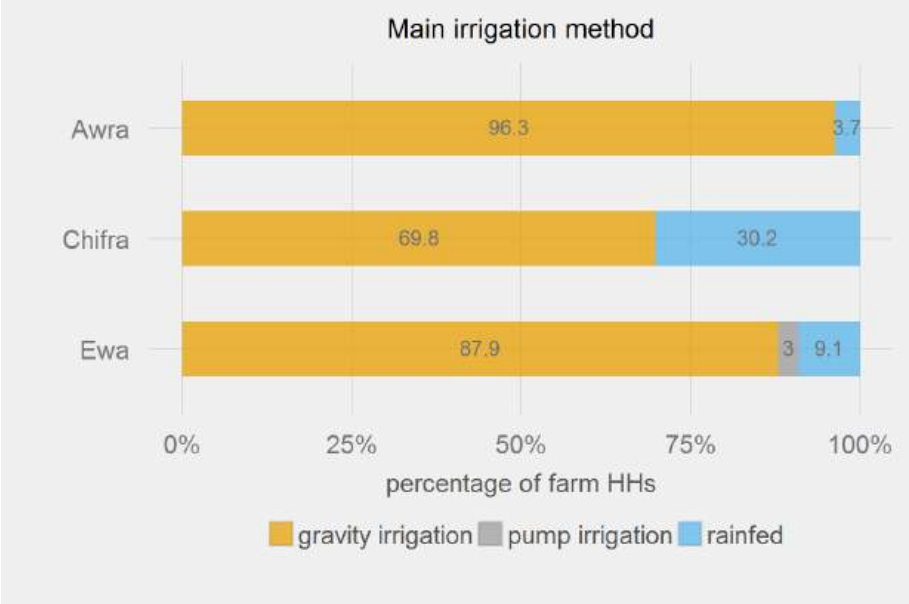


Figure 23: Main irrigation methods in Awra, Chifra and Ewa woredas

As reported by a DA working in Ali-Beri-Mesgid Kebelle gravity irrigation along Awra River is mainly constrained by problems with the diversion box (distribution of water) and recurrent silting of irrigation canals. Even though there are water user committees, who decide on the distribution of the water there seems to be a lack of responsibility or capacity to maintain the irrigation infrastructure.

**Soil Fertility Management**

Most of the respondents did not apply type of fertilizer to their farmlands (84.6%). Moreover, only few households used animal manure to improve soil fertility and stability. Chemical fertilizer was only used by few households in Ewa, probably under the influence of the villagization project in Sunnunta in which some people from Fantena Badule were involved. See Figure 24 and Table 65 in Annex V.VII.

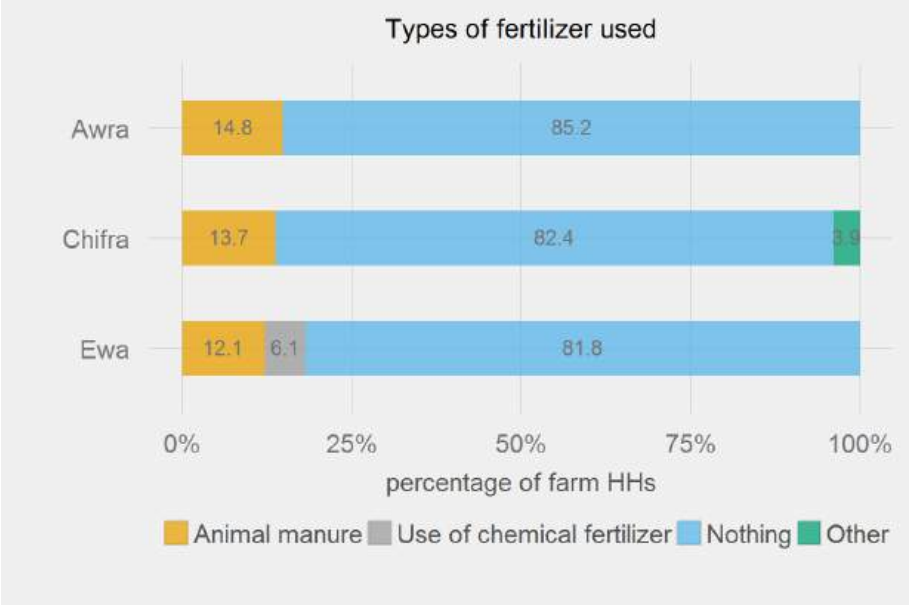


Figure 24: Types of fertilizer used in Awra, Chifra and Ewa woredas

### Sources of Crop Seeds

Seeds for cereals like maize are generally purchased (73.4% of all agro-pastoralists). Only 16.5% get access to seeds from governmental nursery sites (Chifra, Ewa) where they are distributed free of charge. The functional nursery site within Chifra Woreda mainly distributes tree seedlings for fodder and fruit trees and fodder grass seeds. Therefore only 14.9% of the agro-pastoralists get seeds for cereals from the nursery. In Ewa 30% of the agro-pastoralists mentioned nurseries as one source for their maize seeds even though the majority of people from Ewa (60%) purchase seeds.

Please see Table 66, Table 67 and Table 68 in Annex V.VII for the sources of cereal, vegetable and fodder grass seeds.

### Soil and Water Conservation

Techniques for erosion control on cropland are applied in all agro-pastoral Woredas, especially in Awra. Here only 11.1% do not apply any control measures while 63% build soil-bunds and 22.2% stone bunds. In Chifra and Ewa around 30% have not implemented any soil and water conservation measures. See Table 69 in Annex V.VII

The up-take of new techniques and mutual learning is facilitated for those Afar living close to farmers from Amhara or Tigray with whom some Afar have built close relations. Some interviewees mentioned that they learned from watching and imitating people from the highlands. Woreda experts interviewed for this study stated that only few agropastoralists in Awra and Ewa use oxen for ploughing (this was confirmed during by agro-pastoralists and during transect walks). People who grow crops in the surveyed settlements usually rent oxen from Amhara people (100 ETB for two oxen for one day) or they share oxen among them. In the latter case, no payment is involved as the oxen belong to a cooperative (some oxen have been given by SSD to cooperatives). Members are only requested to feed the oxen before handing them over to the next person who needs it to plough.

Average Yield and Use of Harvest

**Average Yields**

Under conditions of no fertilizer use, widespread gravity irrigation and rare use of oxen for ploughing the average grain yield of maize is 556.6 kg/ha. Agro-pastoralists in Awra have the highest maize yields with an average of 976.2 kg/ha. This is more than twice as much compared to agro-pastoralists in Ewa and Chifra, with 400 kg/ha and 468.8 kg/ha respectively. The highest yield in the study area (1527.3 kg/ha) was reported in the control village Awra Woreda which was located in Hida Kebele (see Figure 25).

Hida Kebele has benefited significantly from the activities of the NGO SSD to foster irrigation agriculture. According to woreda experts interviewed for this study, Hida is one of the wealthiest kebeles in the Awra. It is characterised by a high degree of food security and more diversified sources of income than in other kebeles and woredas.

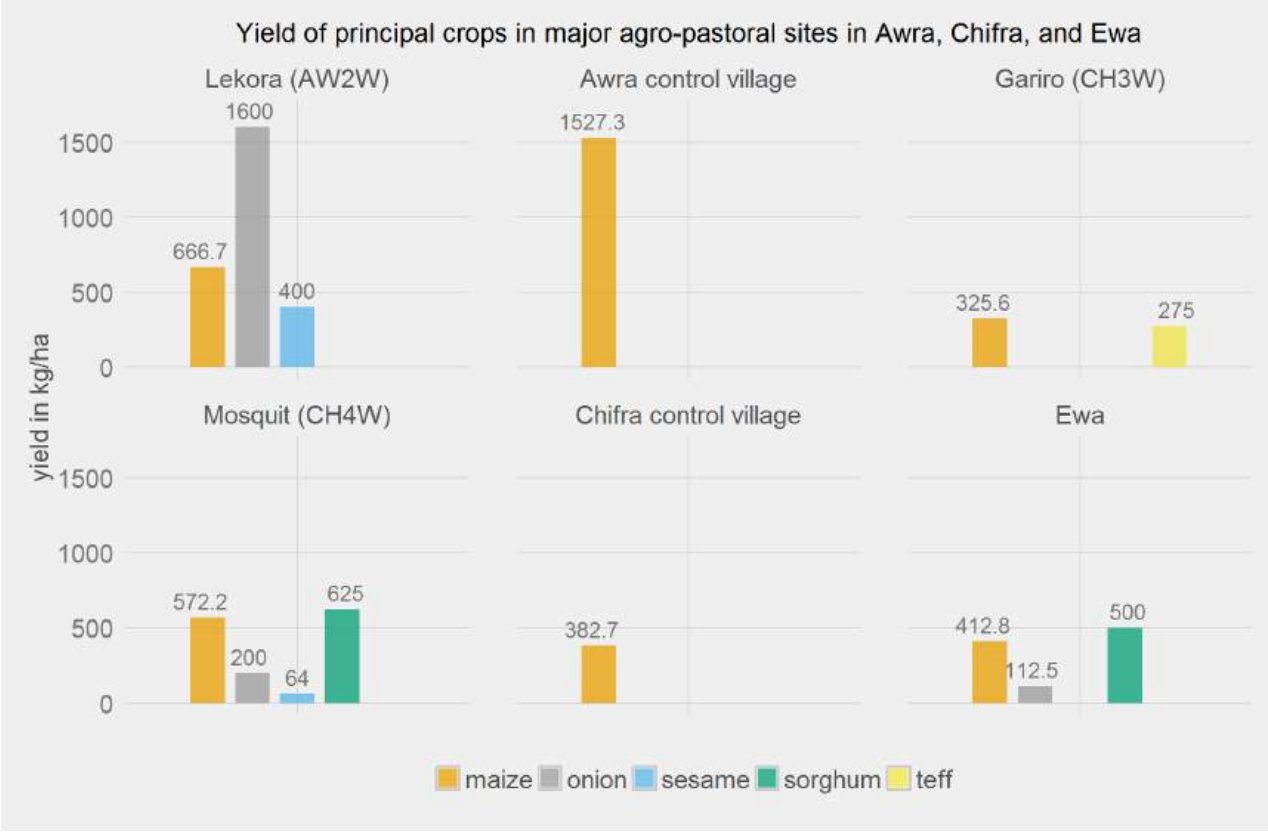


Figure 25: Average yields of principal crops in major agro-pastoral sites in Awra, Chifra, and Ewa

The yields stated by the agro-pastoralists are significantly lower than the yields estimated by Woreda experts. In Ewa it was said that the average yield would be 10 quintal per hectare (1,000 kg/ha) under conditions of gravity irrigation and manual ploughing. In Awra, where oxen ploughing is more common in some kebeles, the yield was estimated with 36 quintal per hectare (3,600 kg/ha).

A detailed overview of crop yields on woreda and site level can be found in Table 70 and Table 71 in Annex V.VII.

**Use of Maize Harvest**

Most of the agricultural produce is used for household subsistence. On average, households who grew maize sold only 6.1% of their harvest on the market while 71.6% of the harvested

amount were consumed at home. 11.9% of the harvest was given to needy clan members as a gift (social support) and 8.8 % were used as fodder. See Figure 26 as well Table 72 and Table 73 in Annex V.VII.

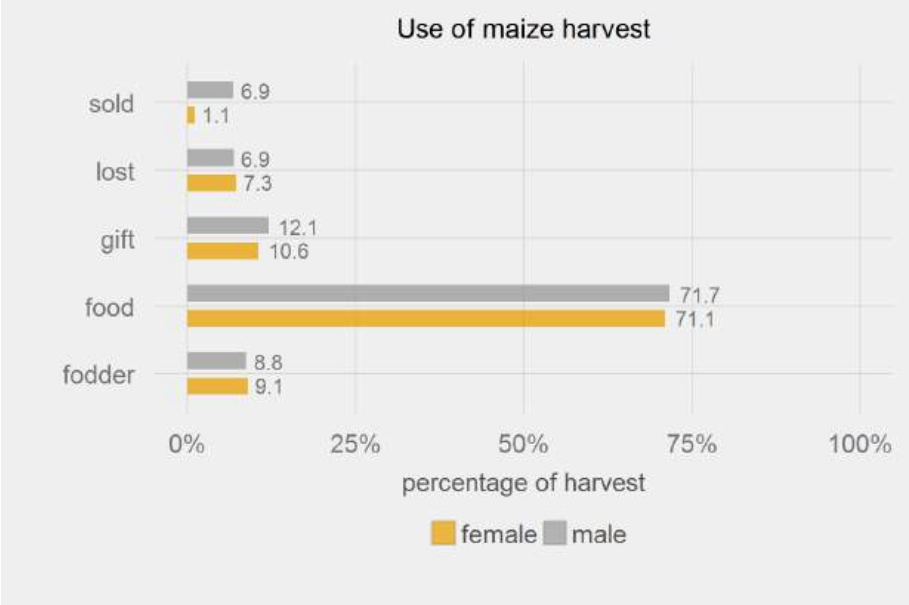


Figure 26: Use of maize harvest in female- and male-headed households

The current relevance of agriculture in terms of income generation is relatively low. The surveyed settlements in Awra are an stick out in this respect. Households in Awra sold on average 12.1% of the produced maize which is a considerably higher percentage than the percentage sold in Ewa (0.7%) and Chifra (3.3%). The much lower yields in Ewa and Chifra are barely enough for the subsistence of the household.

*"The poor ones survive with this small food aid they get from the government for some months and when their food is finished they depend on the support of those rich ones among us. Afars have the tradition of helping each other and that is how they survive. Another means of survival is the small agricultural produce during* karma *(rainy season). The little bit of rain makes the land to grow grass and waters our agriculture. After eating the grass our animals produce some milk and our agriculture give us some grain with which we survive for some time.*

(FGD men, Mesgid, Chifra, 2015)

Estimates of the agro-pastoralists concerning post-harvest losses indicate very low losses even though there are no specific storage facilities or techniques. Reasons for this might be the generally low production (with little that can be stored for a longer period), little rainfall or moisture or simply wrong estimates.

Tree planting

Due to increasing deforestation (see chapter 0) planting trees is an important measures to contribute to soil stability. The planting of trees for the sake of food/fodder production is mostly practiced in sites in Chifra and Ewa. In total, 10.6% of the surveyed households have planted trees in the past three years. The figures are highest in Chifra and Ewa, were 40.2 and 22.5% of households, respectively have planted threes in the past three years (Figure 27 and Table 74 in Annex V.VII).

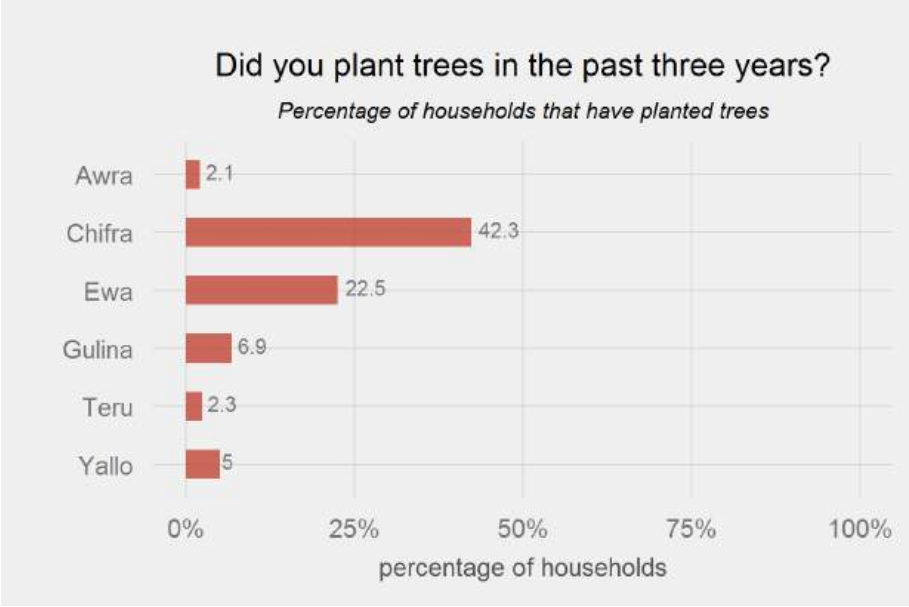


Figure 27: Share of households growing trees per woreda

Access to seedlings is constrained due to a lack of nurseries and inadequate extension services. Places with functional nurseries can provide tree seedlings. That is the case in Chifra, where 70.7% of households who planted trees, got their seeds through the governmental nursery (Table 75 in Annex V.VII).

In Ewa trees are mainly planted for fruit production (banana, papaya, mango), which was initiated by the NGO SSD. In sites of Chifra Woreda it is especially the multi-purpose, fast-growing, non-thorny *neem* trees (originally from India) which have been planted. In addition, different native trees were planted like Shifara, Subla, Kasalto and Madera, which play an important role as fodder resource for livestock (Table 74 in Annex V.VII).

## 3.8 Nutritional Status and Food Security

Food Shortages

Out of all surveyed households, 78.4% reported to have faced a severe food shortage within the last three years. In Yallo, Kori, Teru and Gulina food shortage was worst with over 90% of all respondents indicating severe food shortage while numbers were lowest in the agro-pastoral sites of Ewa and Chifra (See Figure 28 and Table 76 in Annex V.VIII).

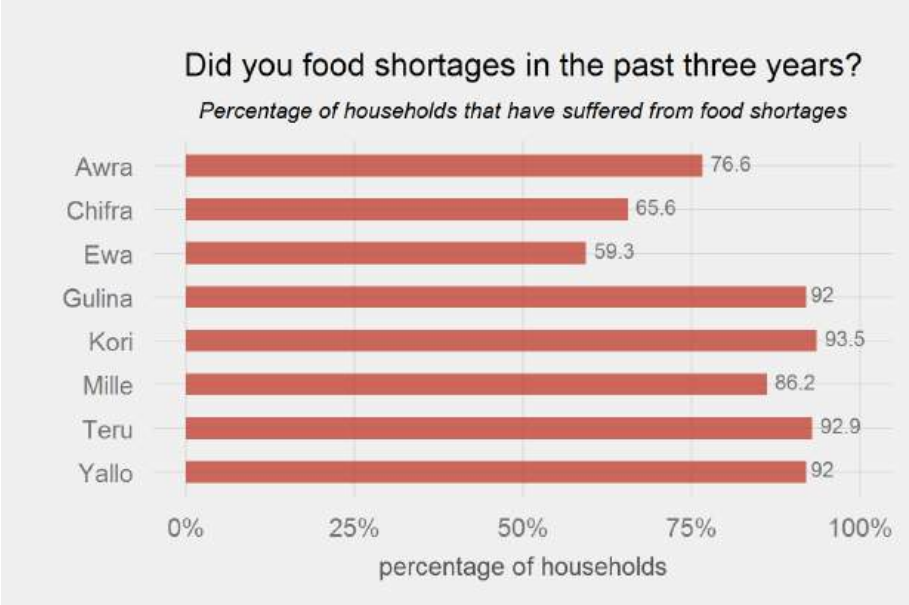


Figure 28: Occurrence of food shortages in the last three years per woreda

Food Consumed

During the survey, interviewees were which types of food they had consumed in the last 24 hours. The food consumed during the time of the survey consisted mainly of cereals (maize), pulses and milk. More than 95% of all households had consumed cereals within the last 24 hours, but only between 19% (Kori) and 48% (Awra, Ewa) of all households had consumed milk. Vegetables, fruit and meat played a negligible role for consumption (Figure 29 and Table 77 in Annex V.VIII).

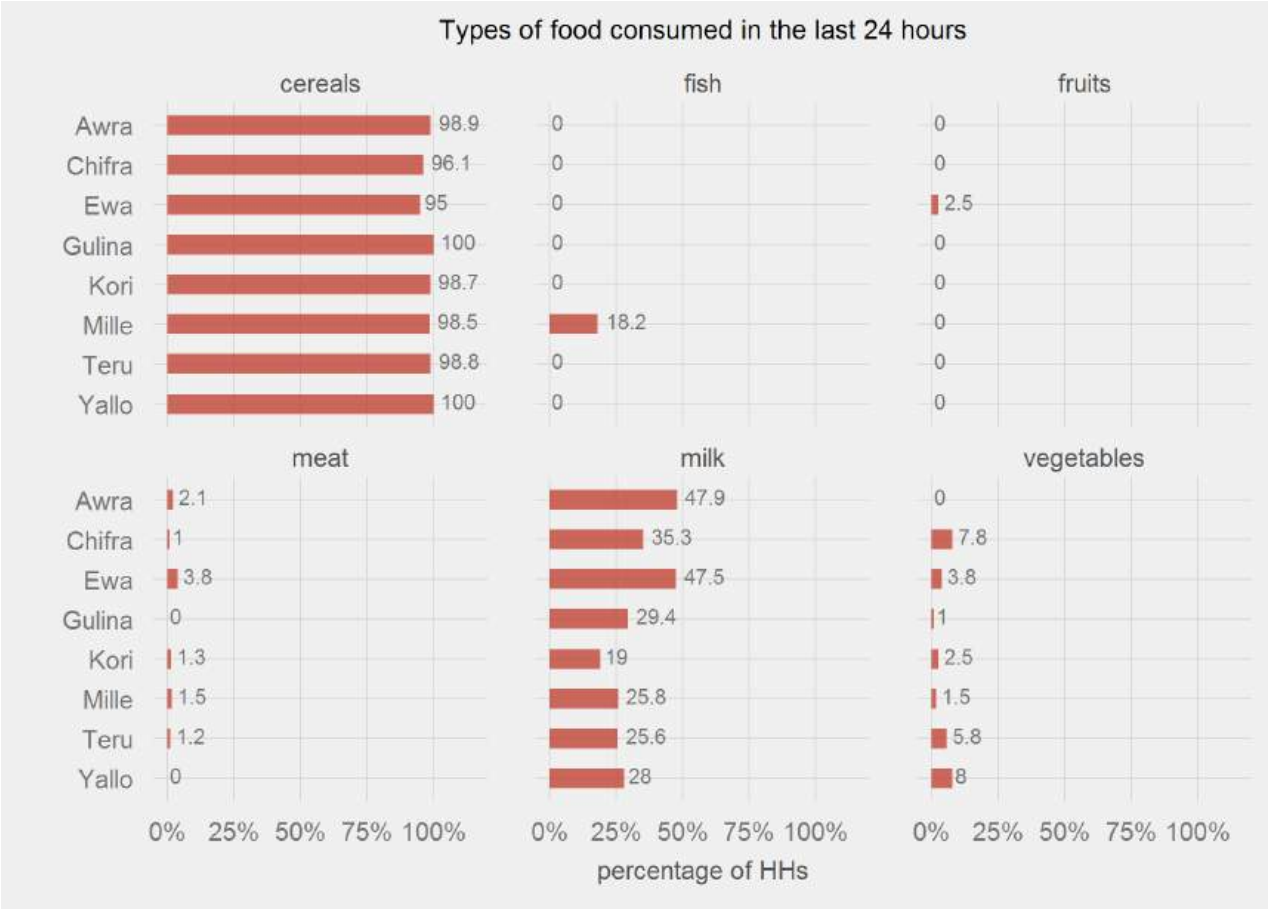


Figure 29: Types of food consumed in last 24 hours

Some women from Chifra comment on the nutritional changes:

> *"We don't have good food at this time. We eat maize and sometimes we rely on the food aid of the government. In the past, we had good food types such as* Gadaleyta[5] *which tastes like milk. We had good rain coming on time and we used to grow* Gadaleyta *on our own farm lands. We also bought food in the market. Now however, because of lack of rain, we eat a little bit of maize which is either grown by some farmers here or brought by some people from very far places of Amhara.*
>
> (Woman A)
>
> *"Currently, we also eat Shiro, a food which we didn't eat in the past. During the old days, Afars didn't eat Shiro because they believe it burns your stomach. In the past, we had milk and butter and life was good. Now we don't have all that. Hence, the food we had in the past is totally incomparable with the food we have at this time."*
>
> (Woman B, Chifra, Mesgid Kebele)

Perception of Food Quality and Quantity

The large majority of the respondents perceived the food quality as well as the quantity as highly insufficient. 12.1 % off all households assessed the quality of their food as average and 86.7% as poor. In terms of quantity, the results are slightly better as 20% rated the food quantity as average and 79.1% as poor. As the question referred to the current situation it can be assumed that the drought during the time of the survey significantly influenced people's

[5] A type of sorghum.

perception . Many people complained about the unavailability of milk in the settlements visited so that the diet of most depended solemnly on cereals, which is not a favoured food item by Afar pastoralists.

The comparison between woredas related to the perceived food quality and food quantity is shown in the Figures below and in Table 78 and Table 79 in Annex V.VIII.

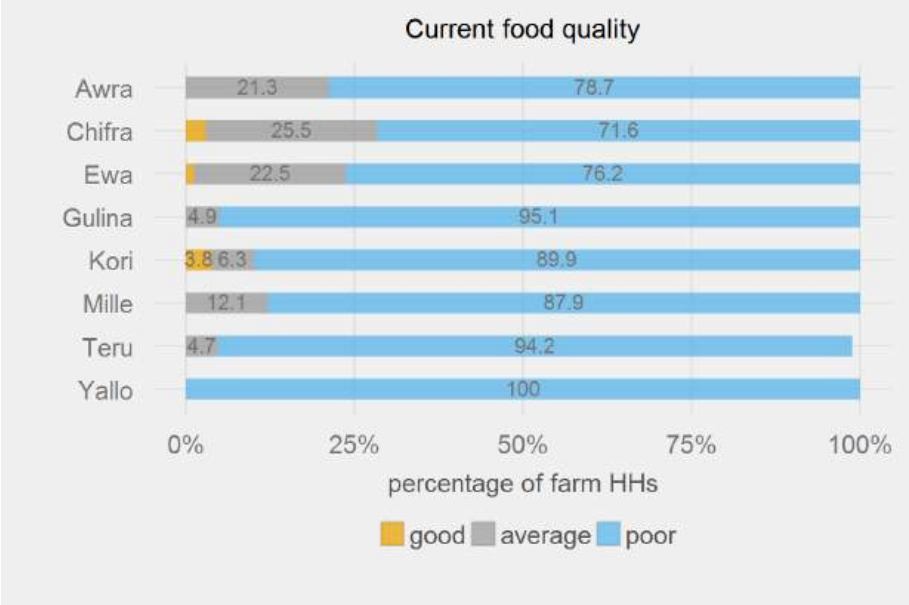


Figure 30: Perception of current food quality per woreda

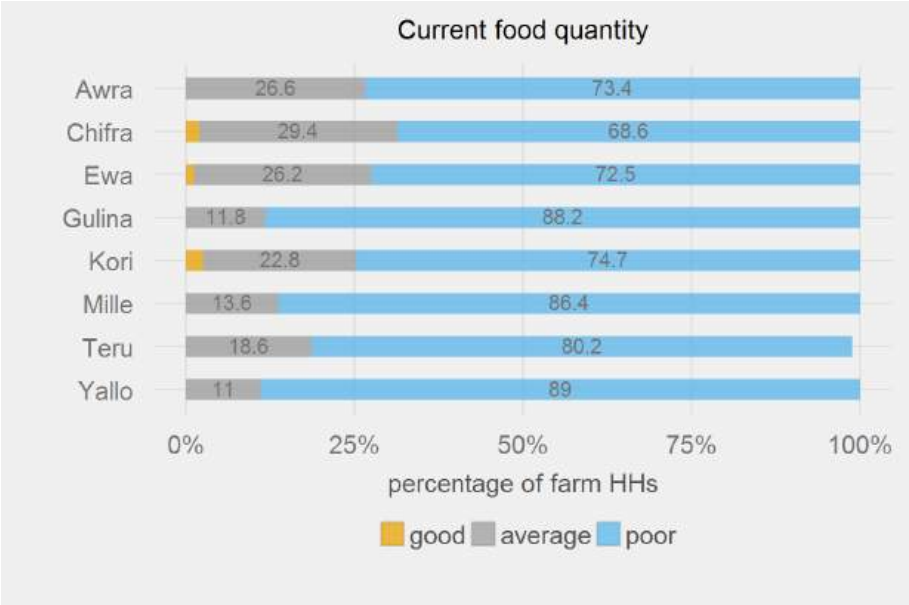


Figure 31: Perception of current food quantity per woreda

These figures show that people in Chifra, Ewa and Awra assessed their nutritional situation slightly better than people in other woredas while people in Gulina and Yallo seem to be worst off. Reasons for this might be the fact that the drought was less intense in Chifra and Ewa compared to the other woredas and therefore the availability of milk in these woredas was slightly higher. The survey revealed that the number of households, which had consumed milk (within the last 24 hours), was significantly higher here compared to other woredas (close to 50% in Awra and Ewa, 35.3% in Chifra).

Corresponding to the above assessments are the results concerning the percentage of households who had faced severe food shortage within the last three years (Figure 28). Slightly better again are the sites within Chifra, Ewa and Awra while in all other sites around 90% of the HH stated that they had suffered from severe food shortage recently.

Sources of Food Consumed

Almost all respondents have to purchase most of the food consumed on the market. Cereals in particular are purchased on the market while own produce of crops plays a marginal role among the food sources as it corresponds to the small number of people growing crops (Chifra 52%, Awra 29%, Ewa 41%). The second most important source of cereals is food aid, which plays a prime role in the sites within Kori, Teru and Yallo (more than 50% of all households). (Figure 32 and Table 80 in Annex V.VIII).

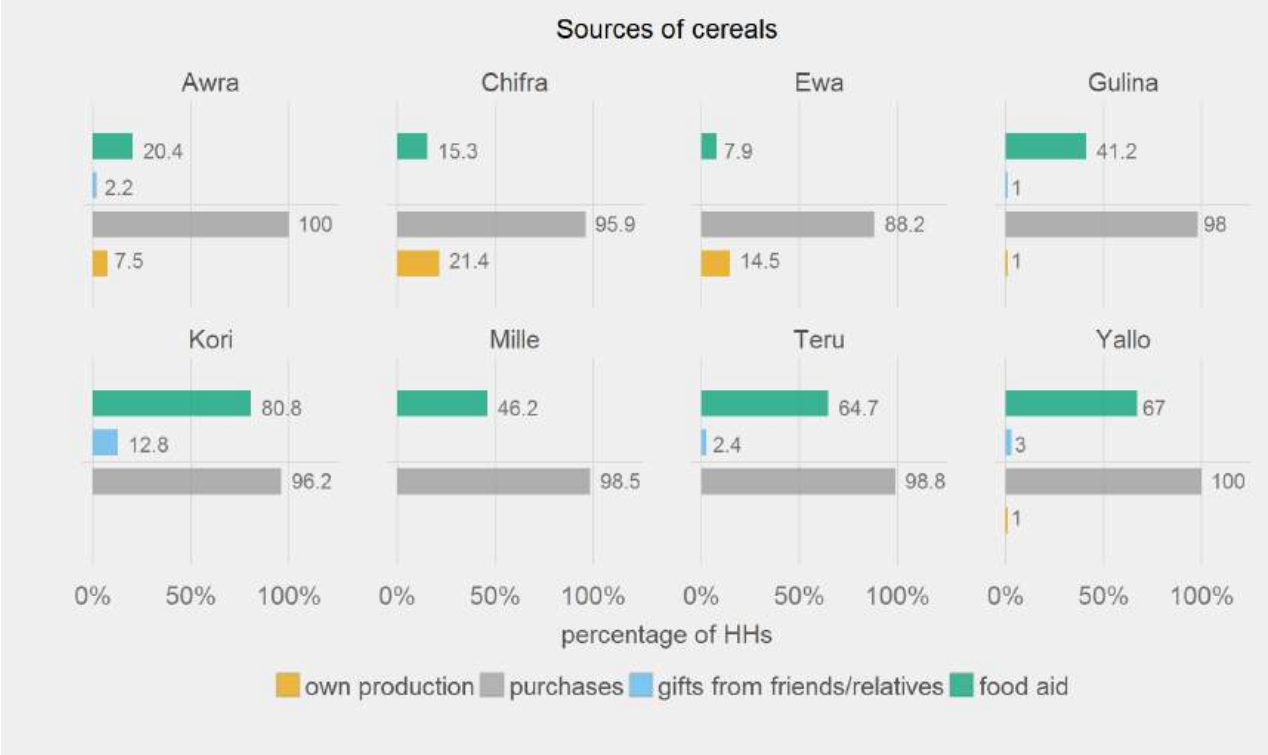


Figure 32: Sources of consumed cereals per woreda

Milk instead is only rarely purchased in the market. Almost all the milk that was consumed during the time of the survey came from own production. Even more, milk was hardly available during the time of the survey due to the drought (Figure 33 and Table 80 in Annex V.VIII).

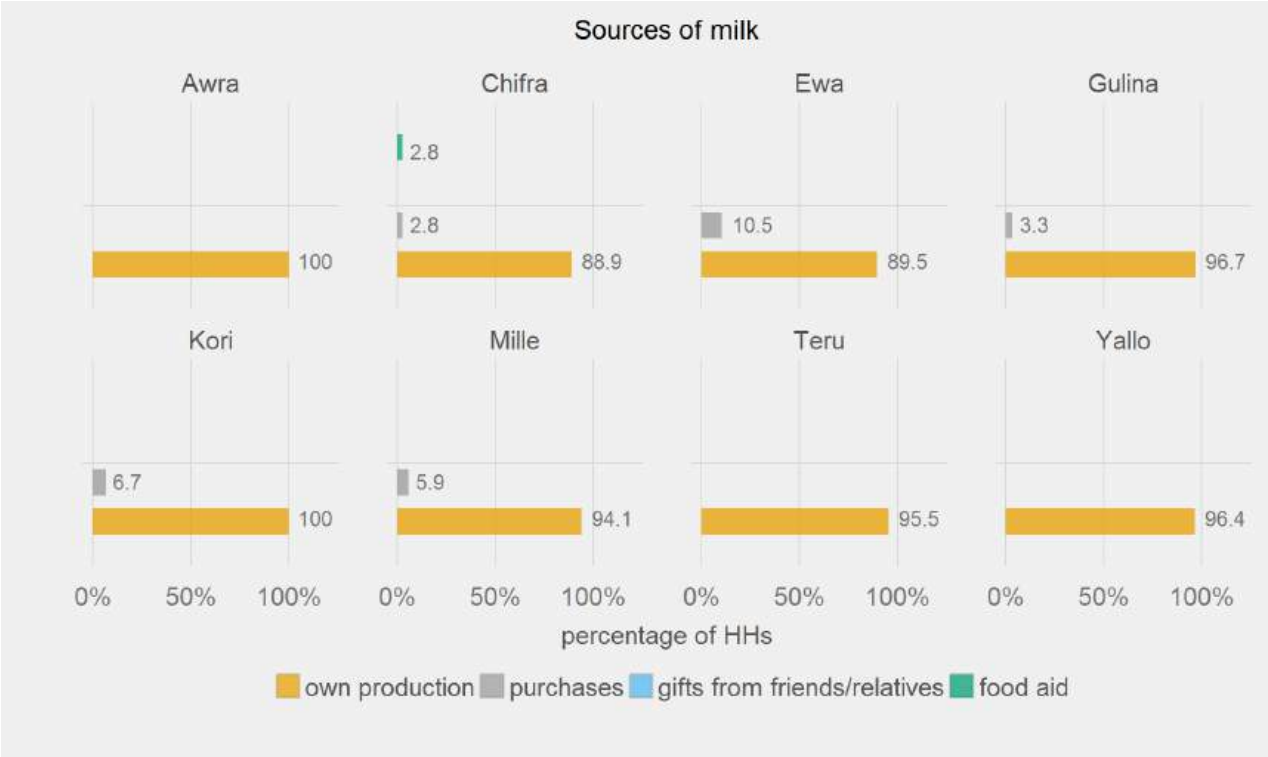


Figure 33: Sources of consumed milk per woreda

### 3.9 Local Perceptions of External Interventions in NRM

Past and ongoing natural resource based development interventions by external actors have mainly taken place in the form of development activities by bilateral organizations, NGOs and the Ethiopian Government and by the governmental extension services.

Development Programmes

Some household members in survey sites of Zone 4 referred to their first involvement in agricultural activities during the *Derg* time when they were employed on cotton farms along the Gulina River or in Tigray (e.g. in Gulina and Yallo). This was during the time of the Third Livestock Development Project (1975-84) which focused on the commercialization of livestock and the rehabilitation and development of vast rangelands in today's Somali, Afar and Oromiya regions. The project, which was funded, by the World Bank and the African Development Bank was divided in three regional sub-projects. One of those was the North-East Rangeland Development Unit (NERDU) that targeted the area between Chifra and Yallo and the adjacent districts of today's Tigray Region. Being asked for his or her past involvement in development activities nobody mentioned this project.

Box 1: The Third Livestock Development Project (TLDP)

"TLDP was a comprehensive venture aimed at increasing livestock productivity, increasing off take, and raising the standard of living of pastoral people by restructuring the traditional system of extensive livestock production. This was to be achieved through the provision of veterinary and livestock extension services, water and infrastructure development, training of the rural population, capacity building of governmental institutions responsible for the livestock sector, and conducting appropriate research. There were other components including a water spreading program*, ranch development program, a stocker/feeder program and marketing programs that were intended to mitigate stress on pastoral systems that occur from drought

situation. The intent of the ranch scheme and the stocker feeder programs was to remove stock from the rangeland before they were decimated by drought. The stocker/feeder program was aimed to facilitate off take to prevent build-up of herds and subsequent die-off of animals. In general, the long-term objective of TLDP was to establish a comprehensive system of range use under which herders could adjust their overall stock numbers in relation to carrying capacity so that production and productivity of the rangeland and the livestock could increase.

Lack of knowledge of pastoral behavior and attempts made by the project to change traditional practices was a major problem of TLDP. It was ultimately unsuccessful in achieving its goals. Land use planning and proposals for improved range management were not applied… Pastoralists were hardly involved as the project was implemented in a top-down manner and underestimated the strength of traditional institutions and utility of indigenous knowledge." (Desta, 2009)

*Water spreading measures constructed within the framework of the World Bank approach are not to be confused with the water spreading weirs that are constructed in dry river valleys (GIZ approach).

Instead of this large-scale project elderly people from the Arapta clan in Chifra, Mesgid Kebele remembered vividly the activities of a German medical doctor, Dr Tenambergen, who introduced them to agriculture after the drought in the early 1970s and who started sending some children to school. One elder stressed their relatively long involvement in agriculture: "Even when people lived scattered we did agriculture here". All sons of the late Arapta clan leader were sent to school so that they now have major positions in the regional and woreda government (e.g. the Regional Vice-President Awel Arba). The initiative in Chifra which began at that time has been ongoing since then, nowadays under the auspices of the German Verein 'Ausbildungsförderung Afar-Region /AFAR e.V..

People in Mesqid Kebele also mentioned the pump irrigation which was established by Save the Children UK's PILLAR (Preparedness Improves Livelihoods and Resilience) project. This project was also active in Ewa woreda but people there did not mention the project when being asked for past interventions. The only NGO which was positively mentioned various times was SDD (Support for Sustainable Development) which was active in several kebeles of Ewa and Awra over a period of eight years (including the survey kebeles of 1st Badule in Ewa and Lekora in Awra). Most other activities by NGOs (e.g. Islamic Relief, Afar Pastoralist Development Association, APDA) have been relief-oriented and/or rather short-term and most did not bring any tangible improvement to the life of the communities. Instead some of the recent SWC measures (trenches) in Yallo by APDA became preferential growth sites for Prosopis Juliflora (own observation). What sets the approach of SSD apart from other NGOs was not only its long term involvement, but also its close follow-up of project activities which focused on the introduction of irrigated crop production along rivers coming from escarpment. SSD staff kept living within Ewa and Awra, which created trust among the communities who first reacted with resistance (interview with SSD project manager).

Being asked for current governmental activities of natural resource management and rehabilitation of rangelands the establishment of soil and stone bunds in the framework of PSNP was mostly the only thing that was named. Pastoralists interviewed perceived these self-help measures as highly unsatisfactory as they hadn't perceived any tangible change in the magnitude of erosion.

Extension Services

The local perception concerning the access to extension services shows that access to veterinary services stands out especially in Chifra, Ewa, Awra and Yallo where more than 50 % rate the access at least medium. The accessibility of extension services related to NRM and agriculture instead is dominantly rated as bad (Figure 34).

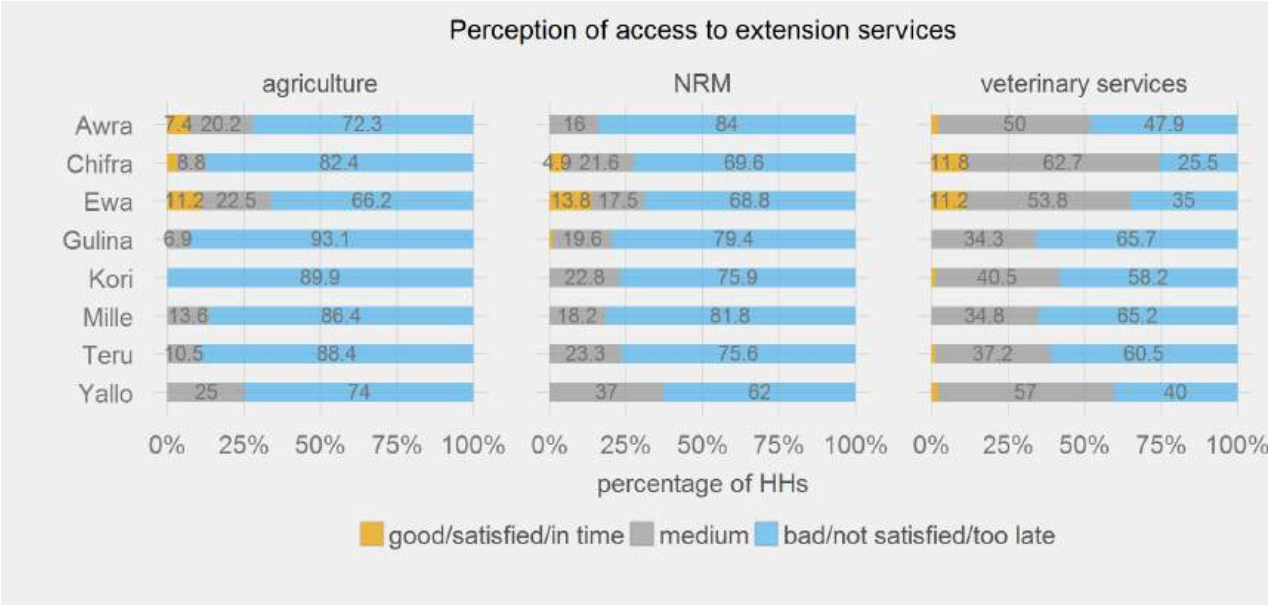


Figure 34: Perception of access to extension services per woreda

The quality of the extension services is perceived worse than their access (Figure 35). Again, it is the sites in Chifra and Ewa where households assess the quality of services better compared to other settlements visited. Her at least more than 25 % say that the quality of veterinary services is good or medium. The quality of extension for agriculture and NRM is generally assessed as insufficient. Even in sites where irrigated agriculture could potentially play a role due to the availability of water (Mille, Gulina, Teru) extension are not perceived to be a helpful support for the majority of households.

This subjective negative perception of pastoralists concerning the quality of extension services correlated with the outcomes of expert interviews with core process owners of extension and NRM on woreda level.

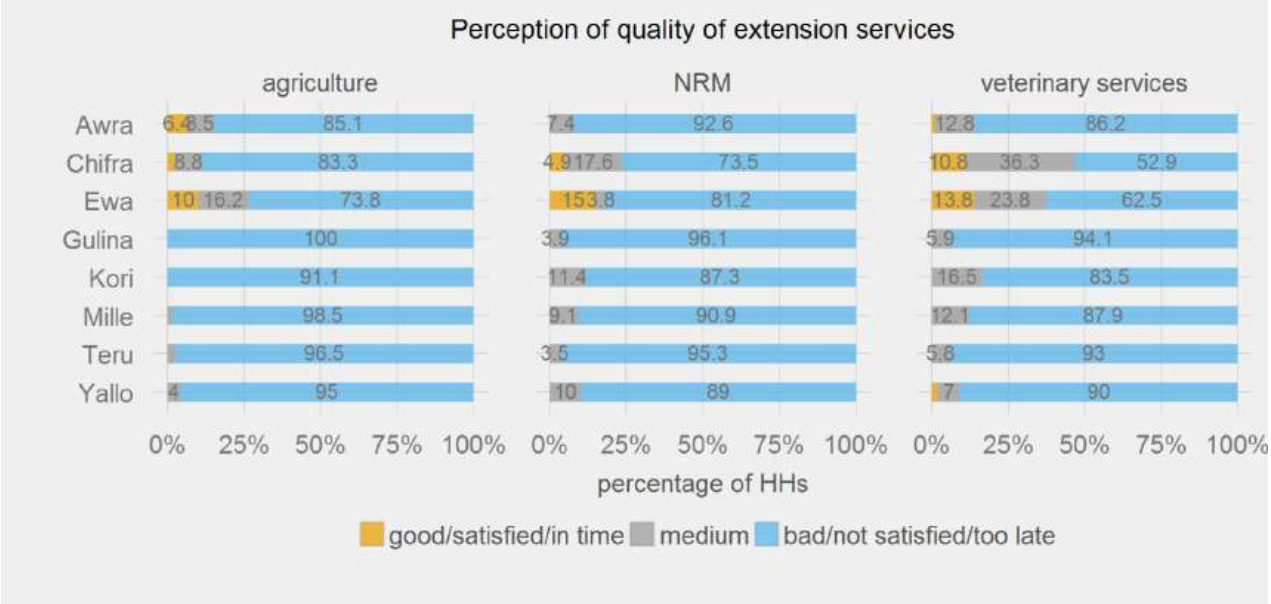


Figure 35: Perception of quality of extension services per woreda

Credit Groups and Cooperatives

The majority of respondents did not belong to group institutions for economic ends, be it cooperatives or credit groups. Only in the sites in Chifra and Ewa few men and women were involved in credit groups (see Figure 36 and Table 81 in Annex V.IX). Cooperatives are more widespread in the surveyed settlements than credit groups. On several occasions during interviewees stated their interests to organize into cooperatives for the sake of agriculture, fodder production and other purposes like bee-keeping.


Figure 36: Membership of households in cooperatives, credit and other groups per woreda

Again cooperatives existed in Chifra and Ewa but also in Kori and Mille. Some women from Mesgid in Chifra reported that they had been organized into an agricultural cooperative with 80 members for the production of vegetables and fodder grasses along the Mille River. This cooperative, which was established under in the context of the PILLAR project, had collapsed due to flash floods which destroyed the cropland the year before. During an FGD with women

from the former cooperative stated that they were eager to start again in case they would receive some support.

The high number of cooperative members in Mille is the result of the sampling of villages. In Mille, the survey focused on settlements benefitting from a fishing cooperative which had been established a year earlier by VSF-Germany, supported through funds from GIZ. The 38 members of this cooperative included men as well as women. This cooperative was originally established by the Government after the creation of the Tendaho Lake but became dysfunctional shortly after its inception and was revitalized by VSF. Members of the cooperative can be considered 'fishing pastoralists' as they still have animals which are currently with relatives in Chifra. The biggest constraint for the cooperative is lack of transport which prevents them to access the market in Mille. Even though yields are reportedly high (60-70 big, mainly cat fish, after setting the net for one time), they often cannot be sold. There is another cooperative at the lake (in Dubti Woreda) originally established by the Government and now supported by the sugarcane plantation. This cooperative delivers fish to Logya Town.

The cooperative has established byelaws, sanctions and rules, which determine temporal and spatial restrictions for fishing in order to secure the rehabilitation of fish stocks. As stated by one member of the cooperative fishing is restricted during the rainy season as this is the reproduction period.

# 4 Conclusion

One of the main results in terms of future development interventions that match local aspirations relates to the need for livelihood diversification and income generation. 97.6% of the pastoral interviewees generate income through the sale of animals. For most of them, this is the only source of income as only 25.1 % of all household have non-pastoral sources of income. In 18% of all surveyed households, women are engaged in non-pastoral IGAs which are generally low paid. Income is therefore one of the main bottlenecks for the pastoral livelihood system, especially as the need to generate income is constantly rising with the decreasing number of animals and the increasing food gap within the household.

So far, only 17.7% people (125 out of 709 surveyed households) within the target areas grow crops. Among the agro-pastoral households, female-headed households make up 16.8% (21 out of 125 households). The an average cultivated area per household is 0.87 ha. Maize is the main – for most households only – crop, and is grown by 96% of all agro-pastoralists. Other crops grown include teff (grown by 8%), sesame (3.2%) and sorghum (1.6%). Most agro-pastoralists live clustered in Chifra, Ewa and Awra. In the remaining areas, people depend almost exclusively on livestock.

Farming practices and techniques applied are mostly very basic. Gravity irrigation dominates (76.8%), fertilizers are generally not applied (84.6%) and soil and water conservation measures on cropland are limited to the establishment of stone and soil bunds. Under these conditions, agricultural productivity is very low. The average dry grain yields of maize, the main crop, is 556 kg/ha. On average only 6.1% of this the produced amount of maize is sold on the market, mostly by men. The largest part of the harvest is consumed within the households or given to destitute household of the same clan. Out of the group of agro-pastoralists, only 24 % are generating income through the sale of part of their harvest.

Many of the pastoralists want to diversify and are interested to grow crops or produce fodder but lack the basic means to do so, especially sufficient and reliable access to water, financial capital, tools and seeds.

> *“Without water our lives are destabilized. We can’t think about development as long as we don’t have water.”*
>
> (Elder, Musle, Kori, 2015)

In several sites, people also voiced their interest in the (re-)establishment of cooperatives which had become dysfunctional. In Mesgid (Chifra) a women’s agricultural cooperative with 80 members had lost their production base due to flash floods which destroyed their cropland. In Fantena Badule (Ewa) several cooperatives (beekeeping, fodder, etc.) had become dysfunctional during the current drought.

The large majority of the target sites are currently caught in a vicious cycle. Declining livestock numbers and low involvement in non-pastoral subsistence as well as market-oriented activities puts people in a situation of chronic food insecurity, which forces them to sell their only assets (livestock) to buy food. The constantly eroding livestock holdings reinforce the need for income generation and therefore the sale of animals as other means to generate income/produce food are lacking. Under these conditions, destitution and dependency on food aid/PSNP have become widespread.

The sustainable improvement of local livelihoods and resilience requires an integrated approach which combines large-scale rangeland rehabilitation with strengthened forms of communal land management and empowered local NRM institutions, small-scale irrigated agriculture and locally adapted forms of water harvesting. This could for example benefit fodder production on

rehabilitated patches of land, which also meets local interests raised in various localities. People in Yalo raised their intent to divert the water from the intermittent rivers to facilitate irrigation for agriculture and fodder production.

What remains an important question for future interventions refers to the aspirations of the youth. So far, out-migration by the youth to urban areas has been limited when compared with highland regions. However, it can be assumed that this will increase in the future with successively increasing levels of education in rural areas. Education and sedentarization are tightly linked and with the increasing exposure to urban life and many young people nowadays prefer a 'modern' life in town, which offers different opportunities to earn money. The current growth of small and medium urban centres in Afar (e.g. Mille and Logyia) is part of this trend, but also a result of an increasing influx from highland migrants who are looking for jobs. Businesses in Afar have always been and are still dominated by other ethnic groups, mainly from Tigray and Amhara. Currently more and more Afar acquire land, but what is lacking so far are business activities as these lands are mostly used for speculation or lease.

# 5 Literature

## 5.1 Project Reports and Documentations

Afar National Regional State, ANRS (2011): Teru sub basin integrated Land Use Planning and Environmental impact Study Project - Technical Report: Hydrology and Water Resource.

BoPAD, Natural Resources Management Sector and SDR-ASAL Team (2015): 2015 Budget Year Annual Plan;

Brook Yoseph and Winterscheid, K. (2014): Report on Relevant Stakeholders Involved in Project Implementation Processes in Afar Region - Woredas: Mille, Chifra, Ewa, Awra and Kori. GIZ;

Central Statistical Agency, CSA (2015): National Statistics Abstract (available under: http://www.csa.gov.et/index.php/2013-02-20-13-43-35/national-statistics-abstract/141-population, accessed 24 January 2016);

Central Statistical Agency, CSA (2007): Census 2007 (available under http://www.csa.gov.et/index.php/2013-02-20-14-51-51/2013-04-01-11-53-00/census-2007, accessed 24 January 2016);

Ellinger, M. (2015): Results based Monitoring: Report of results in brief. Afar Soil Rehabilitation Project/GIZ;

GIZ/ASDR (2015): Activities report for 10/2013 to 12/2014;

GIZ/ASDR (2015): Activities report for 01/2015 to 06/2015.

GIZ (2015): Documentation Monitoring Workshop of ASRP/GIZ, Semera; and

Indris Siraje (2015): Report on Capacity Development Need Assessment of Governmental Partners (BoPAD/PADO/DAs) in Afar Region in terms of Planning, Monitoring and Evaluation of Natural Resource Management Activities.

Ministry of Water Resources, MoWR, (2011): Ethiopia: Strategic Framework for Managed Groundwater Development. (http://metameta.nl/wp-content/uploads/2012/10/2011_03_08_eth_frwrk_FINALSF.pdf, accessed 15.01.2016)

## 5.2 Academic Publications Cited

Behnke, R. And Kerven, C. (2013): *Counting the costs: replacing pastoralism with irrigated agriculture in the Awash valley, north-eastern Ethiopia*. IIED Climate Change Working Paper No.4.

Coppock, L. (): The Borana Plateau of Southern Ethiopia.

Cossins, Neil (1972): No way to live: A Study of the Afar Clans of the North-east Rangelands Carried Out for the Livestock and Meat Board of the Imperial Ethiopian Government.

Desta, Solomon (2006): Pastoralism and Development in Ethiopia. Ethiopian Economic Association, Vol 9(3), pp 12-20.

Little, P., & McPeak, J. (2014). *Pastoralism and resilience in Africa south of the Sahara.* IFPRI.

Müller-Mahn, D., Rettberg, S. and G. Getachew (2010): Pathways and dead ends of pastoral development among the Afar and Karrayu in Ethiopia'. *European Journal for Development Research* 22 (5): 660–677.

Rettberg, S. (2013): Religious change and the remaking of boundaries among Muslim Afar pastoralists. In: DESPLAT, P. & ØSTEBØ, T. (Eds.): Muslim Ethiopia: Transforming Identities and New Representations. 71-88 S. Basingstoke (Palgrave Macmillan).

# 6 Annexes

## Annex I

### Field Investigation Programme

| Date | Destination/ Woreda | Program |
|---|---|---|
| 28/10 – 01/11 | Chifra | Household survey, FGD, expert interviews |
| 02/11 – 06/11 | Ewa | dito |
| 07/11 – 11/11 | Awra | dito |
| 12/11 – 16/11 | Gulina | dito |
| 17/11 – 21/11 | Yallo | dito |
| 22/11 – 26/11 | Teru | dito |
| 27/11 – 30/11 | Mille | dito |
| 01/12 – 07/12 | Kori | dito |

## Annex II

## Qualitative Transcribed Interviews

| Date | Woreda | Type of interview | Qualitative Interview conducted: |
|---|---|---|---|
| 28/10 – 01/11 | Chifra | FGD | Men from Geriro |
| | | FGD | Women from Mesgid |
| | | FGD | Men from Mesgid |
| 02/11 – 06/11 | Ewa | FGD | Men and women from 1st Badule |
| | | Expert | Female pastoralist, birth attendant, 1st Badule |
| | | FGD | Men in Bolotoma |
| 07/11 – 11/11 | Awra | Expert | Male pastoralist, owner of a deep well in Finto na Asala |
| | | Expert | Kebele chairman from Lekora |
| 12/11 – 16/11 | Gulina | Expert | Male pastoralist from Kelewan |
| | | FGD | Men from Mulina as' ale |
| | | Expert | Kebele spokeswoman from Bakaru |
| 17/11 – 21/11 | Yallo | FGD | Men from Afdero |
| 22/11 – 26/11 | Teru | Expert | Clan leader |
| | | FGD | Men from Dabaho |
| | | Expert | Female (agro-) pastoralist |
| 27/11 – 30/11 | Mille | FGD | Men and women, members of fishing cooperative Gesiyo |
| | | Expert | Female pastoralist, destitute, from Harsis |
| 01/12 – 07/12 | Kori | FGD | Men from Musle |
| | | FGD | Men and women from Marro |

## Annex III

## Guiding Questions

**A. Problem ranking**

- What are biggest constraints that community is facing?

**B. Historical profile: trends in life quality since Haile Selassie period**

- Important events in the collective memory, which influenced life quality significantly: Droughts, Conflicts, Epidemics, Change of Government, etc.
- Discuss Historical trends in availability of water, pastures, milk and driving factors
- Time after which things got worse and worse: no rehabilitation of pastures and herds
- What have been the best rangelands during the transitional period? Currently?

**C. Impact of changes in natural resources (compare past and present)**

- Who was considered as *gaddaali* [Afar: rich] in the past and nowadays?
- How has amount of milk production changed?
- How do you generally move throughout the year? Who is deciding where to go: whole clan, *dahla* [Afar: sub-clan], household?
- When do other clans come here? Where from, how long do they stay, who?
- What have been the best rangelands during the transitional period? Currently?

**D. Land tenure, institutions, resource based conflicts**

- What have been most common issues negotiated in *mablo* [Afar: clan elder] meetings during the last year? Relevance of conflicts over use of land and water? Reasons for resource based conflicts?
- How do you avoid overgrazing of pasturelands? Who is responsible for that? Changes in responsibilities and ways of regulation?

**E. Agriculture (if relevant)**

- When and why started?
- How do you distribute agricultural land? Done by clan or by government? Do you have land title?
- Techniques applied: ploughing, storage
- Major constraints

**F. History of external interventions**

- What is your experience with past and present interventions to improve the management of natural resources in this area? What has been the impact on your life quality?
- Cooperatives in village? Which types? Impact on life quality?

**G. Suggestions**

- Suggestions for further development of the area

**Additional: For women**

- Nutritional changes compared to the past? Changes in work burden?
- How did the consumption and availability of firewood change within the last 10 years?
- FHHs: How many? Increasing number?
- In which cases can married women make independent decisions concerning farming or livestock, without consent from their husband?
- How far do you need to go to find wells: dry season (distance or time):, rainy season, drought
- How many times per day do you collect firewood? How much time per day is spent to collect firewood (Both ways)?

## Annex IV

## Computer-Assisted Personal Interview (CAPI) Technology

### Introduction

Computer-Assisted Personal Interviewing (CAPI) is a potentially cheaper and faster alternative to traditional paper-based interviewing. It offers the advantage of data entry during a personal interview and helps to ensure consistency of the collected data through using automatic skips and a branching logic in structure of the questionnaire. Though CAPI has been used in household surveys since the 1990s, it has become much more widespread since the release of the first Apple iPad tablet computer in 2010. In recent years, the increased availability of lower-priced tablet computers and off-the-shelf survey software have allowed for a wider uptake of this technology even among organisations with limited resources in developing countries[6].

### Use of CAPI in the Baseline Study

The majority of questionnaires (659) were filled on paper. In addition, four enumerators were trained to use tablet computers (HUAWEI MediaPad X2) for Computer-Assisted Personal Interviews (CAPI) during interviews in Kori and Mille woredas. The use of this Computer-Assisted Personal Interview technology was supported by special backstopping support from the AHT Project Director. Out of the total of 709 interviews, 50 were conducted using the Interviewer app that is part of the Survey Solutions systems developed by the World Bank.

The use of the Survey Solutions followed nine basic steps beginning from the decision to use CAPI in the baseline survey to data cleaning an combining the data collected using Survey Solutions with those entered manually into the EpiData Entry mask:

1. Decision to use CAPI.
2. Development of paper-based household questionnaire.
    - Participatory process with GIZ team and project M&E consultant.
3. Adapting questionnaire into the Survey Solutions Designer (https://solutions.worldbank.org).
4. Testing questionnaire on the Survey Solutions Tester app (https://play.google.com/store/apps/details?id=org.worldbank.solutions.Vtester).
    - Done simultaneously while adapting the questionnaire.
5. Setting up the survey on the AHT-server at the World Bank (https://aht.mysurvey.solutions).
6. Procurement of tablets (HUAWEI MediaPad X2) and installation of Survey Solutions Interviewer app (available as .apk-file from the front page of the AHT-server).
7. Training of enumerators in the use of tablets and the Survey Solutions Interviewer App.
8. Export of data in Stata dta-format.
9. Data cleaning and integration into dataset from paper questionnaires.

An extensive documentation of the Survey Solutions system can be found on the dedicated site on the World Bank homepage und http://go.worldbank.org/XFG5IAXBC0.

[6] Leisher, C. A Comparison of Tablet-Based and Paper-Based Survey Data Collection in Conservation Projects. Soc. Sci. 2014, 3, 264-271. URL: http://www.mdpi.com/2076-0760/3/2/264

### Enumerator training

The training started with a presentation about the background of CAPI in general and Survey Solutions in particular. The presentation also elaborated on the general functions of the Interviewer app by using screenshots from the actual questionnaire on the tablet. After the presentation one tablet was handed out to each of the four enumerators who took part in the training. Each enumerator was then asked to enter the answers from an interview that had been done before using the traditional paper-based questionnaires. During this try-out the enumerators asked questions and got a better understanding of the interviewer app. After all enumerators had entered one interview each, the group discussed remaining questions before the enumerators each entered a second interview. Finally, the trainer showed the enumerators the Survey Solutions Headquarters to explain what happens to the data after the interview has been uploaded.

### Feedback by enumerators

All four enumerators who used tablets during the household survey assessed the method positively. It was consensus that it takes more time to use paper questionnaires. Moreover, the fact that the Interviewer app uses a color-coded system (blue for unanswered questions and sections, red for errors and green for answered questions and sections) was found to very helpful during the interviews. Finally, the branching logic of the questionnaire, i.e. the Interviewer app directs the flow of the questions based on previous answers, made it easier for the enumerators to move through the questionnaire. Finally, thanks to the widespread availability and use of smartphones, all enumerators easily got used to using the tablet and the Interviewer app.

### Headquarters

The Headquarters software is a suite of connected tools for the administrator and headquarters users:

- To track the overall progress of the survey (Reports);
- To review completed interviews (Interviews);
- To manage the human resources (Teams and Roles);
- To specify survey instruments, create survey assignments with those instruments (Survey Setup); and
- To export the data collected from these assignments (Data Export).

A detailed documentation of the functions of the Headquarters software can be found on the Survey Solutions homepage[7]. Some of the useful features are elaborated here based on examples.

Headquarters records the time difference between the moment when the first answer is recorded on a tablet and when the ‘Complete’ button is pressed. According to this function, an interview took an average of 16 minutes. It hast to be noted, however, that most of the interviews that were conducted using the Survey Solutions Interviewer app, took place in Kori Woreda, where none of the respondents practiced agriculture. This means that an entire section

[7] See http://go.worldbank.org/XFG5IAXBC0.

(C Crop production) of the questionnaire could be skipped, which reduced the time necessary for an interview.

Moreover, while the survey is still ongoing supervisors can check the status of the survey and see the results of the completed interviews (see Figure 37). The Headquarters administrator and the survey supervisors can then have a look at the entered answers of individual interviews (Figure 38).

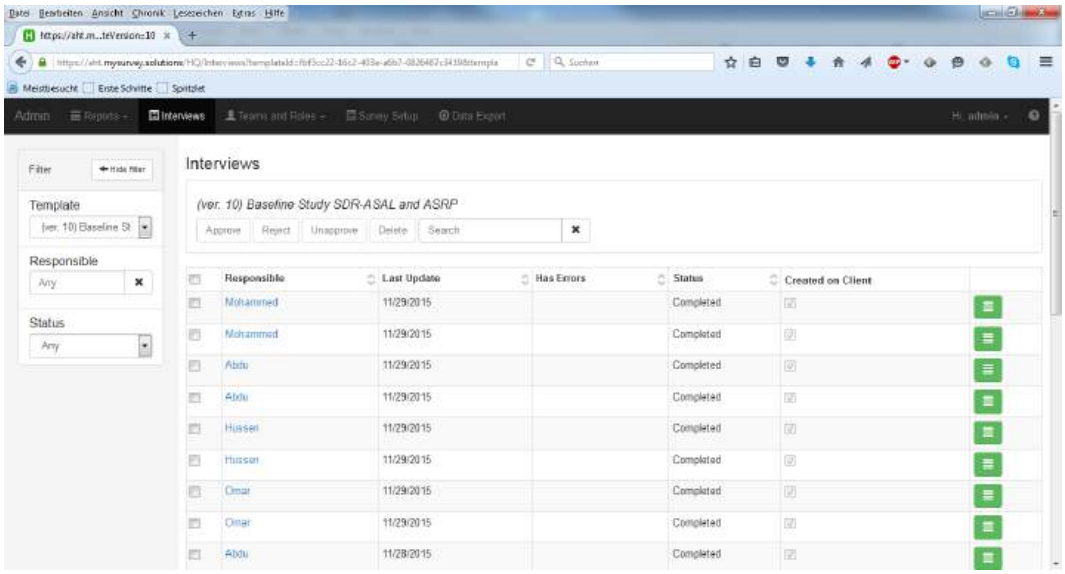


Figure 37: Survey status in Survey Solutions Headquarters

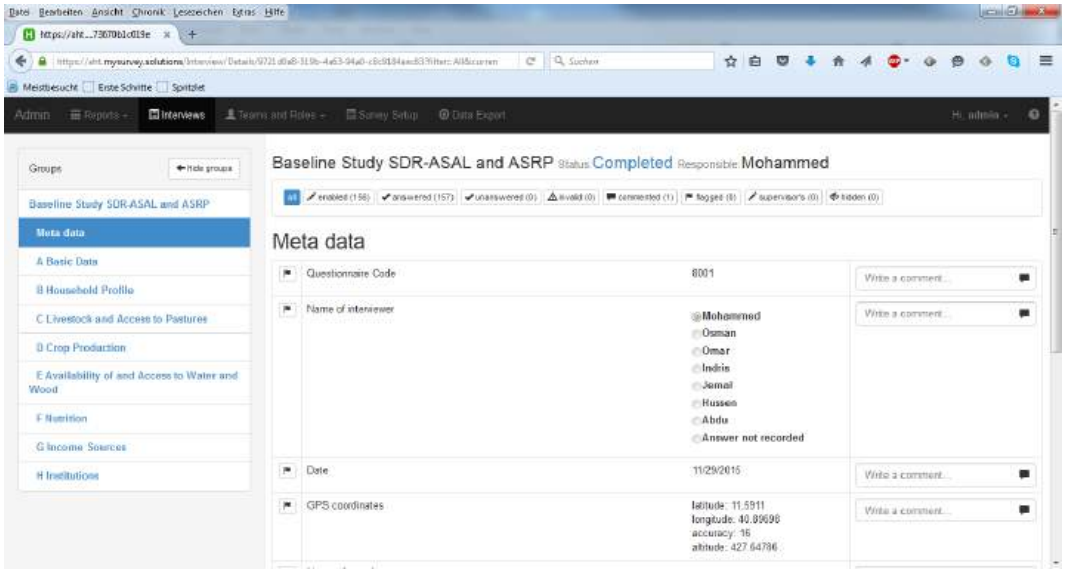


Figure 38: Overview of completed and uploaded interview in Survey Solutions Headquarters

The Headquarters software also produces Map Reports that indicate the exact location interviews took place (if the GPS coordinates were recorded). An example for Kori Woreda is shown in Figure 39.

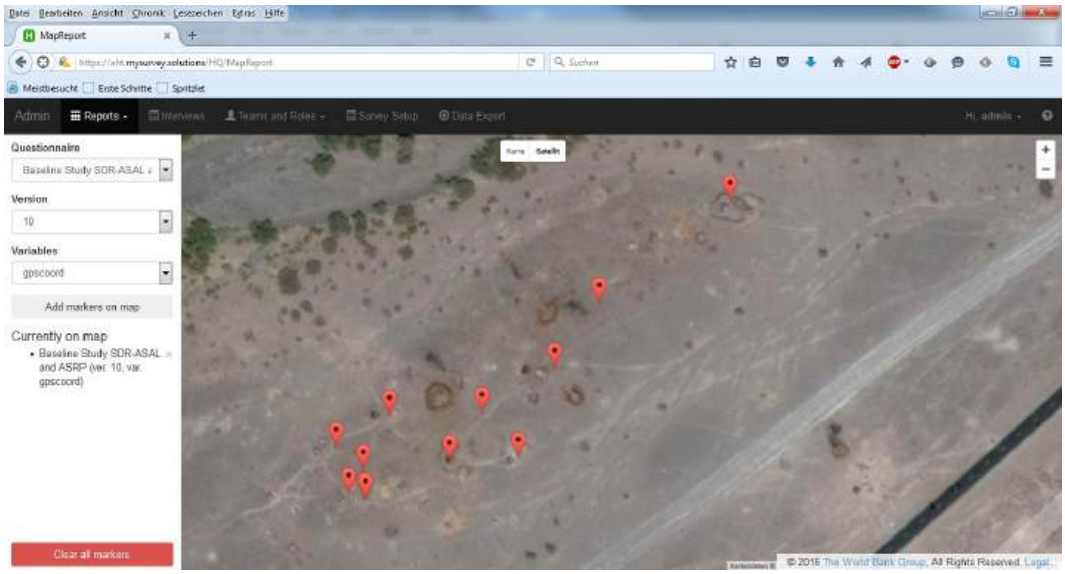


Figure 39: Example of Survey Solutions Map Report for Kori Woreda

## Conclusions

During the baseline study for the GIZ project 'Soil Conservation and Rehabilitation for Food Security', traditional paper-based questionnaires were used for the majority of household interviews. However, due its potential to reduce costs and the risk of errors during data collection and entry, the Consultant tested CAPI on tablet computers as a novel approach for data collection in household surveys. The most important conclusions are:

- Data were uploaded every evening, which facilitated an overview of the already entered data.
- The survey contained validation data that made it impossible to enter values outside a given range. The International Team Leader, the National Survey Team Leader and the Project Director could also view and check the collected information as soon as the enumerators had uploaded their interviews. In this way, possible errors or inconsistencies could be easily detected.
- Pre-installed consistency and quality checks allowed the enumerators to see errors and allowed them to correct these errors, e.g. the number of individual members cannot be greater than the sum of individual household members.
- The dynamic structure facilitated the interview as questions that were not relevant in a given interview (e.g. questions about crop yields to farmer who do not practice agriculture) were skipped automatically.
- On a logistical note: there was no need to print the questionnaires (which costs time and money) and to carry them along to field work in sufficient quantity. Moreover, the enumerators did not have to carry the questionnaires along to their interviews.
- The headquarter functions allowed to assess meta data about the survey, like the duration of the survey and to see the exact locations were interviews took place, which includes the distance of households from the nearest roads and the distance between households. Having this data, allows for an easier planning of follow-up surveys (How long does it take to conduct an interview? How many interviews can be done per day? How long does it take to drive to a particular settlement?).
- Using CAPI for a household survey can significantly reduce the necessary personnel and material resources. Since the data are entered directly entered into the tablet, there is no need to developed a separate data entry mask and train and supervise a team of

specialized data entry clerks. With a given budget and time frame, the geographical scope of a study can be significantly expanded over a study that uses only paper-based questionnaires and data entry clerks.

- Almost all modern tablets are equipped with powerful cameras and GPS, which allows interviewers to take photos of the interviewee and his or her surroundings while also recording the exact location the interview took place. Especially for monitoring and evaluation purposes this allows for easier reproducibility of the methodology and traceability of settlements or even individual interviewees. The full functionality of this feature was not used during this baseline survey but should be considered for future monitoring purposes.

Finally, the Consultant recommends the use of CAPI for further household surveys in similar project contexts for the presented reasons. Survey Solutions is a free-of-charge comprehensive and well-thought-out solution for using CAPI for household surveys.

**Annex V**

**Data Tables**

## List of Tables

## Annex V.I Potential Beneficiaries

Table 6: Population and total number of households in surveyed villages and number of interviewed households in surveyed villages per site

| | | | | **total number of households and population in surveyed villages** | | | | **Number and population of interviewed households in surveyed villages** | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| woreda | kebele | site | number of villages surveyed | total number of HHs* | male-headed HHs (%)* | female-headed HHs (%)* | population *** | number of interviewed HHs | male-headed HHs (%) | female-headed HHs (%) | population *** |
| **Awra** | Lakora | Lekora (AW2W) | 2 | 149 | 71.1 | 28.9 | 1077 | 39 | 66.7 | 33.3 | 282 |
| | Finto na Asala | Finto (AW8W) | 2 | 329 | 82.4 | 17.6 | 2377 | 35 | 65.7 | 34.3 | 253 |
| | Hida | Awra control village | 1 | 58 | 82.8 | 17.2 | 419 | 20 | 80.0 | 20.0 | 145 |
| **Chifra** | Geriro | Gariro (CH3W) | 2 | 165 | 84.8 | 15.2 | 1192 | 39 | 79.5 | 20.5 | 282 |
| | Mesgid | Mosquit (CH4W) | 2 | 275 | 90.9 | 9.1 | 1987 | 43 | 76.7 | 23.3 | 311 |
| | Tegri | Chifra control village | 1 | 80 | 85.0 | 15.0 | 578 | 20 | 75.0 | 25.0 | 145 |
| **Ewa** | 1st Badule | Ewa | 3 | 258 | 79.5 | 20.5 | 1864 | 55 | 70.9 | 29.1 | 397 |
| | Bolotoma | Ewa control village | 1 | 200 | 69.0 | 31.0 | 1445 | 25 | 56.0 | 44.0 | 181 |
| **Gulina** | Kelwan | Tabiadora (GU1W) | 1 | 145 | 82.8 | 17.2 | 1048 | 21 | 52.4 | 47.6 | 152 |
| | Mulina Asa'ala | Admalif (GU2W) | 2 | 215 | 76.7 | 23.3 | 1554 | 39 | 79.5 | 20.5 | 282 |
| | Wanasa & Harigerbo | Bakaru (GU4W) | 1 | 50 | 80.0 | 20.0 | 361 | 21 | 66.7 | 33.3 | 152 |
| | Galikoma | Gulina control village | 1 | 25 | 84.0 | 16.0 | 181 | 21 | 81.0 | 19.0 | 152 |
| **Kori** | Musle | Kori | 3 | 255 | 76.1 | 23.9 | 1842 | 58 | 74.1 | 25.9 | 419 |
| | Guyah & Ella | Kori control village | 1 | 190 | 65.8 | 34.2 | 1373 | 21 | 52.4 | 47.6 | 152 |
| **Mille** | Gasiyo na la'as | Mille | 3 | 205 | 80.5 | 19.5 | 1482 | 56 | 67.9 | 32.1 | 405 |
| | Harsis | Mille control village | 1 | 50 | 90.0 | 10.0 | 361 | 10 | 60.0 | 40.0 | 72 |
| **Teru** | Debaho | Gadoweitu (TE1W) | 2 | 450 | 88.9 | 11.1 | 3251 | 41 | 65.9 | 34.1 | 296 |
| | Digdigsala | Adgola (TE2W) | 1 | 57 | 78.9 | 21.1 | 412 | 24 | 79.2 | 20.8 | 173 |
| | Digdigsala | Teru control village | 1 | 75 | 80.0 | 20.0 | 542 | 21 | 61.9 | 38.1 | 152 |
| **Yallo** | Koli na Gaboli | Elei El Golo (YA1W) | 2 | 278 | 96.0 | 4.0 | 2008 | 41 | 78.0 | 22.0 | 296 |
| | Walae' | Muhur Golo (YA2W) | 2 | 91 | 85.7 | 14.3 | 657 | 39 | 61.5 | 38.5 | 282 |
| | Uddayile | Yallo control village | 1 | 140 | 78.6 | 21.4 | 1012 | 20 | 65.0 | 35.0 | 145 |

*based on estimates by *kebele* chairmen and villagers, **based on household survey, ***based on number of households and average household size from household survey

Table 7: Population and total number of households in surveyed villages and number of interviewed households in surveyed villages per woreda

| | | **total number of households and population in surveyed villages** | | | | **number and population of interviewed households in surveyed villages** | | | |
|---|---|---|---|---|---|---|---|---|---|
| woreda | number of villages surveyed | total number of HHs* | male-headed (%)* | female-headed (%)* | population *** | number of interviewed HHs | male-headed (%) | female-headed (%) | population *** |
| **Awra** | 5 | 536 | 79 | 21 | 3,873 | 94 | 69 | 31 | 680 |
| **Chifra** | 5 | 520 | 88 | 12 | 3,757 | 102 | 77 | 23 | 738 |
| **Ewa** | 4 | 458 | 75 | 25 | 3,309 | 80 | 66 | 34 | 578 |
| **Gulina** | 5 | 435 | 80 | 20 | 3,144 | 102 | 72 | 28 | 738 |
| **Kori** | 4 | 445 | 72 | 28 | 3,215 | 79 | 68 | 32 | 571 |
| **Mille** | 4 | 255 | 82 | 18 | 1,843 | 66 | 67 | 33 | 477 |
| **Teru** | 4 | 582 | 87 | 13 | 4,205 | 86 | 69 | 31 | 621 |
| **Yallo** | 5 | 509 | 89 | 11 | 3,677 | 100 | 69 | 31 | 723 |
| **Total** | 36 | 3,740 | 82 | 18 | 27,023 | 709 | 70 | 30 | 5,126 |

*based on estimates by *kebele* chairmen and villagers

**based on household survey

***based on number of households and average household size from household survey

## Annex V.II Household Structure

Table 8: Membership of household heads (differentiated by sex) in different age groups (<20 years, 21-40 years, 41-60 years)

| | | **Age group membership of household heads** | | |
|---|---|---|---|---|
| | | <20 years | 21-40 years | 41-60 years |
| sex of HH head | N | (%) | (%) | (%) |
| female | 213 | 4.2 | 64.8 | 29.1 |
| male | 496 | 3.8 | 64.9 | 29.2 |
| total | 709 | 3.9 | 64.9 | 29.2 |

Table 9: Marital status of household heads (differentiated by sex)

| | | **Marital status of household head** | | | |
|---|---|---|---|---|---|
| | | married | widowed | divorced | not married |
| sex of HH head | N | (%) | (%) | (%) | (%) |
| female | 213 | 77.9 | 18.3 | 0 | 3.3 |
| male | 496 | 92.7 | 1.2 | 0 | 0.8 |
| total | 709 | 88.3 | 6.35 | 0 | 1.5 |

Table 10: Mean, median, minimum and maximum household size per woreda

| | | **Household size** | | | |
|---|---|---|---|---|---|
| | | mean | median | min | max |
| woreda | N | (no) | (no) | (no) | (no) |
| Awra | 94 | 7.3 | 7 | 1 | 20 |
| Chifra | 102 | 7 | 7 | 1 | 17 |
| Ewa | 80 | 7.3 | 6 | 2 | 25 |
| Gulina | 102 | 8 | 7 | 1 | 34 |
| Kori | 79 | 7 | 7 | 3 | 17 |
| Mille | 66 | 6.2 | 6 | 2 | 21 |
| Teru | 86 | 7.7 | 7 | 2 | 20 |
| Yallo | 100 | 6.9 | 6 | 1 | 22 |
| total | 709 | 7.2 | 7 | 1 | 34 |

Table 11: Mean, median, minimum and maximum household size per woreda differentiated by sex of household head

| | | | **Household size** | | | |
|---|---|---|---|---|---|---|
| | | | mean | median | min | max |
| woreda | sex of HH head | N | (no) | (no) | (no) | (no) |
| Awra | female | 29 | 6.1 | 6 | 1 | 13 |
| | male | 65 | 7.8 | 7 | 2 | 20 |
| Chifra | female | 23 | 5.7 | 6 | 1 | 10 |
| | male | 79 | 7.4 | 7 | 2 | 17 |
| Ewa | female | 27 | 6.9 | 6 | 2 | 18 |
| | male | 53 | 7.5 | 6 | 2 | 25 |
| Gulina | female | 29 | 6.3 | 6 | 3 | 10 |
| | male | 73 | 8.7 | 8 | 1 | 34 |
| Kori | female | 25 | 6.3 | 6 | 3 | 12 |
| | male | 54 | 7.3 | 7 | 3 | 17 |
| Mille | female | 22 | 6.3 | 7 | 3 | 11 |
| | male | 44 | 6.2 | 6 | 2 | 21 |
| Teru | female | 27 | 7.3 | 8 | 2 | 20 |
| | male | 59 | 7.9 | 7 | 2 | 20 |
| Yallo | female | 31 | 5.7 | 5 | 1 | 13 |
| | male | 69 | 7.5 | 7 | 2 | 22 |
| total | female | 213 | 6.3 | 6 | 1 | 20 |
| total | male | 496 | 7.6 | 7 | 1 | 34 |

Table 12: Average household composition per woreda

| | | | **Average number of household members in different age groups** | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | < 5 years | | 5 to 18 years | | 18 years < | |
| woreda | N | mean HH size | female | male | female | male | female | male |
| Awra | 94 | 7.3 | 0.9 | 1.0 | 1.4 | 1.6 | 1.2 | 1.1 |
| Chifra | 102 | 7.0 | 0.9 | 1.1 | 1.2 | 1.4 | 1.3 | 1.2 |
| Ewa | 80 | 7.3 | 0.9 | 1.2 | 1.2 | 1.7 | 1.2 | 1.1 |
| Gulina | 102 | 8.0 | 1.3 | 1.2 | 1.3 | 1.7 | 1.3 | 1.2 |
| Kori | 79 | 7.0 | 0.9 | 1.1 | 1.1 | 1.6 | 1.3 | 1.1 |
| Mille | 66 | 6.2 | 0.8 | 0.6 | 1.0 | 1.3 | 1.3 | 1.2 |
| Teru | 86 | 7.7 | 1.1 | 1.2 | 1.4 | 1.6 | 1.3 | 1.1 |
| Yallo | 100 | 6.9 | 1.0 | 1.0 | 1.1 | 1.3 | 1.4 | 1.1 |
| total | 709 | 7.2 | 1.0 | 1.1 | 1.2 | 1.5 | 1.3 | 1.1 |

Table 13: Average household composition per woreda differentiated by sex of household head

| | | | | **Mean number of household members in different age groups** | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | < 5 years | | 5 to 18 years | | 18 years < | |
| woreda | sex of HH head | N | mean HH size | female | male | female | male | female | male |
| Awra | female | 29 | 6.1 | 0.8 | 1 | 1 | 1.3 | 1.1 | 1 |
| | male | 65 | 7.8 | 1 | 1 | 1.6 | 1.7 | 1.3 | 1.2 |
| Chifra | female | 23 | 5.7 | 1 | 0.8 | 0.7 | 1 | 1.1 | 1.1 |
| | male | 79 | 7.4 | 0.9 | 1.1 | 1.3 | 1.5 | 1.4 | 1.2 |
| Ewa | female | 27 | 6.9 | 0.9 | 1.1 | 1.4 | 1.4 | 1.1 | 0.9 |
| | male | 53 | 7.5 | 0.9 | 1.2 | 1.2 | 1.8 | 1.3 | 1.2 |
| Gulina | female | 29 | 6.3 | 0.9 | 0.9 | 1.1 | 1.2 | 1.1 | 1 |
| | male | 73 | 8.7 | 1.4 | 1.3 | 1.4 | 1.8 | 1.4 | 1.2 |
| Kori | female | 25 | 6.3 | 0.8 | 0.8 | 1.2 | 1.5 | 1.1 | 0.8 |
| | male | 54 | 7.3 | 0.9 | 1.2 | 1 | 1.6 | 1.5 | 1.2 |
| Mille | female | 22 | 6.3 | 0.9 | 0.7 | 1.1 | 1.5 | 1.2 | 0.9 |
| | male | 44 | 6.2 | 0.7 | 0.6 | 1 | 1.2 | 1.3 | 1.3 |
| Teru | female | 27 | 7.3 | 1.2 | 1.1 | 1.2 | 1.3 | 1.5 | 1 |
| | male | 59 | 7.9 | 1.1 | 1.2 | 1.4 | 1.7 | 1.3 | 1.2 |
| Yallo | female | 31 | 5.7 | 0.9 | 0.7 | 0.9 | 1.3 | 1.2 | 0.8 |
| | male | 69 | 7.5 | 1 | 1.2 | 1.3 | 1.3 | 1.5 | 1.2 |
| Total | female | 213 | 6.3 | 0.9 | 0.9 | 1.1 | 1.3 | 1.2 | 0.9 |
| | male | 496 | 7.6 | 1 | 1.1 | 1.3 | 1.6 | 1.4 | 1.2 |

Table 14: Households with members (total, men, women, and children) currently staying outside their settlement per woreda

| | | **Households with members staying outside their settlement** | | | |
|---|---|---|---|---|---|
| | | total | men | women | children |
| woreda | N | (%) | (%) | (%) | (%) |
| Awra | 94 | 7.4 | 7.4 | 2.1 | 0 |
| Chifra | 102 | 17.6 | 7.8 | 3.9 | 1 |
| Ewa | 80 | 12.5 | 10 | 5 | 0 |
| Gulina | 102 | 17.6 | 11.8 | 2.9 | 2.9 |
| Kori | 79 | 13.9 | 13.9 | 1.3 | 1.3 |
| Mille | 66 | 15.2 | 12.1 | 0 | 1.5 |
| Teru | 86 | 24.4 | 22.1 | 9.3 | 2.3 |
| Yallo | 100 | 14 | 10 | 4 | 2 |
| total | 709 | 15.4 | 11.7 | 3.7 | 1.4 |

Table 15: Migration reasons of household members per woreda

| | | Migration reasons of household members | | | | |
|---|---|---|---|---|---|---|
| | | school/ studies | work in other town/ region (permanent) | work in other town/ region (seasonal) | far away pastures | other |
| woreda | N | (%) | (%) | (%) | (%) | (%) |
| Awra | 7 | 42.9 | 14.3 | 0 | 57.1 | 0 |
| Chifra | 18 | 33.3 | 0 | 11.1 | 11.1 | 5.6 |
| Ewa | 10 | 40 | 20 | 0 | 70 | 10 |
| Gulina | 18 | 44.4 | 5.6 | 0 | 44.4 | 5.6 |
| Kori | 11 | 18.2 | 18.2 | 9.1 | 72.7 | 0 |
| Mille | 10 | 60 | 10 | 10 | 30 | 0 |
| Teru | 21 | 38.1 | 9.5 | 0 | 61.9 | 4.8 |
| Yallo | 14 | 21.4 | 0 | 7.1 | 64.3 | 7.1 |
| total | 109 | 36.7 | 8.3 | 4.6 | 49.5 | 4.6 |

Table 16: Migration reasons of men per woreda

| | | Migration reasons of men | | | | |
|---|---|---|---|---|---|---|
| | | school/ studies | work in other town/ region (permanent) | work in other town/ region (seasonal) | far away pastures | other |
| woreda | N | (%) | (%) | (%) | (%) | (%) |
| Awra | 7 | 42.9 | 0 | 0 | 57.1 | 0 |
| Chifra | 8 | 50 | 0 | 25 | 25 | 0 |
| Ewa | 8 | 37.5 | 25 | 0 | 75 | 0 |
| Gulina | 12 | 25 | 8.3 | 0 | 66.7 | 8.3 |
| Kori | 11 | 9.1 | 18.2 | 9.1 | 72.7 | 0 |
| Mille | 8 | 62.5 | 12.5 | 12.5 | 37.5 | 0 |
| Teru | 19 | 31.6 | 10.5 | 0 | 57.9 | 0 |
| Yallo | 10 | 20 | 0 | 10 | 60 | 10 |
| total | 83 | 32.5 | 9.6 | 6 | 57.8 | 2.4 |

Table 17: Migration reasons of women per woreda

| | | Migration reasons of women | | | | |
|---|---|---|---|---|---|---|
| | | school/ studies | work in other town/ region (permanent) | work in other town/ region (seasonal) | far away pastures | other |
| woreda | N | (%) | (%) | (%) | (%) | (%) |
| Awra | 2 | 50 | 50 | 0 | 0 | 0 |
| Chifra | 4 | 75 | 0 | 0 | 25 | 0 |
| Ewa | 4 | 50 | 0 | 0 | 25 | 25 |
| Gulina | 3 | 66.7 | 0 | 0 | 33.3 | 0 |
| Kori | 1 | 0 | 0 | 0 | 100 | 0 |
| Mille | 0 | - | - | - | - | - |
| Teru | 8 | 50 | 0 | 0 | 37.5 | 12.5 |
| Yallo | 4 | 25 | 0 | 0 | 75 | 0 |
| total | 26 | 50 | 3.8 | 0 | 38.5 | 7.7 |

## Annex V.III Mobility Patterns

Table 18: Time of year during which households live in their settlement per woreda

| | | Time of settlement | | |
|---|---|---|---|---|
| | | all year | only during dry season | only during wet season |
| woreda | N | (%) | (%) | (%) |
| Awra | 94 | 90.4 | 2.1 | 6.4 |
| Chifra | 102 | 82.4 | 10.8 | 6.9 |
| Ewa | 80 | 78.8 | 11.2 | 10.0 |
| Gulina | 102 | 79.4 | 19.6 | 1.0 |
| Kori | 79 | 89.9 | 6.3 | 2.5 |
| Mille | 66 | 98.5 | 0.0 | 1.5 |
| Teru | 86 | 94.2 | 3.5 | 2.3 |
| Yallo | 100 | 99.0 | 0.0 | 0.0 |
| total | 709 | 88.7 | 7.1 | 3.8 |

Table 19: Time of year during which households live in their settlement per site

| | | | | Time of settlement | | |
|---|---|---|---|---|---|---|
| | | | | all year | only during dry season | only during wet season |
| woreda | kebele | site | N | (%) | (%) | (%) |
| **Awra** | Lakora | Lekora (AW2W) | 39 | 89.7 | 2.6 | 7.7 |
| | Finto na Asala | Finto (AW8W) | 35 | 97.1 | 2.9 | 0 |
| | Hida | Awra control village | 20 | 80 | 0 | 15 |
| **Chifra** | Geriro | Gariro (CH3W) | 39 | 84.6 | 7.7 | 7.7 |
| | Mesgid | Mosquit (CH4W) | 43 | 72.1 | 18.6 | 9.3 |
| | Tegri | Chifra control village | 20 | 100 | 0 | 0 |
| **Ewa** | 1st Badule | Ewa | 55 | 78.2 | 14.5 | 7.3 |
| | Bolotoma | Ewa control village | 55 | 78.2 | 14.5 | 7.3 |
| **Gulina** | Kelwan | Tabiadora (GU1W) | 21 | 100 | 0 | 0 |
| | Mulina Asa'ala | Admalif (GU2W) | 39 | 59 | 41 | 0 |
| | Wanasa & Harigerbo | Bakaru (GU4W) | 21 | 81 | 19 | 0 |
| | Galikoma | Gulina control village | 21 | 95.2 | 0 | 4.8 |
| **Kori** | Musle | Kori | 58 | 86.2 | 8.6 | 3.4 |
| | Guyah & Ella | Kori control village | 21 | 100 | 0 | 0 |
| **Mille** | Gasiyo na la'as | Mille | 56 | 98.2 | 0 | 1.8 |
| | Harsis | Mille control village | 10 | 100 | 0 | 0 |
| **Teru** | Debaho | Gadoweitu (TE1W) | 41 | 95.1 | 4.9 | 0 |
| | Digdigsala | Adgola (TE2W) | 24 | 91.7 | 0 | 8.3 |
| | Digdigsala | Teru control village | 21 | 95.2 | 4.8 | 0 |
| **Yallo** | Koli na Gaboli | Elei El Golo (YA1W) | 41 | 97.6 | 0 | 0 |
| | Walae' | Muhur Golo (YA2W) | 39 | 100 | 0 | 0 |
| | Uddayile | Yallo control village | 20 | 100 | 0 | 0 |

## Annex V.IV Environmental Challenges

Table 20: Rangelands affected by invasive species and techniques applied to prevent further spread per woreda

| | | | | **Techniques applied to prevent further spread of invasive species** | | | |
|---|---|---|---|---|---|---|---|
| | | HHs reporting that rangelands are affected by invasive species | | uprooting and cutting | rangeland enclosures | other | nothing |
| woreda | N | (%) | no | (%) | (%) | (%) | (%) |
| Awra | 94 | 53.2 | 50 | 30 | 0 | 0 | 70 |
| Chifra | 102 | 65.7 | 67 | 55.2 | 0 | 0 | 43.3 |
| Ewa | 80 | 82.5 | 66 | 47 | 0 | 1.5 | 51.5 |
| Gulina | 102 | 62.7 | 64 | 15.6 | 0 | 1.6 | 82.8 |
| Kori | 79 | 32.9 | 26 | 30.8 | 0 | 0 | 65.4 |
| Mille | 66 | 60.6 | 40 | 30 | 0 | 0 | 70 |
| Teru | 86 | 55.8 | 48 | 43.8 | 0 | 0 | 56.2 |
| Yallo | 100 | 91 | 91 | 58.2 | 1.1 | 1.1 | 41.8 |
| total | 709 | 63.8 | 452 | 41.4 | 0.2 | 0.7 | 57.7 |

Table 21: Rangelands affected by invasive species and techniques applied to prevent further spread per site

| | | | | | | **Techniques applied to prevent further spread of invasive species** | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | HHs reporting that rangelands are affected by invasive species | | uprooting and cutting | rangeland enclosures | other | nothing |
| woreda | kebele | site | N | (%) | N | (%) | (%) | (%) | (%) |
| **Awra** | Lakora | Lekora (AW2W) | 39 | 61.5 | 24 | 45.8 | 0 | 0 | 54.2 |
| | Finto na Asala | Finto (AW8W) | 35 | 28.6 | 10 | 0 | 0 | 0 | 100 |
| | Hida | Awra control village | 20 | 80 | 16 | 25 | 0 | 0 | 75 |
| **Chifra** | Geriro | Gariro (CH3W) | 39 | 59 | 23 | 60.9 | 0 | 0 | 39.1 |
| | Mesgid | Mosquit (CH4W) | 43 | 76.7 | 33 | 51.5 | 0 | 0 | 45.5 |
| | Tegri | Chifra control village | 20 | 55 | 11 | 54.5 | 0 | 0 | 45.5 |
| **Ewa** | 1st Badule | Ewa | 55 | 85.5 | 47 | 46.8 | 0 | 2.1 | 51.1 |
| | Bolotoma | Ewa control village | 25 | 76 | 19 | 47.4 | 0 | 0 | 52.6 |
| **Gulina** | Kelwan | Tabiadora (GU1W) | 21 | 52.4 | 11 | 27.3 | 0 | 9.1 | 63.6 |
| | Mulina Asa'ala | Admalif (GU2W) | 39 | 79.5 | 31 | 9.7 | 0 | 0 | 90.3 |
| | Wanasa & Harigerbo | Bakaru (GU4W) | 21 | 47.6 | 10 | 10 | 0 | 0 | 90 |
| | Galikoma | Gulina control village | 21 | 57.1 | 12 | 25 | 0 | 0 | 75 |
| **Kori** | Musle | Kori | 58 | 36.2 | 21 | 38.1 | 0 | 0 | 57.1 |
| | Guyah & Ella | Kori control village | 21 | 23.8 | 5 | 0 | 0 | 0 | 100 |
| **Mille** | Gasiyo na la'as | Mille | 56 | 71.4 | 40 | 30 | 0 | 0 | 70 |
| | Harsis | Mille control village | 10 | 0 | - | - | - | - | - |
| **Teru** | Debaho | Gadoweitu (TE1W) | 41 | 70.7 | 29 | 44.8 | 0 | 0 | 55.2 |
| | Digdigsala | Adgola (TE2W) | 24 | 41.7 | 10 | 40 | 0 | 0 | 60 |
| | Digdigsala | Teru control village | 21 | 42.9 | 9 | 44.4 | 0 | 0 | 55.6 |
| **Yallo** | Koli na Gaboli | Elei El Golo (YA1W) | 41 | 92.7 | 38 | 73.7 | 0 | 0 | 26.3 |
| | Walae' | Muhur Golo (YA2W) | 39 | 87.2 | 34 | 47.1 | 0 | 0 | 52.9 |
| | Uddayile | Yallo control village | 20 | 95 | 19 | 47.4 | 5.3 | 5.3 | 52.6 |

Table 22: Households reporting sufficient pasture for their livestock per woreda

| | | **Households reporting sufficient pasture for their livestock** | | | |
|---|---|---|---|---|---|
| | | for camels | for cattle | for goats | for sheep |
| woreda | N | (%) | (%) | (%) | (%) |
| Awra | 94 | 0 | 0 | 4.6 | 4.9 |
| Chifra | 102 | 9.5 | 0 | 12.1 | 6 |
| Ewa | 80 | 3.2 | 0 | 2.8 | 0 |
| Gulina | 102 | 0 | 0 | 0 | 0 |
| Kori | 79 | 0 | 0 | 0 | 0 |
| Mille | 66 | 3.8 | 0 | 4.6 | 2.5 |
| Teru | 86 | 0 | 0 | 1.2 | 1.4 |
| Yallo | 100 | 0 | 0 | 0 | 0 |
| total | 709 | 2.2 | 0 | 3.2 | 1.9 |

Table 23: Households reporting sufficient pasture for their livestock per site

| | | | | **Households reporting sufficient pasture for their livestock** | | | |
|---|---|---|---|---|---|---|---|
| | | | | for camels | for camels | for camels | for camels |
| woreda | kebele | site | N | (%) | (%) | (%) | (%) |
| **Awra** | Lakora | Lekora (AW2W) | 39 | 0 | 0 | 8.8 | 9.4 |
| | Finto na Asala | Finto (AW8W) | 35 | 0 | 0 | 2.9 | 2.9 |
| | Hida | Awra control village | 20 | 0 | 0 | 0 | 0 |
| **Chifra** | Geriro | Gariro (CH3W) | 39 | 6.9 | 0 | 10.5 | 6.5 |
| | Mesgid | Mosquit (CH4W) | 43 | 13.8 | 0 | 20 | 8.3 |
| | Tegri | Chifra control village | 20 | 0 | 0 | 0 | 0 |
| **Ewa** | 1st Badule | Ewa | 55 | 2.3 | 0 | 2.1 | 0 |
| | Bolotoma | Ewa control village | 25 | 5.3 | 0 | 4.3 | 0 |
| **Gulina** | Kelwan | Tabiadora (GU1W) | 21 | 0 | 0 | 0 | 0 |
| | Mulina Asa'ala | Admalif (GU2W) | 39 | 0 | 0 | 0 | 0 |
| | Wanasa & Harigerbo | Bakaru (GU4W) | 21 | 0 | 0 | 0 | 0 |
| | Galikoma | Gulina control village | 21 | 0 | 0 | 0 | 0 |
| **Kori** | Musle | Kori | 58 | 0 | 0 | 0 | 0 |
| | Guyah & Ella | Kori control village | 21 | 0 | 0 | 0 | 0 |
| **Mille** | Gasiyo na la'as | Mille | 56 | 4.8 | 0 | 5.5 | 2.9 |
| | Harsis | Mille control village | 10 | 0 | 0 | 0 | 0 |
| **Teru** | Debaho | Gadoweitu (TE1W) | 41 | 0 | 0 | 2.4 | 3.3 |
| | Digdigsala | Adgola (TE2W) | 24 | 0 | 0 | 0 | 0 |
| | Digdigsala | Teru control village | 21 | 0 | 0 | 0 | 0 |
| **Yallo** | Koli na Gaboli | Elei El Golo (YA1W) | 41 | 0 | 0 | 0 | 0 |
| | Walae' | Muhur Golo (YA2W) | 39 | 0 | 0 | 0 | 0 |
| | Uddayile | Yallo control village | 20 | 0 | 0 | 0 | 0 |

Table 24: Techniques applied to protect pastureland from erosion per woreda

| | | **Techniques applied by to protect pastureland from erosion** | | | | |
|---|---|---|---|---|---|---|
| | | stone bunds | soil bunds | half-moons | other | nothing |
| woreda | N | (%) | (%) | (%) | (%) | (%) |
| Awra | 94 | 7.4 | 4.3 | 3.2 | 1.1 | 88.3 |
| Chifra | 102 | 30.4 | 15.7 | 2.9 | 1 | 55.9 |
| Ewa | 80 | 18.8 | 12.5 | 0 | 1.2 | 72.5 |
| Gulina | 102 | 4.9 | 19.6 | 0 | 1 | 75.5 |
| Kori | 79 | 15.2 | 1.3 | 0 | 1.3 | 60.8 |
| Mille | 66 | 0 | 6.1 | 0 | 0 | 87.9 |
| Teru | 86 | 10.5 | 3.5 | 1.2 | 0 | 84.9 |
| Yallo | 100 | 3 | 9 | 1 | 2 | 88 |
| total | 709 | 11.6 | 9.4 | 1.1 | 1 | 76.4 |

Table 25: Techniques applied to protect pastureland from erosion per site

| | | | | **Techniques applied by to protect pastureland from erosion** | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | stone bunds | soil bunds | half-moons | other | nothing |
| woreda | kebele | site | N | (%) | (%) | (%) | (%) | (%) |
| **Awra** | Lakora | Lekora (AW2W) | 39 | 5.1 | 5.1 | 5.1 | 0 | 87.2 |
| | Finto na Asala | Finto (AW8W) | 35 | 14.3 | 5.7 | 2.9 | 2.9 | 85.7 |
| | Hida | Awra control village | 20 | 0 | 0 | 0 | 0 | 95 |
| **Chifra** | Geriro | Gariro (CH3W) | 39 | 48.7 | 15.4 | 0 | 0 | 35.9 |
| | Mesgid | Mosquit (CH4W) | 43 | 20.9 | 4.7 | 2.3 | 2.3 | 74.4 |
| | Tegri | Chifra control village | 20 | 15 | 40 | 10 | 0 | 55 |
| **Ewa** | 1st Badule | Ewa | 55 | 20 | 18.2 | 0 | 1.8 | 69.1 |
| | Bolotoma | Ewa control village | 25 | 16 | 0 | 0 | 0 | 80 |
| **Gulina** | Kelwan | Tabiadora (GU1W) | 21 | 0 | 33.3 | 0 | 0 | 66.7 |
| | Mulina Asa'ala | Admalif (GU2W) | 21 | 14.3 | 19 | 0 | 0 | 71.4 |
| | Wanasa&Harigerbo | Bakaru (GU4W) | 39 | 2.6 | 15.4 | 0 | 2.6 | 79.5 |
| | Galikoma | Gulina control village | 21 | 4.8 | 14.3 | 0 | 0 | 81 |
| **Kori** | Musle | Kori | 58 | 13.8 | 0 | 0 | 0 | 62.1 |
| | Guyah & Ella | Kori control village | 21 | 19 | 4.8 | 0 | 4.8 | 57.1 |
| **Mille** | Gasiyo na la'as | Mille | 56 | 0 | 7.1 | 0 | 0 | 92.9 |
| | Harsis | Mille control village | 10 | 0 | 0 | 0 | 0 | 60 |
| **Teru** | Debaho | Gadoweitu (TE1W) | 41 | 19.5 | 7.3 | 2.4 | 0 | 70.7 |
| | Digdigsala | Adgola (TE2W) | 24 | 4.2 | 0 | 0 | 0 | 95.8 |
| | Digdigsala | Teru control village | 21 | 0 | 0 | 0 | 0 | 100 |
| **Yallo** | Koli na Gaboli | Elei El Golo (YA1W) | 41 | 0 | 9.8 | 2.4 | 0 | 87.8 |
| | Walae' | Muhur Golo (YA2W) | 39 | 2.6 | 7.7 | 0 | 2.6 | 92.3 |
| | Uddayile | Yallo control village | 20 | 10 | 10 | 0 | 5 | 80 |

Table 26: Households reporting sufficient water for their livestock per woreda

| | | **Households reporting sufficient water for their livestock** | | | |
|---|---|---|---|---|---|
| | | for camels | for cattle | for goats | for sheep |
| woreda | N | (%) | (%) | (%) | (%) |
| Awra | 94 | 16.1 | 14.5 | 25.3 | 24.4 |
| Chifra | 102 | 60.3 | 52.4 | 53.8 | 52.2 |
| Ewa | 80 | 82.3 | 78.5 | 76.1 | 78.8 |
| Gulina | 102 | 6 | 7.9 | 10.8 | 11.4 |
| Kori | 79 | 2.3 | 3 | 1.3 | 1.7 |
| Mille | 66 | 61.5 | 77.8 | 58.5 | 55 |
| Teru | 86 | 12.5 | 18.9 | 14.5 | 15.9 |
| Yallo | 100 | 0 | 0 | 5.3 | 4.1 |
| total | 709 | 30.2 | 30.6 | 28.9 | 28.5 |

Table 27: Households reporting sufficient water for their livestock per site

| | | | | **Households reporting sufficient water for their livestock** | | | |
|---|---|---|---|---|---|---|---|
| | | | | for camels | for camels | for camels | for camels |
| woreda | kebele | site | N | (%) | (%) | (%) | (%) |
| **Awra** | Lakora | Lekora (AW2W) | 39 | 9.1 | 13.8 | 20.6 | 21.9 |
| | Finto na Asala | Finto (AW8W) | 35 | 18.5 | 10.7 | 34.3 | 35.3 |
| | Hida | Awra control village | 20 | 23.1 | 21.1 | 16.7 | 6.2 |
| **Chifra** | Geriro | Gariro (CH3W) | 39 | 55.2 | 45.5 | 50 | 51.6 |
| | Mesgid | Mosquit (CH4W) | 43 | 75.9 | 71.8 | 80 | 79.2 |
| | Tegri | Chifra control village | 20 | 0 | 8.3 | 11.1 | 0 |
| **Ewa** | 1st Badule | Ewa | 55 | 76.7 | 69.6 | 68.8 | 71.4 |
| | Bolotoma | Ewa control village | 25 | 94.7 | 100 | 91.3 | 91.7 |
| **Gulina** | Kelwan | Tabiadora (GU1W) | 21 | 8.3 | 4.8 | 5.3 | 0 |
| | Mulina Asa'ala | Admalif (GU2W) | 39 | 3.8 | 13.8 | 13.2 | 16.7 |
| | Wanasa & Harigerbo | Bakaru (GU4W) | 21 | 0 | 0 | 5 | 5.3 |
| | Galikoma | Gulina control village | 21 | 12.5 | 6.7 | 18.8 | 21.4 |
| **Kori** | Musle | Kori | 58 | 2.6 | 3.3 | 1.8 | 2 |
| | Guyah & Ella | Kori control village | 21 | 0 | 0 | 0 | 0 |
| **Mille** | Gasiyo na la'as | Mille | 56 | 71.4 | 77.8 | 63.6 | 61.8 |
| | Harsis | Mille control village | 10 | 20 | 0 | 30 | 16.7 |
| **Teru** | Debaho | Gadoweitu (TE1W) | 41 | 6.2 | 9.1 | 9.8 | 10 |
| | Digdigsala | Adgola (TE2W) | 24 | 7.7 | 5.6 | 4.8 | 5.6 |
| | Digdigsala | Teru control village | 21 | 66.7 | 62.5 | 33.3 | 33.3 |
| **Yallo** | Koli na Gaboli | Elei El Golo (YA1W) | 41 | 0 | 0 | 0 | 0 |
| | Walae' | Muhur Golo (YA2W) | 39 | 0 | 0 | 8.6 | 7.1 |
| | Uddayile | Yallo control village | 20 | 0 | 0 | 10.5 | 7.1 |

Table 28: Average time needed to reach the most frequently used water source for animals (one way) per woreda

| | | | | **Time needed to reach nearest water source** | | |
|---|---|---|---|---|---|---|
| | | | N | <1 hour | 1-2 hours | >2 hours |
| woreda | kebele | site | | (%) | (%) | (%) |
| **Awra** | Lakora | Lekora (AW2W) | 39 | 7.7 | 41.0 | 51.3 |
| | Finto na Asala | Finto (AW8W) | 35 | 31.4 | 42.9 | 25.7 |
| | Hida | Awra control village | 20 | 15.0 | 50.0 | 35.0 |
| **Chifra** | Geriro | Gariro (CH3W) | 39 | 15.4 | 41.0 | 43.6 |
| | Mesgid | Mosquit (CH4W) | 43 | 67.4 | 20.9 | 11.6 |
| | Tegri | Chifra control village | 20 | 0.0 | 10.0 | 90.0 |
| **Ewa** | 1st Badule | Ewa | 54 | 37.0 | 35.2 | 27.8 |
| | Bolotoma | Ewa control village | 25 | 32.0 | 24.0 | 44.0 |
| **Gulina** | Kelwan | Tabiadora (GU1W) | 21 | 0.0 | 14.3 | 85.7 |
| | Mulina Asa'ala | Admalif (GU2W) | 39 | 0.0 | 5.1 | 94.9 |
| | Wanasa & Harigerbo | Bakaru (GU4W) | 21 | 14.3 | 33.3 | 52.4 |
| | Galikoma | Gulina control village | 21 | 28.6 | 52.4 | 19.0 |
| **Kori** | Musle | Kori | 58 | 3.4 | 6.9 | 89.7 |
| | Guyah & Ella | Kori control village | 21 | 0.0 | 0.0 | 100.0 |
| **Mille** | Gasiyo na la'as | Mille | 56 | 62.5 | 28.6 | 8.9 |
| | Harsis | Mille control village | 10 | 100.0 | 0.0 | 0.0 |
| **Teru** | Debaho | Gadoweitu (TE1W) | 41 | 43.9 | 29.3 | 26.8 |
| | Digdigsala | Adgola (TE2W) | 24 | 12.5 | 4.2 | 83.3 |
| | Digdigsala | Teru control village | 21 | 33.3 | 23.8 | 42.9 |
| **Yallo** | Koli na Gaboli | Elei El Golo (YA1W) | 41 | 0.0 | 24.4 | 75.6 |
| | Walae' | Muhur Golo (YA2W) | 38 | 10.5 | 23.7 | 65.8 |
| | Uddayile | Yallo control village | 20 | 0.0 | 30.0 | 70.0 |

Table 29: Water sources for farming per woreda

| | | Water sources for farming | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | *buye* | *ela* | river | other surface water | water point | water trucking | other |
| woreda | N | (%) | (%) | (%) | (%) | (%) | (%) | (%) |
| Awra | 27 | 0 | 0 | 92.6 | 3.7 | 0 | 0 | 3.7 |
| Chifra | 53 | 1.9 | 3.8 | 64.2 | 0 | 0 | 1.9 | 26.4 |
| Ewa | 33 | 0 | 6.1 | 78.8 | 6.1 | 3 | 0 | 9.1 |
| Gulina | 2 | 0 | 0 | 50 | 0 | 0 | 0 | 0 |
| Teru | 6 | 0 | 0 | 0 | 33.3 | 50 | 0 | 0 |
| Yallo | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 50 |
| total | 125 | 0.8 | 3.2 | 68.8 | 4 | 3.2 | 0.8 | 16 |

Table 30: Water sources for farming per woreda (disaggregated by season)

| | | | Water sources for farming | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | *buye* | *ela* | river | other surface water | water point | water trucking | other |
| woreda | season | N | (%) | (%) | (%) | (%) | (%) | (%) | (%) |
| **Awra** | wet season | 27 | 0 | 0 | 85.2 | 3.7 | 0 | 0 | 3.7 |
| | dry season | 27 | 0 | 0 | 92.6 | 3.7 | 0 | 0 | 0 |
| **Chifra** | wet season | 53 | 1.9 | 3.8 | 49.1 | 0 | 0 | 1.9 | 26.4 |
| | dry season | 53 | 0 | 1.9 | 62.3 | 0 | 0 | 0 | 9.4 |
| **Ewa** | wet season | 33 | 0 | 0 | 69.7 | 3 | 3 | 0 | 9.1 |
| | dry season | 33 | 0 | 6.1 | 63.6 | 3 | 3 | 0 | 0 |
| **Gulina** | wet season | 2 | 0 | 0 | 50 | 0 | 0 | 0 | 0 |
| | dry season | 2 | 0 | 0 | 50 | 0 | 0 | 0 | 0 |
| **Teru** | wet season | 6 | 0 | 0 | 0 | 33.3 | 50 | 0 | 0 |
| | dry season | 6 | 0 | 0 | 0 | 0 | 50 | 0 | 0 |
| **Yallo** | wet season | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 50 |
| | dry season | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 25 |
| **total** | wet season | 125 | 0.8 | 1.6 | 58.4 | 3.2 | 3.2 | 0.8 | 16 |
| | dry season | 125 | 0 | 2.4 | 64 | 1.6 | 3.2 | 0 | 4.8 |

Table 31: Water sources for household consumption per woreda

| | | **Water sources for household consumption** | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | *buye* | *ela* | river | other surface water | water point | water trucking | other |
| woreda | N | (%) | (%) | (%) | (%) | (%) | (%) | (%) |
| Awra | 94 | 6.4 | 41.5 | 45.7 | 19.1 | 29.8 | 1.1 | 0 |
| Chifra | 102 | 4.9 | 2.9 | 71.6 | 10.8 | 47.1 | 2.9 | 0 |
| Ewa | 80 | 15 | 3.8 | 67.5 | 25 | 56.2 | 1.2 | 1.2 |
| Gulina | 102 | 7.8 | 46.1 | 54.9 | 12.7 | 36.3 | 1 | 0 |
| Kori | 79 | 1.3 | 30.4 | 21.5 | 86.1 | 12.7 | 59.5 | 29.1 |
| Mille | 66 | 30.3 | 39.4 | 21.2 | 36.4 | 0 | 0 | 60.6 |
| Teru | 86 | 3.5 | 62.8 | 18.6 | 58.1 | 67.4 | 0 | 4.7 |
| Yallo | 100 | 1 | 53 | 15 | 32 | 75 | 14 | 5 |
| total | 709 | 7.9 | 35.1 | 40.6 | 33.3 | 42.5 | 9.4 | 10.3 |

Table 32: Water sources for household consumption per woreda (disaggregated by season)

| | | | **Water sources for household consumption** | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | *buye* | *ela* | river | other surface water | water point | water trucking | other |
| woreda | season | N | (%) | (%) | (%) | (%) | (%) | (%) | (%) |
| **Awra** | wet season | 94 | 6.4 | 30.9 | 37.2 | 19.1 | 25.5 | 1.1 | 0 |
| | dry season | 94 | 1.1 | 41.5 | 38.3 | 0 | 28.7 | 0 | 0 |
| **Chifra** | wet season | 102 | 2.9 | 2 | 54.9 | 9.8 | 41.2 | 2.9 | 0 |
| | dry season | 102 | 2 | 2.9 | 69.6 | 2 | 40.2 | 2.9 | 0 |
| **Ewa** | wet season | 80 | 11.2 | 1.2 | 47.5 | 25 | 42.5 | 1.2 | 1.2 |
| | dry season | 80 | 12.5 | 2.5 | 53.8 | 1.2 | 53.8 | 0 | 0 |
| **Gulina** | wet season | 102 | 4.9 | 23.5 | 48 | 12.7 | 28.4 | 0 | 0 |
| | dry season | 102 | 5.9 | 45.1 | 38.2 | 0 | 35.3 | 1 | 0 |
| **Kori** | wet season | 79 | 1.3 | 8.9 | 21.5 | 83.5 | 12.7 | 3.8 | 13.9 |
| | dry season | 79 | 0 | 30.4 | 1.3 | 46.8 | 7.6 | 59.5 | 24.1 |
| **Mille** | wet season | 66 | 19.7 | 24.2 | 13.6 | 33.3 | 0 | 0 | 48.5 |
| | dry season | 66 | 25.8 | 39.4 | 10.6 | 4.5 | 0 | 0 | 51.5 |
| **Teru** | wet season | 86 | 2.3 | 26.7 | 12.8 | 58.1 | 58.1 | 0 | 3.5 |
| | dry season | 86 | 2.3 | 61.6 | 5.8 | 7 | 66.3 | 0 | 2.3 |
| **Yallo** | wet season | 100 | 1 | 23 | 15 | 25 | 58 | 5 | 4 |
| | dry season | 100 | 0 | 46 | 0 | 11 | 67 | 14 | 1 |
| **total** | wet season | 709 | 5.6 | 17.6 | 32.4 | 31.6 | 34.8 | 1.8 | 7.2 |
| | dry season | 709 | 5.4 | 33.7 | 28.5 | 8.5 | 39.1 | 9.2 | 7.9 |

Table 33: Water sources for livestock per woreda

| | | Water sources for livestock | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | *buye* | *ela* | river | other surface water | water point | water trucking | other |
| woreda | N | (%) | (%) | (%) | (%) | (%) | (%) | (%) |
| Awra | 94 | 1.1 | 38.3 | 69.1 | 19.1 | 0 | 0 | 0 |
| Chifra | 102 | 2 | 2.9 | 98 | 17.6 | 0 | 0 | 0 |
| Ewa | 80 | 11.2 | 3.8 | 100 | 21.2 | 0 | 0 | 0 |
| Gulina | 102 | 5.9 | 48 | 65.7 | 33.3 | 2 | 0 | 0 |
| Kori | 79 | 1.3 | 34.2 | 25.3 | 87.3 | 16.5 | 24.1 | 31.6 |
| Mille | 66 | 15.2 | 15.2 | 22.7 | 39.4 | 0 | 0 | 75.8 |
| Teru | 86 | 2.3 | 68.6 | 20.9 | 75.6 | 34.9 | 0 | 4.7 |
| Yallo | 100 | 0 | 77 | 32 | 58 | 18 | 0 | 3 |
| total | 709 | 4.4 | 37.2 | 56 | 43 | 8.9 | 2.7 | 11.6 |

Table 34: Water sources for livestock per woreda (disaggregated by season)

| | | | Water sources for livestock | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | *buye* | *ela* | river | other surface water | water point | water trucking | other |
| woreda | season | N | (%) | (%) | (%) | (%) | (%) | (%) | (%) |
| Awra | wet season | 94 | 0 | 27.7 | 62.8 | 19.1 | 0 | 0 | 0 |
| | dry season | 94 | 1.1 | 38.3 | 59.6 | 0 | 0 | 0 | 0 |
| **Chifra** | wet season | 102 | 2 | 1 | 82.4 | 16.7 | 0 | 0 | 0 |
| | dry season | 102 | 0 | 2.9 | 92.2 | 1 | 0 | 0 | 0 |
| **Ewa** | wet season | 80 | 2.5 | 0 | 81.2 | 21.2 | 0 | 0 | 0 |
| | dry season | 80 | 10 | 3.8 | 91.2 | 0 | 0 | 0 | 0 |
| **Gulina** | wet season | 102 | 2.9 | 20.6 | 47.1 | 33.3 | 2 | 0 | 0 |
| | dry season | 102 | 3.9 | 46.1 | 53.9 | 0 | 2 | 0 | 0 |
| **Kori** | wet season | 79 | 1.3 | 8.9 | 25.3 | 86.1 | 12.7 | 1.3 | 15.2 |
| | dry season | 79 | 1.3 | 34.2 | 2.5 | 46.8 | 13.9 | 22.8 | 26.6 |
| **Mille** | wet season | 66 | 7.6 | 0 | 19.7 | 39.4 | 0 | 0 | 51.5 |
| | dry season | 66 | 13.6 | 15.2 | 13.6 | 7.6 | 0 | 0 | 68.2 |
| **Teru** | wet season | 86 | 1.2 | 29.1 | 11.6 | 74.4 | 23.3 | 0 | 4.7 |
| | dry season | 86 | 1.2 | 68.6 | 10.5 | 8.1 | 33.7 | 0 | 1.2 |
| **Yallo** | wet season | 100 | 0 | 35 | 29 | 56 | 9 | 0 | 1 |
| | dry season | 100 | 0 | 76 | 10 | 2 | 18 | 0 | 2 |
| **total** | wet season | 709 | 2 | 16.2 | 46.3 | 42.3 | 5.8 | 0.1 | 7.2 |
| | dry season | 709 | 3.4 | 36.8 | 43.4 | 7.3 | 8.5 | 2.5 | 9.7 |

Table 35: Changes in access to water for farming in the past ten years per woreda

| | | **Changes in access to water for farming in the past ten years** | | |
|---|---|---|---|---|
| | | increase | decrease | stable |
| woreda | N | (%) | (%) | (%) |
| Awra | 21 | 4.8 | 85.7 | 9.5 |
| Chifra | 50 | 2 | 84 | 14 |
| Ewa | 32 | 0 | 90.6 | 9.4 |
| Gulina | 2 | 0 | 100 | 0 |
| Teru | 3 | 66.7 | 33.3 | 0 |
| Yallo | 4 | 0 | 100 | 0 |
| total | 112 | 3.6 | 85.7 | 10.7 |

Table 36: Changes in access to water for farming in the past ten years per site

| | | | | **Changes in access to water for farming in the past ten years** | | |
|---|---|---|---|---|---|---|
| | | | | increase | decrease | stable |
| woreda | kebele | site | N | (%) | (%) | (%) |
| **Awra** | Lakora | Lekora (AW2W) | 10 | 0 | 90 | 10 |
| | Hida | Awra control village | 11 | 9.1 | 81.8 | 9.1 |
| **Chifra** | Geriro | Gariro (CH3W) | 18 | 0 | 100 | 0 |
| | Mesgid | Mosquit (CH4W) | 25 | 4 | 68 | 28 |
| | Tegri | Chifra control village | 7 | 0 | 100 | 0 |
| **Ewa** | 1st Badule | Ewa | 29 | 0 | 89.7 | 10.3 |
| | Bolotoma | Ewa control village | 3 | 0 | 100 | 0 |
| **Gulina** | Mulina Asa'ala | Admalif (GU2W) | 2 | 0 | 100 | 0 |
| **Teru** | Debaho | Gadoweitu (TE1W) | 1 | 0 | 100 | 0 |
| | Digdigsala | Teru control village | 2 | 100 | 0 | 0 |
| **Yallo** | Koli na Gaboli | Elei El Golo (YA1W) | 3 | 0 | 100 | 0 |
| | Walae' | Muhur Golo (YA2W) | 1 | 0 | 100 | 0 |

Table 37: Changes in access to water for household consumption in the past ten years per woreda

| | | **Changes in access to water for household consumption in the past ten years** | | |
|---|---|---|---|---|
| | | increase | decrease | stable |
| woreda | N | (%) | (%) | (%) |
| Awra | 94 | 10.6 | 79.8 | 9.6 |
| Chifra | 102 | 8.8 | 68.6 | 22.5 |
| Ewa | 79 | 25.3 | 53.2 | 21.5 |
| Gulina | 102 | 12.7 | 86.3 | 1 |
| Kori | 79 | 20.3 | 78.5 | 1.3 |
| Mille | 65 | 4.6 | 83.1 | 12.3 |
| Teru | 86 | 58.1 | 39.5 | 2.3 |
| Yallo | 100 | 30 | 64 | 6 |
| total | 707 | 21.4 | 69.2 | 9.5 |

Table 38: Changes in access to water for household consumption in the past ten years per site

| | | | | **Changes in access to water for household consumption in the past ten years** | | |
|---|---|---|---|---|---|---|
| | | | | increase | decrease | stable |
| woreda | kebele | site | N | (%) | (%) | (%) |
| **Awra** | Lakora | Lekora (AW2W) | 39 | 2.6 | 87.2 | 10.3 |
| | Finto na Asala | Finto (AW8W) | 35 | 5.7 | 85.7 | 8.6 |
| | Hida | Awra control village | 20 | 35 | 55 | 10 |
| **Chifra** | Geriro | Gariro (CH3W) | 39 | 2.6 | 79.5 | 17.9 |
| | Mesgid | Mosquit (CH4W) | 43 | 16.3 | 46.5 | 37.2 |
| | Tegri | Chifra control village | 20 | 5 | 95 | 0 |
| **Ewa** | 1st Badule | Ewa | 54 | 5.6 | 70.4 | 24.1 |
| | Bolotoma | Ewa control village | 25 | 68 | 16 | 16 |
| **Gulina** | Kelwan | Tabiadora (GU1W) | 21 | 0 | 100 | 0 |
| | Mulina Asa'ala | Admalif (GU2W) | 21 | 52.4 | 42.9 | 4.8 |
| | Wanasa&Harigerbo | Bakaru (GU4W) | 39 | 0 | 100 | 0 |
| | Galikoma | Gulina control village | 21 | 9.5 | 90.5 | 0 |
| **Kori** | Musle | Kori | 58 | 13.8 | 84.5 | 1.7 |
| | Guyah & Ella | Kori control village | 21 | 38.1 | 61.9 | 0 |
| **Mille** | Gasiyo na la'as | Mille | 55 | 5.5 | 80 | 14.5 |
| | Harsis | Mille control village | 10 | 0 | 100 | 0 |
| **Teru** | Debaho | Gadoweitu (TE1W) | 41 | 68.3 | 31.7 | 0 |
| | Digdigsala | Adgola (TE2W) | 24 | 29.2 | 70.8 | 0 |
| | Digdigsala | Teru control village | 21 | 71.4 | 19 | 9.5 |
| **Yallo** | Koli na Gaboli | Elei El Golo (YA1W) | 41 | 26.8 | 65.9 | 7.3 |
| | Walae' | Muhur Golo (YA2W) | 39 | 48.7 | 46.2 | 5.1 |
| | Uddayile | Yallo control village | 20 | 0 | 95 | 5 |

Table 39: Changes in access to water for livestock in the past ten years per woreda

| | | **Changes in access to water for livestock in the past ten years** | | |
|---|---|---|---|---|
| | | increase | decrease | stable |
| woreda | N | (%) | (%) | (%) |
| Awra | 94 | 4.3 | 80.9 | 14.9 |
| Chifra | 102 | 7.8 | 68.6 | 23.5 |
| Ewa | 79 | 12.7 | 68.4 | 19 |
| Gulina | 100 | 0 | 96 | 4 |
| Kori | 79 | 11.4 | 86.1 | 1.3 |
| Mille | 64 | 6.2 | 81.2 | 12.5 |
| Teru | 85 | 11.8 | 87.1 | 1.2 |
| Yallo | 100 | 5 | 91 | 4 |
| total | 703 | 7.1 | 82.6 | 10.1 |

Table 40: Changes in access to water for livestock in the past ten years per site

| | | | | **Changes in access to water for livestock in the past ten years** | | |
|---|---|---|---|---|---|---|
| | | | | increase | decrease | stable |
| woreda | kebele | site | N | (%) | (%) | (%) |
| **Awra** | Lakora | Lekora (AW2W) | 39 | 2.6 | 84.6 | 12.8 |
| | Finto na Asala | Finto (AW8W) | 35 | 5.7 | 85.7 | 8.6 |
| | Hida | Awra control village | 20 | 5 | 65 | 30 |
| **Chifra** | Geriro | Gariro (CH3W) | 39 | 5.1 | 74.4 | 20.5 |
| | Mesgid | Mosquit (CH4W) | 43 | 14 | 48.8 | 37.2 |
| | Tegri | Chifra control village | 20 | 0 | 100 | 0 |
| **Ewa** | 1st Badule | Ewa | 55 | 10.9 | 72.7 | 16.4 |
| | Bolotoma | Ewa control village | 24 | 16.7 | 58.3 | 25 |
| **Gulina** | Kelwan | Tabiadora (GU1W) | 21 | 0 | 100 | 0 |
| | Mulina Asa'ala | Admalif (GU2W) | 21 | 0 | 81 | 19 |
| | Wanasa&Harigerbo | Bakaru (GU4W) | 39 | 0 | 100 | 0 |
| | Galikoma | Gulina control village | 19 | 0 | 100 | 0 |
| **Kori** | Musle | Kori | 58 | 5.2 | 91.4 | 1.7 |
| | Guyah & Ella | Kori control village | 21 | 28.6 | 71.4 | 0 |
| **Mille** | Gasiyo na la'as | Mille | 54 | 7.4 | 77.8 | 14.8 |
| | Harsis | Mille control village | 10 | 0 | 100 | 0 |
| **Teru** | Debaho | Gadoweitu (TE1W) | 41 | 7.3 | 92.7 | 0 |
| | Digdigsala | Adgola (TE2W) | 23 | 4.3 | 95.7 | 0 |
| | Digdigsala | Teru control village | 21 | 28.6 | 66.7 | 4.8 |
| **Yallo** | Koli na Gaboli | Elei El Golo (YA1W) | 41 | 0 | 95.1 | 4.9 |
| | Walae' | Muhur Golo (YA2W) | 39 | 12.8 | 84.6 | 2.6 |
| | Uddayile | Yallo control village | 20 | 0 | 95 | 5 |

Table 41: Perceived depth of groundwater table per woreda

| | | | **Perceived depth of groundwater table** | | |
|---|---|---|---|---|---|
| | | HHs reporting to get groundwater by digging | today | three years ago | ten years ago |
| woreda | N | (%) | (m) | (m) | (m) |
| Awra | 94 | 48.9 | -15.4 | -10.3 | -7.1 |
| Chifra | 102 | 11.8 | -6.5 | -4.0 | -2.4 |
| Ewa | 80 | 31.2 | -6.5 | -4.3 | -2.7 |
| Gulina | 102 | 61.8 | -6.3 | -3.3 | -2.2 |
| Kori | 79 | 21.5 | -5.9 | -3.7 | -2.1 |
| Mille | 66 | 63.6 | -3.6 | -2.4 | -1.6 |
| Teru | 86 | 72.1 | -5.7 | -3.3 | -1.5 |
| Yallo | 100 | 48 | -9.6 | -5.7 | -3.5 |

Table 42: Perceived depth of groundwater table per site

| | | | | | Perceived depth of groundwater table | | |
|---|---|---|---|---|---|---|---|
| | | | | HHs reporting to get groundwater by digging | today | three years ago | ten years ago |
| woreda | kebele | site | N | (%) | (m) | (m) | (m) |
| **Awra** | Lakora | Lekora (AW2W) | 39 | 17.9 | -8.1 | -4.9 | -4.4 |
| | Finto na Asala | Finto (AW8W) | 35 | 94.3 | -18.6 | -12.8 | -8.7 |
| | Hida | Awra control village | 20 | 30 | -5.8 | -2.5 | -1.5 |
| **Chifra** | Geriro | Gariro (CH3W) | 39 | 7.7 | -5 | -2 | -1 |
| | Mesgid | Mosquit (CH4W) | 43 | 7 | -15 | -12 | -10 |
| | Tegri | Chifra control village | 20 | 30 | -4.8 | -2.5 | -0.9 |
| **Ewa** | 1st Badule | Ewa | 55 | 38.2 | -6.8 | -4.3 | -3 |
| | Bolotoma | Ewa control village | 25 | 16 | -4.9 | -3.9 | -1.5 |
| **Gulina** | Kelwan | Tabiadora (GU1W) | 21 | 42.9 | -4.4 | -2.1 | -3.9 |
| | Mulina Asa'ala | Admalif (GU2W) | 39 | 59 | -4.3 | -2 | -1.2 |
| | Wanasa&Harigerbo | Bakaru (GU4W) | 21 | 57.1 | -7.3 | -4.6 | -2.2 |
| | Galikoma | Gulina control village | 21 | 90.5 | -9 | -4.6 | -2.7 |
| **Kori** | Musle | Kori | 58 | 29.3 | -5.9 | -3.7 | -2.1 |
| | Guyah & Ella | Kori control village | 21 | 0 | - | - | - |
| **Mille** | Gasiyo na la'as | Mille | 56 | 60.7 | -3.4 | -2.3 | -1.7 |
| | Harsis | Mille control village | 10 | 80 | -4.5 | -2.9 | -1.3 |
| **Teru** | Debaho | Gadoweitu (TE1W) | 41 | 78 | -6.6 | -3.6 | -1.7 |
| | Digdigsala | Adgola (TE2W) | 24 | 45.8 | -3.9 | -2.5 | -1.2 |
| | Digdigsala | Teru control village | 21 | 90.5 | -5.3 | -3.3 | -1.5 |
| **Yallo** | Koli na Gaboli | Elei El Golo (YA1W) | 41 | 85.4 | -9.6 | -6.1 | -3.9 |
| | Walae' | Muhur Golo (YA2W) | 39 | 15.4 | -8.2 | -4 | -2 |
| | Uddayile | Yallo control village | 20 | 35 | -10.6 | -5.1 | -2.6 |

## Annex V.V Livestock Holdings and Wealth

Table 43: Livestock ownership per woreda

| | | Percentage of households owning different types of animals | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | any type of animal | camels | cattle | sheep | goats | donkeys | HHs with neither cattle nor camels |
| woreda | N | (%) | (%) | (%) | (%) | (%) | (%) | (%) |
| Awra | 94 | 98.9 | 66.0 | 80.9 | 87.2 | 92.6 | 43.6 | 10.6 |
| Chifra | 102 | 100.0 | 61.8 | 82.4 | 65.7 | 89.2 | 48.0 | 9.8 |
| Ewa | 80 | 97.5 | 77.5 | 81.2 | 82.5 | 88.8 | 47.5 | 11.2 |
| Gulina | 102 | 100.0 | 65.7 | 74.5 | 77.5 | 91.2 | 46.1 | 10.8 |
| Kori | 79 | 100.0 | 55.7 | 41.8 | 74.7 | 98.7 | 49.4 | 31.6 |
| Mille | 66 | 98.5 | 39.4 | 13.6 | 60.6 | 98.5 | 54.5 | 56.1 |
| Teru | 86 | 100.0 | 37.2 | 43.0 | 80.2 | 96.5 | 52.3 | 44.2 |
| Yallo | 100 | 96.0 | 54.0 | 35.0 | 74.0 | 94.0 | 58.0 | 34.0 |
| total | 709 | 98.9 | 57.8 | 58.5 | 75.6 | 93.4 | 49.8 | 24.5 |

Table 44: Mean, minimum and maximum number of animals per woreda

| | | **Mean, minimum and maximum number of animals** | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | camels | | | cattle | | | sheep | | | goats | | | donkeys | | |
| woreda | N | mean | min | max | mean | min | max | mean | min | max | mean | min | max | mean | min | max |
| Awra | 94 | 5.6 | 1 | 40 | 5.2 | 1 | 30 | 11.0 | 2 | 50 | 14.2 | 2 | 41 | 1.7 | 1 | 5 |
| Chifra | 102 | 3.7 | 1 | 15 | 3.8 | 1 | 20 | 7.5 | 1 | 40 | 10.5 | 2 | 40 | 1.4 | 1 | 3 |
| Ewa | 80 | 4.2 | 1 | 12 | 4.4 | 1 | 20 | 7.9 | 1 | 30 | 8.5 | 3 | 30 | 1.5 | 1 | 5 |
| Gulina | 102 | 5.8 | 1 | 60 | 4.4 | 1 | 30 | 7.5 | 1 | 20 | 12.1 | 2 | 40 | 1.4 | 1 | 4 |
| Kori | 79 | 6.6 | 1 | 40 | 7.1 | 1 | 30 | 16.3 | 1 | 110 | 24.2 | 2 | 200 | 1.4 | 1 | 3 |
| Mille | 66 | 4.1 | 1 | 20 | 2.7 | 1 | 5 | 7.9 | 1 | 30 | 17.8 | 5 | 50 | 1.2 | 1 | 5 |
| Teru | 86 | 3.7 | 1 | 15 | 4.2 | 1 | 20 | 9.3 | 2 | 30 | 16.0 | 3 | 50 | 1.5 | 1 | 10 |
| Yallo | 100 | 3.7 | 1 | 20 | 3.1 | 1 | 7 | 10.7 | 1 | 80 | 12.9 | 2 | 50 | 1.6 | 1 | 20 |
| total | 709 | 4.7 | 1 | 60 | 4.5 | 1 | 30 | 9.8 | 1 | 110 | 14.3 | 2 | 200 | 1.5 | 1 | 20 |

Table 45: Changes in the number of camels in the past ten years per woreda

| | | **Changes in the number of camels in the past ten years** | | |
|---|---|---|---|---|
| | | increase | decrease | stable |
| woreda | N | (%) | (%) | (%) |
| Awra | 94 | 0 | 94.7 | 0 |
| Chifra | 102 | 0 | 89.2 | 1 |
| Ewa | 80 | 0 | 96.2 | 1.2 |
| Gulina | 102 | 1 | 95.1 | 0 |
| Kori | 79 | 0 | 88.6 | 1.3 |
| Mille | 66 | 0 | 97 | 0 |
| Teru | 86 | 0 | 96.5 | 0 |
| Yallo | 100 | 0 | 92 | 1 |
| total | 709 | 0.1 | 93.5 | 0.6 |

Table 46: Changes in the number of cattle in the past ten years per woreda

| | | **Changes in the number of cattle in the past ten years** | | |
|---|---|---|---|---|
| | | increase | decrease | stable |
| woreda | N | (%) | (%) | (%) |
| Awra | 94 | 0 | 96.8 | 1.1 |
| Chifra | 102 | 0 | 96.1 | 1 |
| Ewa | 80 | 0 | 98.8 | 0 |
| Gulina | 102 | 1 | 97.1 | 0 |
| Kori | 79 | 0 | 84.8 | 0 |
| Mille | 66 | 0 | 89.4 | 0 |
| Teru | 86 | 0 | 96.5 | 1.2 |
| Yallo | 100 | 0 | 95 | 1 |
| total | 709 | 0.1 | 94.6 | 0.6 |

Table 47: Changes in the number of goats in the past ten years per woreda

| | | **Changes in the number of goats in the past ten years** | | |
|---|---|---|---|---|
| | | increase | decrease | stable |
| woreda | N | (%) | (%) | (%) |
| Awra | 94 | 0 | 100 | 0 |
| Chifra | 102 | 0 | 95.1 | 2.9 |
| Ewa | 80 | 0 | 97.5 | 0 |
| Gulina | 102 | 1 | 97.1 | 0 |
| Kori | 79 | 0 | 97.5 | 0 |
| Mille | 66 | 1.5 | 98.5 | 0 |
| Teru | 86 | 0 | 100 | 0 |
| Yallo | 100 | 0 | 100 | 0 |
| total | 709 | 0.3 | 98.2 | 0.4 |

Table 48: Changes in the number of sheep in the past ten years per woreda

| | | **Changes in the number of sheep in the past ten years** | | |
|---|---|---|---|---|
| | | increase | decrease | stable |
| woreda | N | (%) | (%) | (%) |
| Awra | 94 | 0 | 98.9 | 0 |
| Chifra | 102 | 0 | 91.2 | 2 |
| Ewa | 80 | 0 | 97.5 | 0 |
| Gulina | 102 | 1 | 96.1 | 0 |
| Kori | 79 | 0 | 94.9 | 1.3 |
| Mille | 66 | 1.5 | 97 | 0 |
| Teru | 86 | 0 | 97.7 | 0 |
| Yallo | 100 | 0 | 99 | 0 |
| total | 709 | 0.3 | 96.5 | 0.4 |

Table 49: Average share of animals owned by wife

| | **Average share of animals owned by wife** | | | | |
|---|---|---|---|---|---|
| | camels | cattle | sheep | goats | donkeys |
| woreda | (%) | (%) | (%) | (%) | (%) |
| Awra | 28 | 30.9 | 40.7 | 38.1 | 80.3 |
| Chifra | 19 | 27.5 | 31.5 | 32.7 | 70.6 |
| Ewa | 27.5 | 29.2 | 34 | 33.7 | 76.8 |
| Gulina | 36.5 | 36.7 | 41.1 | 35.4 | 81.2 |
| Kori | 12.1 | 33.9 | 29.6 | 31.7 | 68.5 |
| Mille | 20.8 | 0 | 46.2 | 38.5 | 70.5 |
| Teru | 31.9 | 43.2 | 40.2 | 41.6 | 65.7 |
| Yallo | 14.4 | 21.3 | 32.1 | 35.8 | 78.3 |
| total | 24.6 | 31.6 | 36.1 | 35.9 | 74.4 |

Table 50: Mean number of donkeys and percentage of households owning one, two, three, four or more donkeys per woreda

| | | | **HHs owning one, two, three, four or more donkeys** | | | |
|---|---|---|---|---|---|---|
| | | | one per HH | two per HH | three per HH | four or more per HH |
| woreda | N | avg. no. of donkeys | (%) | (%) | (%) | (%) |
| Awra | 41 | 1.7 | 51.2 | 36.6 | 2.4 | 9.8 |
| Chifra | 49 | 1.4 | 69.4 | 22.4 | 8.2 | 0.0 |
| Ewa | 38 | 1.5 | 65.8 | 26.3 | 5.3 | 2.6 |
| Gulina | 47 | 1.4 | 76.6 | 12.8 | 8.5 | 2.1 |
| Kori | 39 | 1.4 | 71.8 | 17.9 | 10.3 | 0.0 |
| Mille | 36 | 1.2 | 86.1 | 11.1 | 0.0 | 2.8 |
| Teru | 45 | 1.5 | 73.3 | 20.0 | 4.4 | 2.2 |
| Yallo | 58 | 1.6 | 84.5 | 8.6 | 1.7 | 5.2 |
| total | 353 | 1.5 | 72.8 | 19.0 | 5.1 | 3.1 |

Table 51: Percentage of households that shifted their herd composition and type of shift per woreda

| | | | | Type of shift in herd composition | | |
|---|---|---|---|---|---|---|
| | | households that have shifted their herd composition | | more camels and goats | more cattle and sheep | more sheep and goats |
| woreda | N | (%) | N | (%) | (%) | (%) |
| Awra | 94 | 6.4 | 6 | 50 | 0 | 50 |
| Chifra | 102 | 14.7 | 15 | 40 | 6.7 | 46.7 |
| Ewa | 80 | 10 | 8 | 62.5 | 0 | 37.5 |
| Gulina | 102 | 1 | 1 | 0 | 100 | 0 |
| Kori | 79 | 1.3 | 1 | 0 | 0 | 0 |
| Mille | 66 | 0 | 1 | 0 | 0 | 0 |
| Teru | 86 | 0 | 0 | - | - | - |
| Yallo | 100 | 1 | 1 | 0 | 0 | 100 |
| total | 709 | 4.5 | 33 | 42.4 | 6.1 | 42.4 |

## Annex V.VI Livelihood Diversification and Income Generation

Table 52: Percentage of households with pastoral and non-pastoral income sources

| | | Percentage of households with pastoral and non-pastoral income sources | |
|---|---|---|---|
| | | Pastoral income | Non-pastoral income |
| woreda | N | (%) | (%) |
| Awra | 94 | 98.9 | 27.7 |
| Chifra | 102 | 92.2 | 29.4 |
| Ewa | 80 | 97.5 | 17.5 |
| Gulina | 102 | 100 | 11.8 |
| Kori | 79 | 100 | 20.3 |
| Mille | 66 | 100 | 63.6 |
| Teru | 86 | 97.7 | 18.6 |
| Yallo | 100 | 96 | 23 |
| total | 709 | 97.6 | 25.2 |

Table 53: Mean, minimum and maximum number of animals sold per household per woreda

| | Mean, minimum and maximum number of animals sold per households | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | camels | | | cattle | | | shoats | | |
| woreda | mean | min | max | mean | min | max | mean | min | max |
| Awra | 1.9 | 0 | 10 | 1.8 | 0 | 14 | 9.7 | 0 | 40 |
| Chifra | 1.3 | 0 | 10 | 1.4 | 0 | 6 | 8.5 | 0 | 30 |
| Ewa | 1.7 | 0 | 20 | 1.6 | 0 | 12 | 7.6 | 0 | 30 |
| Gulina | 2.1 | 0 | 7 | 2.2 | 0 | 11 | 10.3 | 1 | 30 |
| Kori | 0.3 | 0 | 2 | 0.5 | 0 | 6 | 22.3 | 3 | 300 |
| Mille | 0.3 | 0 | 2 | 0.2 | 0 | 1 | 15.9 | 3 | 103 |
| Teru | 0.9 | 0 | 5 | 1.1 | 0 | 4 | 15.8 | 5 | 35 |
| Yallo | 1.3 | 0 | 4 | 1.5 | 0 | 6 | 14 | 2 | 103 |
| total | 1.4 | 0 | 20 | 1.6 | 0 | 14 | 12.8 | 0 | 300 |

Table 54: Income sources of households and main responsibility (men, women, both) per woreda

| | | | **Percentage of households with different income sources** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Selling animals | Selling milk and butter | Sale of firewood | Sale of charcoal | Sale of grain | Sale of fodder crops | Day labour | Leasing land | Money from relatives | Governmental income | Other income sources |
| woreda | Main responsibility | N | (%) | (%) | (%) | (%) | (%) | (%) | (%) | (%) | (%) | (%) | (%) |
| **Awra** | men | 94 | 16 | 0 | 0 | 0 | 2.1 | 0 | 0 | 0 | 1.1 | 1.1 | 0 |
| | men and women | 94 | 73.4 | 0 | 0 | 0 | 3.2 | 1.1 | 1.1 | 0 | 1.1 | 1.1 | 16 |
| | women | 94 | 9.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.1 | 0 | 1.1 |
| **Chifra** | men | 102 | 25.5 | 2.9 | 0 | 0 | 1 | 0 | 2.9 | 1 | 1 | 7.8 | 0 |
| | men and women | 102 | 53.9 | 2 | 1 | 0 | 2.9 | 0 | 0 | 0 | 0 | 6.9 | 3.9 |
| | women | 102 | 11.8 | 1 | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 1 |
| **Ewa** | men | 80 | 21.2 | 0 | 0 | 0 | 0 | 0 | 1.2 | 0 | 0 | 5 | 0 |
| | men and women | 80 | 55 | 0 | 0 | 0 | 1.2 | 0 | 0 | 1.2 | 2.5 | 3.8 | 2.5 |
| | women | 80 | 21.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.2 |
| **Gulina** | men | 102 | 20.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.9 | 0 |
| | men and women | 102 | 70.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.9 |
| | women | 102 | 8.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 4.9 |
| **Kori** | men | 79 | 19 | 0 | 3.8 | 0 | 0 | 0 | 1.3 | 0 | 0 | 1.3 | 0 |
| | men and women | 79 | 63.3 | 0 | 5.1 | 0 | 0 | 0 | 0 | 0 | 1.3 | 0 | 1.3 |
| | women | 79 | 17.7 | 0 | 7.6 | 0 | 0 | 0 | 0 | 0 | 0 | 1.3 | 6.3 |
| **Mille** | men | 66 | 6.1 | 0 | 9.1 | 0 | 0 | 0 | 4.5 | 0 | 0 | 3 | 4.5 |
| | men and women | 66 | 72.7 | 0 | 30.3 | 1.5 | 0 | 0 | 1.5 | 1.5 | 0 | 3 | 3 |
| | women | 66 | 21.2 | 0 | 7.6 | 0 | 0 | 0 | 3 | 0 | 0 | 1.5 | 0 |

| | | | Percentage of households with different income sources | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| woreda | Main responsibility | N | Selling animals (%) | Selling milk and butter (%) | Sale of firewood (%) | Sale of charcoal (%) | Sale of grain (%) | Sale of fodder crops (%) | Day labour (%) | Leasing land (%) | Money from relatives (%) | Governmental income (%) | Other income sources (%) |
| **Teru** | men | 86 | 9.3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.5 | 0 |
| | men and women | 86 | 77.9 | 0 | 3.5 | 0 | 0 | 1.2 | 0 | 0 | 0 | 1.2 | 0 |
| | women | 86 | 10.5 | 0 | 9.3 | 0 | 0 | 0 | 0 | 0 | 1.2 | 1.2 | 0 |
| **Yallo** | men | 100 | 17 | 0 | 0 | 0 | 0 | 0 | 13 | 0 | 2 | 3 | 0 |
| | men and women | 100 | 64 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 4 |
| | women | 100 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| **Total** | men | 709 | 17.3 | 0.4 | 1.3 | 0 | 0.4 | 0 | 3 | 0.1 | 0.6 | 3.5 | 0.4 |
| | men and women | 709 | 66.1 | 0.3 | 3.9 | 0.1 | 1 | 0.3 | 0.3 | 0.3 | 0.7 | 2.3 | 4.5 |
| | women | 709 | 14 | 0.1 | 2.7 | 0 | 0 | 0 | 0.4 | 0 | 0.7 | 0.6 | 1.8 |

Table 55: Percentage of income spent for different purposes per woreda

| | **Percentage of income spent for different purposes** | | | | | |
|---|---|---|---|---|---|---|
| | food | animals | health | school | clothes | other |
| woreda | (%) | (%) | (%) | (%) | (%) | (%) |
| Awra | 56.2 | 10.3 | 11.8 | 3.5 | 17.8 | 0.0 |
| Chifra | 47.5 | 11.9 | 14.7 | 6.7 | 16.7 | 0.4 |
| Ewa | 55.9 | 10.1 | 10.7 | 4.9 | 17.1 | 1.1 |
| Gulina | 54.4 | 9.0 | 11.6 | 5.8 | 18.7 | 0.0 |
| Kori | 62.4 | 4.6 | 11.3 | 2.7 | 18.4 | 0.0 |
| Mille | 56.7 | 7.6 | 11.7 | 5.3 | 19.1 | 0.0 |
| Teru | 57.7 | 6.7 | 12.3 | 3.4 | 18.5 | 0.0 |
| Yallo | 58.0 | 8.8 | 11.2 | 5.0 | 17.4 | 0.0 |
| total | 55.8 | 8.8 | 12.0 | 4.7 | 17.9 | 0.2 |

Table 56: Percentage of income spent for different purposes per site

| | | | **Percentage of income spent for different purposes** | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | food | animal | health | school | clothes | other |
| woreda | kebele | site | (%) | (%) | (%) | (%) | (%) | (%) |
| **Awra** | Lakora | Lekora (AW2W) | 55.5 | 9.6 | 11 | 5.3 | 18.6 | 0 |
| | Finto na Asala | Finto (AW8W) | 57.6 | 12 | 12.4 | 2.1 | 14.6 | 0 |
| | Hida | Awra control village | 55.2 | 8.5 | 12 | 2.5 | 21.7 | 0 |
| **Chifra** | Geriro | Gariro (CH3W) | 42.1 | 12.7 | 15 | 9.1 | 18.7 | 0 |
| | Mesgid | Mosquit (CH4W) | 48.5 | 13.1 | 15.2 | 5.6 | 15.2 | 0.9 |
| | Tegri | Chifra control village | 55.8 | 7.5 | 13 | 4.5 | 15.8 | 0 |
| **Ewa** | 1st Badule | Ewa | 55.8 | 9.5 | 10.7 | 5.7 | 16.6 | 1.6 |
| | Bolotoma | Ewa control village | 56 | 11.4 | 10.6 | 3.2 | 18 | 0 |
| **Gulina** | Kelwan | Tabiadora (GU1W) | 53.8 | 9.3 | 12.4 | 4.5 | 19.8 | 0 |
| | Mulina Asa'ala | Admalif (GU2W) | 53.8 | 8.6 | 11.4 | 10 | 16 | 0 |
| | Wanasa&Harigerbo | Bakaru (GU4W) | 56.4 | 8.2 | 11.5 | 5 | 18.8 | 0 |
| | Galikoma | Gulina control village | 51.7 | 10.7 | 11.2 | 4.3 | 20 | 0 |
| **Kori** | Musle | Kori | 62.6 | 4.1 | 11.6 | 2.5 | 18.6 | 0 |
| | Guyah & Ella | Kori control village | 61.9 | 5.7 | 10.7 | 3.3 | 17.6 | 0 |
| **Mille** | Gasiyo na la'as | Mille | 55.1 | 8.9 | 11.9 | 5.2 | 19.4 | 0 |
| | Harsis | Mille control village | 66 | 0 | 10.5 | 6 | 17.5 | 0 |
| **Teru** | Debaho | Gadoweitu (TE1W) | 56.3 | 6.6 | 12.9 | 4.3 | 17.2 | 0 |
| | Digdigsala | Adgola (TE2W) | 57.5 | 6.7 | 12.1 | 3.1 | 20.6 | 0 |
| | Digdigsala | Teru control village | 60.5 | 6.9 | 11.4 | 1.9 | 18.6 | 0 |
| **Yallo** | Koli na Gaboli | Elei El Golo (YA1W) | 58.3 | 8.8 | 10.5 | 4.3 | 18.2 | 0 |
| | Walae' | Muhur Golo (YA2W) | 56.8 | 8.8 | 11.7 | 5 | 17.6 | 0 |
| | Uddayile | Yallo control village | 59.7 | 9 | 11.8 | 6.2 | 15.2 | 0.2 |

## Annex V.VII Relevance of Agriculture within Pastoral Livelihoods

Table 57: Percentage of female- and male-headed farm households per woreda

| | **Farm households** | | **Percentage of female- and male-headed households** | | |
|---|---|---|---|---|---|
| | | | Female-headed households | Male-headed households | |
| woreda | N | (%) | N | (%) | (%) |
| Awra | 94 | 28.7 | 27 | 22.2 | 77.8 |
| Chifra | 102 | 52 | 53 | 15.1 | 84.9 |
| Ewa | 80 | 41.2 | 33 | 18.2 | 81.8 |
| Gulina | 102 | 2 | 2 | 0 | 100 |
| Kori | 79 | 0 | 0 | - | - |
| Mille | 66 | 0 | 0 | - | - |
| Teru | 86 | 7 | 6 | 16.7 | 83.3 |
| Yallo | 100 | 4 | 4 | 0 | 100 |
| total | 709 | 17.6 | 125 | 16.8 | 83.2 |

Table 58: Percentage of female- and male-headed farm households per site

| | | | | **Farm households** | | **Percentage of female- and male-headed households** | |
|---|---|---|---|---|---|---|---|
| | | | | | | FHHs | MHHs |
| woreda | kebele | site | N | (%) | N | (%) | (%) |
| **Awra** | Lakora | Lekora (AW2W) | 39 | 38.5 | 15 | 26.7 | 73.3 |
| | Finto na Asala | Finto (AW8W) | 35 | 0 | 0 | - | - |
| | Hida | Awra control village | 20 | 60 | 12 | 16.7 | 83.3 |
| **Chifra** | Geriro | Gariro (CH3W) | 39 | 46.2 | 18 | 11.1 | 88.9 |
| | Mesgid | Mosquit (CH4W) | 43 | 62.8 | 27 | 14.8 | 85.2 |
| | Tegri | Chifra control village | 20 | 40 | 8 | 25 | 75 |
| **Ewa** | 1st Badule | Ewa | 55 | 54.5 | 30 | 20 | 80 |
| | Bolotoma | Ewa control village | 25 | 12 | 3 | 0 | 100 |
| **Gulina** | Kelwan | Tabiadora (GU1W) | 21 | 0 | 0 | - | - |
| | Mulina Asa'ala | Admalif (GU2W) | 39 | 5.1 | 2 | 0 | 100 |
| | Wanasa&Harigerbo | Bakaru (GU4W) | 21 | 0 | 0 | - | - |
| | Galikoma | Gulina control village | 21 | 0 | 0 | - | - |
| **Kori** | Musle | Kori | 58 | 0 | 0 | - | - |
| | Guyah & Ella | Kori control village | 21 | 0 | 0 | - | - |
| **Mille** | Gasiyo na la'as | Mille | 56 | 0 | 0 | - | - |
| | Harsis | Mille control village | 10 | 0 | 0 | - | - |
| **Teru** | Debaho | Gadoweitu (TE1W) | 41 | 4.9 | 2 | 0 | 100 |
| | Digdigsala | Adgola (TE2W) | 24 | 0 | 0 | - | - |
| | Digdigsala | Teru control village | 21 | 19 | 4 | 25 | 75 |
| **Yallo** | Koli na Gaboli | Elei El Golo (YA1W) | 41 | 7.3 | 3 | 0 | 100 |
| | Walae' | Muhur Golo (YA2W) | 39 | 2.6 | 1 | 0 | 100 |
| | Uddayile | Yallo control village | 20 | 0 | 0 | - | - |

Table 59: Importance of crops grown by agro-pastoral households per woreda

| | | **Percentage of farm households growing different crops** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | maize | teff | sorghum | sesame | fodder crops | onion | tomato | pulses | other crops |
| woreda | N | (%) | (%) | (%) | (%) | (%) | (%) | (%) | (%) | (%) |
| Awra | 27 | 100.0 | 0.0 | 0.0 | 7.4 | 3.7 | 3.7 | 0.0 | 0 | 0.0 |
| Chifra | 53 | 96.2 | 11.3 | 1.9 | 1.9 | 1.9 | 1.9 | 0.0 | 0 | 0.0 |
| Ewa | 33 | 90.9 | 3.0 | 3.0 | 0.0 | 3.0 | 12.1 | 6.1 | 0 | 21.2 |
| Gulina | 2 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0.0 |
| Kori | 0 | - | - | - | - | - | - | - | - | - |
| Mille | 0 | - | - | - | - | - | - | - | - | - |
| Teru | 6 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 16.7 | 0 | 0.0 |
| Yallo | 4 | 100.0 | 75.0 | 0.0 | 25.0 | 0.0 | 0.0 | 0.0 | 0 | 0.0 |
| total | 125 | 96.0 | 8.0 | 1.6 | 3.2 | 2.4 | 4.8 | 2.4 | 0 | 5.6 |

Table 60: Importance of crops grown by agro-pastoral households per site

| | | | **Percentage of farm households growing different crops** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | maize | teff | sorghum | sesame | fodder | onion | tomato | pulses | other crops |
| woreda | site* | N | (%) | (%) | (%) | (%) | (%) | (%) | (%) | (%) | (%) |
| **Awra** | Lekora (AW2W) | 15 | 100.0 | 0.0 | 0.0 | 13.3 | 0.0 | 6.7 | 0.0 | 0 | 0.0 |
| | Awra control village | 12 | 100.0 | 0.0 | 0.0 | 0.0 | 8.3 | 0.0 | 0.0 | 0 | 0.0 |
| **Chifra** | Gariro (CH3W) | 18 | 94.4 | 27.8 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0.0 |
| | Mosquit (CH4W) | 27 | 96.3 | 3.7 | 3.7 | 3.7 | 3.7 | 3.7 | 0.0 | 0 | 0.0 |
| | Chifra control village | 8 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0.0 |
| **Ewa** | Ewa | 30 | 93.3 | 0.0 | 3.3 | 0.0 | 3.3 | 13.3 | 6.7 | 0 | 23.3 |
| | Ewa control village | 3 | 66.7 | 33.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0.0 |
| **Gulina** | Admalif (GU2W) | 2 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0.0 |
| **Teru** | Gadoweitu (TE1W) | 2 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0.0 |
| | Teru control village | 4 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 25.0 | 0 | 0.0 |
| **Yallo** | Elei El Golo (YA1W) | 3 | 100.0 | 66.7 | 0.0 | 33.3 | 0.0 | 0.0 | 0.0 | 0 | 0.0 |
| | Muhur Golo (YA2W) | 1 | 100.0 | 100.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0.0 |

*surveyed sites with no agricultural activity have been excluded from this table for reasons of brevity

Table 61: Mean, minimum and maximum crop area per household per woreda (differentiated by sex of household head)

| woreda | sex of HH head | N | Farm HHs within gender group (%) | Crop area | | |
|---|---|---|---|---|---|---|
| | | | | mean (ha) | min (ha) | max (ha) |
| **Awra** | female | 29 | 20.69 | 0.75 | 0.5 | 1 |
| | male | 65 | 32.31 | 0.77 | 0.25 | 2 |
| | both | 94 | 28.72 | 0.77 | 0.25 | 2 |
| **Chifra** | female | 23 | 34.78 | 0.94 | 0.5 | 3 |
| | male | 79 | 56.96 | 0.91 | 0.5 | 4 |
| | both | 102 | 51.96 | 0.91 | 0.5 | 4 |
| **Ewa** | female | 27 | 22.22 | 0.83 | 0.5 | 1 |
| | male | 53 | 50.94 | 1.01 | 0.25 | 3 |
| | both | 80 | 41.25 | 0.98 | 0.25 | 3 |
| **Gulina** | female | 29 | 0 | - | - | - |
| | male | 73 | 2.74 | 0.38 | 0.25 | 0.5 |
| | both | 102 | 1.96 | 0.38 | 0.25 | 0.5 |
| **Kori** | female | 25 | 0 | - | - | - |
| | male | 54 | 0 | - | - | - |
| | both | 79 | 0 | - | - | - |
| **Mille** | female | 22 | 0 | - | - | - |
| | male | 44 | 0 | - | - | - |
| | both | 66 | 0 | - | - | - |
| **Teru** | female | 27 | 3.7 | 0.5 | 0.5 | 0.5 |
| | male | 59 | 8.47 | 0.45 | 0.25 | 0.5 |
| | both | 86 | 6.98 | 0.46 | 0.25 | 0.5 |
| **Yallo** | female | 31 | 0 | - | - | - |
| | male | 69 | 5.8 | 0.95 | 0.8 | 1 |
| | both | 100 | 4 | 0.95 | 0.8 | 1 |
| **total** | female | 213 | 9.86 | 0.83 | 0.5 | 3 |
| | male | 496 | 20.97 | 0.87 | 0.25 | 4 |
| | both | 709 | 17.63 | 0.87 | 0.25 | 4 |

Table 62: Mean, minimum and maximum crop area per household per site (differentiated by sex of household head)

| woreda | kebele | site* | sex of HH head | N | Farm HHs within gender group | Crop area | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | mean | min | max |
| | | | | | (%) | (ha) | (ha) | (ha) |
| **Awra** | Lakora | Lekora (AW2W) | female | 13 | 30.77 | 0.75 | 0.5 | 1 |
| | | | male | 26 | 42.31 | 0.95 | 0.25 | 2 |
| | | | both | 39 | 38.46 | 0.9 | 0.25 | 2 |
| | Hida | Awra control village | female | 4 | 50 | 0.75 | 0.5 | 1 |
| | | | male | 16 | 62.5 | 0.57 | 0.25 | 1 |
| | | | both | 20 | 60 | 0.6 | 0.25 | 1 |
| **Chifra** | Geriro | Gariro (CH3W) | female | 8 | 25 | 2 | 1 | 3 |
| | | | male | 31 | 51.61 | 1.03 | 0.5 | 2 |
| | | | both | 39 | 46.15 | 1.15 | 0.5 | 3 |
| | Mesgid | Mosquit (CH4W) | female | 10 | 40 | 0.62 | 0.5 | 1 |
| | | | male | 33 | 69.7 | 0.86 | 0.5 | 4 |
| | | | both | 43 | 62.79 | 0.82 | 0.5 | 4 |
| | Tegri | Chifra control village | female | 5 | 40 | 0.5 | 0.5 | 0.5 |
| | | | male | 15 | 40 | 0.75 | 0.5 | 1 |
| | | | both | 20 | 40 | 0.69 | 0.5 | 1 |
| **Ewa** | 1st Badule | Ewa | female | 16 | 37.5 | 0.83 | 0.5 | 1 |
| | | | male | 39 | 61.54 | 1.01 | 0.25 | 3 |
| | | | both | 55 | 54.55 | 0.97 | 0.25 | 3 |
| | Bolotoma | Ewa control village | female | 11 | 0 | - | - | - |
| | | | male | 14 | 21.43 | 1 | 1 | 1 |
| | | | both | 25 | 12 | 1 | 1 | 1 |
| **Gulina** | Mulina Asa'ala | Admalif (GU2W) | female | 8 | 0 | - | - | - |
| | | | male | 31 | 6.45 | 0.38 | 0.25 | 0.5 |
| | | | both | 39 | 5.13 | 0.38 | 0.25 | 0.5 |
| **Teru** | Debaho | Gadoweitu (TE1W) | female | 14 | 0 | - | - | - |
| | | | male | 27 | 7.41 | 0.5 | 0.5 | 0.5 |
| | | | both | 41 | 4.88 | 0.5 | 0.5 | 0.5 |
| | Digdigsala | Teru control village | female | 8 | 12.5 | 0.5 | 0.5 | 0.5 |
| | | | male | 13 | 23.08 | 0.42 | 0.25 | 0.5 |
| | | | both | 21 | 19.05 | 0.44 | 0.25 | 0.5 |

| | | | | | | Crop area | | |
|---|---|---|---|---|---|---|---|---|
| woreda | kebele | site* | sex of HH head | N | Farm HHs within gender group (%) | mean (ha) | min (ha) | max (ha) |
| **Yallo** | Koli na Gaboli | Elei El Golo (YA1W) | female | 9 | 0 | - | - | - |
| | | | male | 32 | 9.38 | 1 | 1 | 1 |
| | | | both | 41 | 7.32 | 1 | 1 | 1 |
| | Walae' | Muhur Golo (YA2W) | female | 15 | 0 | - | - | - |
| | | | male | 24 | 4.17 | 0.8 | 0.8 | 0.8 |
| | | | both | 39 | 2.56 | 0.8 | 0.8 | 0.8 |

*surveyed sites with no agricultural activity have been excluded from this table for reasons of brevity

Table 63: Percentage of households using different irrigation methods per woreda

| | | Percentage of households using different irrigation methods | | |
|---|---|---|---|---|
| | | Gravity irrigation | Pump irrigation | rainfed |
| woreda | N | (%) | (%) | |
| Awra | 27 | 96.3 | 0 | 3.7 |
| Chifra | 53 | 69.8 | 0 | 30.2 |
| Ewa | 33 | 87.9 | 3 | 9.1 |
| Gulina | 2 | 50 | 0 | 50 |
| Kori | 0 | - | - | |
| Mille | 0 | - | - | |
| Teru | 6 | 50 | 33.3 | 16.7 |
| Yallo | 4 | 0 | 0 | 100 |
| total | 125 | 76.8 | 2.4 | 20.8 |

Table 64: Percentage of households using different irrigation methods per site

| | | | | Percentage of households using different irrigation methods | | |
|---|---|---|---|---|---|---|
| | | | | Gravity irrigation | Pump irrigation | rainfed |
| woreda | kebele | site* | N | (%) | (%) | |
| **Awra** | Lakora | Lekora (AW2W) | 15 | 93.3 | 0 | 6.7 |
| | Hida | Awra control village | 12 | 100 | 0 | 0 |
| **Chifra** | Geriro | Gariro (CH3W) | 18 | 38.9 | 0 | 61.1 |
| | Mesgid | Mosquit (CH4W) | 27 | 96.3 | 0 | 3.7 |
| | Tegri | Chifra control village | 8 | 50 | 0 | 50 |
| **Ewa** | 1st Badule | Ewa | 30 | 96.7 | 3.3 | 0 |
| | Bolotoma | Ewa control village | 3 | 0 | 0 | 100 |
| **Gulina** | Mulina Asa'ala | Admalif (GU2W) | 2 | 50 | 0 | 50 |
| **Teru** | Debaho | Gadoweitu (TE1W) | 2 | 50 | 0 | 50 |
| | Digdigsala | Teru control village | 4 | 50 | 50 | 0 |
| **Yallo** | Koli na Gaboli | Elei El Golo (YA1W) | 3 | 0 | 0 | 100 |
| | Walae' | Muhur Golo (YA2W) | 1 | 0 | 0 | 100 |

*surveyed sites with no agricultural activity have been excluded from this table for reasons of brevity

Table 65: Percentage of households using different types of fertilizer per woreda

| | | **Percentage of households using different types of fertilizer** | | | |
|---|---|---|---|---|---|
| | | Animal manure | Mineral fertilizer | Other | Nothing |
| woreda | N | (%) | (%) | (%) | (%) |
| Awra | 27 | 14.8 | 0 | 0 | 85.2 |
| Chifra | 51 | 13.7 | 0 | 3.9 | 82.4 |
| Ewa | 33 | 12.1 | 0 | 0 | 81.8 |
| Gulina | 2 | 0 | 0 | 0 | 100 |
| Kori | 0 | - | - | | |
| Mille | 0 | - | - | | |
| Teru | 6 | 0 | 0 | 0 | 100 |
| Yallo | 4 | 0 | 0 | 0 | 100 |
| total | 123 | 12.2 | 0 | 1.6 | 84.6 |

Table 66: Sources of cereal seeds per woreda

| | | **Percentage of households receiving cereal seeds from different sources** | | | | |
|---|---|---|---|---|---|---|
| | | friends/ relatives | nursery | own production | purchased | other sources |
| woreda | N | (%) | (%) | (%) | (%) | (%) |
| Awra | 12 | 16.7 | 0.0 | 33.3 | 58.3 | 41.7 |
| Chifra | 47 | 0.0 | 14.9 | 23.4 | 83.0 | 0.0 |
| Ewa | 20 | 0.0 | 30.0 | 20.0 | 60.0 | 20.0 |
| total | 79 | 2.5 | 16.5 | 24.1 | 73.4 | 11.4 |

Table 67: Sources of vegetable seeds per woreda

| | | **Percentage of households receiving vegetable seeds from different sources** | | | | |
|---|---|---|---|---|---|---|
| | N | friends/ relatives | nursery | own production | purchased | other source |
| woreda | | (%) | (%) | (%) | (%) | (%) |
| Ewa | 11 | 18.2 | 45.5 | 0 | 45.5 | 9.1 |
| total | 11 | 18.2 | 45.5 | 0 | 45.5 | 9.1 |

Table 68: Sources of fodder grass seeds per woreda

| | | **Percentage of households receiving fodder grass seeds from different sources** | | | | |
|---|---|---|---|---|---|---|
| woreda | N | friends/ relatives | nursery | own production | purchased | other source |
| | | (%) | (%) | (%) | (%) | (%) |
| Chifra | 1 | 0 | 0.0 | 0 | 100.0 | 0.0 |
| Ewa | 2 | 0 | 100.0 | 0 | 0.0 | 50.0 |
| total | 3 | 0 | 66.7 | 0 | 33.3 | 33.3 |

Table 69: SWC measures applied to protect cropland from soil erosion per woreda

| | | **SWC measures applied to protect cropland from soil erosion** | | | | |
|---|---|---|---|---|---|---|
| woreda | N | stone bunds (%) | soil bunds (%) | half-moons (%) | other (%) | nothing (%) |
| Awra | 27 | 22.2 | 63 | 0 | 0 | 11.1 |
| Chifra | 53 | 24.5 | 56.6 | 1.9 | 0 | 30.2 |
| Ewa | 33 | 36.4 | 45.5 | 3 | 3 | 33.3 |
| Gulina | 2 | 0 | 50 | 0 | 0 | 50 |
| Kori | 0 | - | - | - | - | - |
| Mille | 0 | - | - | - | - | - |
| Teru | 6 | 0 | 66.7 | 0 | 0 | 33.3 |
| Yallo | 4 | 50 | 25 | 0 | 0 | 50 |
| total | 125 | 26.4 | 54.4 | 1.6 | 0.8 | 28 |

Table 70: Average yields of principal crops per woreda

| | maize | | teff | | sorghum | | sesame | | onion | |
|---|---|---|---|---|---|---|---|---|---|---|
| woreda | N | (kg/ha) | N | (kg/ha) | N | (kg/ha) | N | (kg/ha) | N | (kg/ha) |
| Awra | 27 | 976.2 | 0 | - | 0 | - | 2 | 400 | 1 | 1600.0 |
| Chifra | 51 | 468.8 | 6 | 10.6 | 1 | 625.0 | 1 | 64 | 1 | 200.0 |
| Ewa | 30 | 400.1 | 1 | 0.0 | 1 | 500.0 | 0 | - | 4 | 112.5 |
| Gulina | 2 | 933.3 | 0 | - | 0 | - | 0 | - | 0 | - |
| Kori | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - |
| Mille | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - |
| Teru | 6 | 85.7 | 0 | - | 0 | - | 0 | - | 0 | - |
| Yallo | 4 | 694.4 | 3 | 552.6 | 0 | - | 1 | - | 0 | - |
| total | 120 | 556.0 | 10 | 334.1 | 2 | 583.3 | 4 | 365 | 6 | 200.0 |

Table 71: Average yields of principal crops per site

| | | | maize | | teff | | sorghum | | sesame | | onion | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| woreda | kebele | site | N | (kg/ha) | N | (kg/ha) | N | (kg/ha) | N | (kg/ha) | N | (kg/ha) |
| **Awra** | Lakora | Lekora (AW2W) | 15 | 666.7 | 0 | | 0 | - | 2 | 400 | 1 | 1600 |
| | Finto na Asala | Finto (AW8W) | 0 | - | 0 | | 0 | - | 0 | - | 0 | - |
| | Hida | Awra control village | 12 | 1527.3 | 0 | | 0 | - | 0 | - | 0 | - |
| **Chifra** | Geriro | Gariro (CH3W) | 17 | 325.6 | 5 | 275 | 0 | - | 0 | - | 0 | - |
| | Mesgid | Mosquit (CH4W) | 26 | 572.2 | 1 | - | 1 | 625 | 1 | 64 | 1 | 200 |
| | Tegri | Chifra control village | 8 | 382.7 | 0 | - | 0 | - | 0 | - | 0 | - |
| **Ewa** | 1st Badule | Ewa | 28 | 412.8 | 0 | - | 1 | 500 | 0 | - | 4 | 112.5 |
| | Bolotoma | Ewa control village | 2 | 175 | 1 | 0 | 0 | - | 0 | - | 0 | - |
| **Gulina** | Kelwan | Tabiadora (GU1W) | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - |
| | Mulina Asa'ala | Admalif (GU2W) | 2 | 933.3 | 0 | - | 0 | - | 0 | - | 0 | - |
| | Wanasa & Harigerbo | Bakaru (GU4W) | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - |
| | Galikoma | Gulina control village | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - |
| **Kori** | Guyah & Ella | Kori control village | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - |
| | Musle | Kori | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - |
| **Mille** | Gasiyo na la'as | Mille | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - |
| | Harsis | Mille control village | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - |
| **Teru** | Debaho | Gadoweitu (TE1W) | 2 | 0 | 0 | - | 0 | - | 0 | - | 0 | - |
| | Digdigsala | Adgola (TE2W) | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - |
| | Digdigsala | Teru control village | 4 | 100 | 0 | - | 0 | - | 0 | - | 0 | - |
| **Yallo** | Koli na Gaboli | Elei El Golo (YA1W) | 3 | 825 | 2 | 666.7 | 0 | - | 1 | - | 0 | - |
| | Walae' | Muhur Golo (YA2W) | 1 | 375 | 1 | 125 | 0 | - | 0 | - | 0 | - |
| | Uddayile | Yallo control village | 0 | - | 0 | - | 0 | - | 0 | - | 0 | - |

Table 72: Percentage of maize harvest used for different purposes per woreda

| | | | Percentage of harvest sold for different purposes | | | | |
|---|---|---|---|---|---|---|---|
| | | average amount harvested per household | post-harvest loss | sold | animal fodder | HH consumption | gift |
| woreda | N | kg | (%) | (%) | (%) | (%) | (%) |
| Awra | 27 | 994.2 | 5.8 | 12.4 | 6.6 | 75.1 | 10.6 |
| Chifra | 51 | 516.1 | 9.3 | 3.3 | 13.0 | 66.0 | 9.9 |
| Ewa | 30 | 530.2 | 5.9 | 0.7 | 7.8 | 71.1 | 17.9 |
| Gulina | 2 | 350.0 | 14.3 | 0.0 | 0.0 | 85.7 | 0.0 |
| Kori | 0 | - | - | - | - | - | - |
| Mille | 0 | - | - | - | - | - | - |
| Teru | 6 | 100.0 | 0.0 | 0.0 | 0.0 | 100.0 | 0.0 |
| Yallo | 4 | 416.7 | 0.0 | 0.0 | 0.0 | 92.0 | 8.0 |
| total | 120 | 618.6 | 7.0 | 6.1 | 8.8 | 71.6 | 11.9 |

Table 73: Percentage of maize harvest used for different purposes per site

| | | | | | Percentage of harvest used for different purposes | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | average amount harvested per HH | post-harvest loss | sold | animal fodder | HH consumption | gift |
| woreda | kebele | site | N | (kg) | (%) | (%) | (%) | (%) | (%) |
| **Awra** | Lakora | Lekora (AW2W) | 15 | 766.7 | 1.7 | 8.7 | 5.2 | 78.4 | 7.8 |
| | Finto na Asala | Finto (AW8W) | 0 | - | - | - | - | - | - |
| | Hida | Awra control village | 12 | 1304.5 | 9.1 | 15.3 | 7.7 | 72.5 | 12.9 |
| **Chifra** | Geriro | Gariro (CH3W) | 17 | 372.1 | 11.9 | 1.9 | 6.0 | 65.3 | 7.7 |
| | Mesgid | Mosquit (CH4W) | 26 | 594.2 | 9.7 | 1.6 | 15.1 | 66.6 | 11.7 |
| | Tegri | Chifra control village | 8 | 512.5 | 0.0 | 19.5 | 14.6 | 63.4 | 2.4 |
| **Ewa** | 1st Badule | Ewa | 28 | 556.5 | 6.0 | 0.7 | 8.0 | 70.4 | 18.3 |
| | Bolotoma | Ewa control village | 2 | 175.0 | 0.0 | 0.0 | 0.0 | 100.0 | 0.0 |
| **Gulina** | Kelwan | Tabiadora (GU1W) | 0 | - | - | - | - | - | - |
| | Mulina Asa'ala | Admalif (GU2W) | 2 | 350.0 | 14.3 | 0.0 | 0.0 | 85.7 | 0.0 |
| | Wanasa & Harigerbo | Bakaru (GU4W) | 0 | - | - | - | - | - | - |
| | Galikoma | Gulina control village | 0 | - | - | - | - | - | - |
| **Kori** | Guyah & Ella | Kori control village | 0 | - | - | - | - | - | - |
| | Musle | Kori | 0 | - | - | - | - | - | - |
| **Mille** | Gasiyo na la'as | Mille | 0 | - | - | - | - | - | - |
| | Harsis | Mille control village | 0 | - | - | - | - | - | - |
| **Teru** | Debaho | Gadoweitu (TE1W) | 2 | - | - | - | - | - | - |
| | Digdigsala | Adgola (TE2W) | 0 | - | - | - | - | - | - |
| | Digdigsala | Teru control village | 4 | 100.0 | 0.0 | 0.0 | 0.0 | 100.0 | 0.0 |
| **Yallo** | Koli na Gaboli | Elei El Golo (YA1W) | 3 | 550.0 | 0.0 | 0.0 | 0.0 | 90.9 | 9.1 |
| | Walae' | Muhur Golo (YA2W) | 1 | 150.0 | 0.0 | 0.0 | 0.0 | 100.0 | 0.0 |
| | Uddayile | Yallo control village | 0 | - | - | - | - | - | - |

Table 74: Percentage of households who have planted different types of trees in the past three years per woreda

| | | Households that have planted trees | | Types of trees grown | | |
|---|---|---|---|---|---|---|
| | | | | fruit trees | fodder trees | other trees |
| woreda | N | (%) | N | (%) | (%) | (%) |
| Awra | 94 | 2.1 | 2 | 0.0 | 0.0 | 100.0 |
| Chifra | 102 | 40.2 | 41 | 7.3 | 34.1 | 53.7 |
| Ewa | 80 | 22.5 | 18 | 66.7 | 16.7 | 33.3 |
| Gulina | 102 | 6.9 | 7 | 0.0 | 0.0 | 100.0 |
| Kori | 79 | 0.0 | | | | |
| Mille | 66 | 0.0 | | | | |
| Teru | 86 | 2.3 | 2 | 100.0 | 0.0 | 0.0 |
| Yallo | 100 | 5.0 | 5 | 40.0 | 0.0 | 80.0 |
| total | 709 | 10.6 | 80 | 23.8 | 21.2 | 51.2 |

Table 75: Sources of tree seedlings per woreda

| | | **Sources of tree seedlings** | | | | |
|---|---|---|---|---|---|---|
| woreda | N | government nursery (%) | community nursery (%) | relatives/ friends (%) | own collection (%) | other (%) |
| Awra | 2 | 100 | 0 | 0 | 0 | 0 |
| Chifra | 41 | 70.7 | 2.4 | 14.6 | 9.8 | 0 |
| Ewa | 18 | 44.4 | 0 | 16.7 | 5.6 | 27.8 |
| Gulina | 7 | 28.6 | 0 | 28.6 | 42.9 | 0 |
| Kori | 0 | - | - | - | - | - |
| Mille | 0 | - | - | - | - | - |
| Teru | 2 | 50 | 50 | 0 | 0 | 0 |
| Yallo | 5 | 60 | 0 | 0 | 0 | 40 |
| total | 80 | 56.2 | 2.5 | 13.8 | 10 | 8.8 |

## Annex V.VIII Nutritional Status and Food Security

Table 76: Percentage of households who reported to have suffered from severe food shortages in the last three years per woreda

| | | **Percentage of HHs who have suffered from food shortages in the past three years** |
|---|---|---|
| woreda | N | (%) |
| Awra | 94 | 76.6 |
| Chifra | 102 | 57.8 |
| Ewa | 80 | 43.8 |
| Gulina | 102 | 90.2 |
| Kori | 79 | 91.1 |
| Mille | 66 | 84.8 |
| Teru | 86 | 90.7 |
| Yallo | 100 | 92.0 |
| total | 709 | 78.4 |

Table 77: Types of food consumed in the last 24 hours per woreda

| | | **Food consumed in the last 24 hours** | | | | | | |
|---|---|---|---|---|---|---|---|---|
| woreda | N | milk (%) | cereals (%) | meat (%) | fish (%) | vegetables (%) | fruits (%) | pulses (%) |
| Awra | 94 | 47.9 | 98.9 | 2.1 | 0 | 0 | 0 | 0 |
| Chifra | 102 | 35.3 | 96.1 | 1 | 0 | 7.8 | 0 | 17.6 |
| Ewa | 80 | 47.5 | 95 | 3.8 | 0 | 3.8 | 2.5 | 0 |
| Gulina | 102 | 29.4 | 100 | 0 | 0 | 1 | 0 | 0 |
| Kori | 79 | 19 | 98.7 | 1.3 | 0 | 2.5 | 0 | 41.8 |
| Mille | 66 | 25.8 | 98.5 | 1.5 | 18.2 | 1.5 | 0 | 80.3 |
| Teru | 86 | 25.6 | 98.8 | 1.2 | 0 | 5.8 | 0 | 61.6 |
| Yallo | 100 | 28 | 100 | 0 | 0 | 8 | 0 | 41 |
| total | 709 | 32.6 | 98.3 | 1.3 | 1.7 | 3.9 | 0.3 | 27.9 |

Table 78: Perception of current food quality per woreda

| | | **Perception of current food quality** | | |
|---|---|---|---|---|
| | | good | average | poor |
| woreda | N | (%) | (%) | (%) |
| Awra | 94 | 0.0 | 21.3 | 78.7 |
| Chifra | 102 | 2.9 | 25.5 | 71.6 |
| Ewa | 80 | 1.3 | 22.5 | 76.3 |
| Gulina | 102 | 0.0 | 4.9 | 95.1 |
| Kori | 79 | 3.8 | 6.3 | 89.9 |
| Mille | 66 | 0.0 | 12.1 | 87.9 |
| Teru | 86 | 0.0 | 4.7 | 94.2 |
| Yallo | 100 | 0.0 | 0.0 | 100.0 |
| total | 709 | 1.0 | 12.1 | 86.7 |

Table 79: Perception of current food quantity per woreda

| | | **Perception of current food quantity** | | |
|---|---|---|---|---|
| | | good | average | poor |
| woreda | N | (%) | (%) | (%) |
| Awra | 94 | 0.0 | 26.6 | 73.4 |
| Chifra | 102 | 2.0 | 29.4 | 68.6 |
| Ewa | 80 | 1.3 | 26.3 | 72.5 |
| Gulina | 102 | 0.0 | 11.8 | 88.2 |
| Kori | 79 | 2.5 | 22.8 | 74.7 |
| Mille | 66 | 0.0 | 13.6 | 86.4 |
| Teru | 86 | 0.0 | 18.6 | 80.2 |
| Yallo | 100 | 0.0 | 11.0 | 89.0 |
| total | 709 | 0.7 | 20.0 | 79.1 |

Table 80: Sources of food consumed per woreda

| | | | **Sources of food consumed** | | | | |
|---|---|---|---|---|---|---|---|
| woreda | type of food | N | own production (%) | purchased (%) | gifts (%) | food aid (%) | borrowed (%) |
| **Awra** | cereals | 93 | 7.5 | 100.0 | 2.2 | 20.4 | - |
| | meat | 2 | 50.0 | 50.0 | - | - | - |
| | milk | 45 | 100.0 | - | - | - | - |
| **Chifra** | cereals | 98 | 21.4 | 95.9 | - | 15.3 | - |
| | milk | 36 | 88.9 | 2.8 | - | 2.8 | - |
| | pulses | 18 | - | 100.0 | - | - | - |
| | vegetables | 8 | 25.0 | 100.0 | - | - | - |
| **Ewa** | cereals | 76 | 14.5 | 88.2 | - | 7.9 | 1.3 |
| | fruits | 2 | 50.0 | - | - | - | - |
| | milk | 38 | 89.5 | 10.5 | - | - | - |
| | vegetables | 3 | - | 66.7 | - | - | - |
| **Gulina** | cereals | 102 | 1.0 | 98.0 | 1.0 | 41.2 | 1.0 |
| | milk | 30 | 96.7 | 3.3 | - | - | - |
| | vegetables | 1 | - | 200.0 | - | - | - |
| **Kori** | cereals | 78 | - | 96.2 | 12.8 | 80.8 | - |
| | meat | 1 | 100.0 | - | - | - | - |
| | milk | 15 | 100.0 | 6.7 | - | - | - |
| | pulses | 33 | - | 100.0 | 24.2 | - | - |
| | vegetables | 2 | - | 100.0 | - | - | - |
| **Mille** | cereals | 65 | - | 98.5 | - | 46.2 | - |
| | fish | 12 | 75.0 | 25.0 | - | - | - |
| | meat | 1 | - | 100.0 | - | - | - |
| | milk | 17 | 94.1 | 5.9 | - | - | - |
| | pulses | 53 | - | 98.1 | 1.9 | - | - |
| | vegetables | 1 | - | 100.0 | - | - | - |
| **Teru** | cereals | 85 | - | 98.8 | 2.4 | 64.7 | - |
| | meat | 1 | 100.0 | 100.0 | - | - | - |
| | milk | 22 | 95.5 | - | - | - | - |
| | pulses | 53 | - | 98.1 | 3.8 | 3.8 | - |
| | vegetables | 5 | - | 100.0 | - | - | - |
| **Yallo** | cereals | 100 | 1.0 | 100.0 | 3.0 | 67.0 | - |
| | milk | 28 | 96.4 | - | - | - | - |
| | pulses | 41 | - | 90.2 | 2.4 | 2.4 | - |
| | vegetables | 8 | - | 100.0 | - | - | - |

## Annex V.IX Local Perceptions of External Interventions in NRM

Table 81: Percentage of households that are part of a credit group, cooperative or other type of group per woreda

| | | | **Membership in credit group, cooperative or other type of group** | | |
|---|---|---|---|---|---|
| | | | credit group | cooperative | other type of group |
| woreda | sex of HH head | N | (%) | (%) | (%) |
| **Awra** | female | 29 | 0.0 | 0.0 | 0.0 |
| | male | 65 | 0.0 | 1.5 | 0.0 |
| **Chifra** | female | 23 | 8.7 | 13.0 | 0.0 |
| | male | 79 | 13.9 | 10.1 | 2.5 |
| **Ewa** | female | 27 | 7.4 | 7.4 | 3.7 |
| | male | 53 | 3.8 | 7.5 | 1.9 |
| **Gulina** | female | 29 | 0.0 | 0.0 | 0.0 |
| | male | 73 | 0.0 | 1.4 | 0.0 |
| **Kori** | female | 25 | 0.0 | 12.0 | 0.0 |
| | male | 54 | 0.0 | 5.6 | 0.0 |
| **Mille** | female | 22 | 0.0 | 27.3 | 0.0 |
| | male | 44 | 0.0 | 27.3 | 4.5 |
| **Teru** | female | 27 | 0.0 | 0.0 | 0.0 |
| | male | 59 | 0.0 | 0.0 | 0.0 |
| **Yallo** | female | 31 | 3.2 | 0.0 | 0.0 |
| | male | 69 | 0.0 | 1.4 | 0.0 |
| **total** | female | 213 | 2.3 | 6.6 | 0.5 |
| | male | 496 | 2.6 | 6.0 | 1.0 |