IVM Institute for Environmental Studies

Report on general characteristics of the Borana zone, Ethiopia

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1 Introduction

This report combines the general information that was gathered in the context of the ADAPTS project for the case study in Borana, Ethiopia. ADAPTS is a project that aims at: "*increasing developing countries' adaptive capacities by achieving the inclusion of climate change and adaptation considerations in water policies, local planning and investment decisions* ". ADAPTS sets out to show that adaptation is already taking place at the local scale, and to provide practical experiences and lessons from various contexts that can feed into policy dialogues on climate-proofing water management from the local to the (inter)national level. The project is implemented by a group consisting of NGOs, private companies, Universities and government institutions.

This report provides an overview of the main characteristics of the area, from a physical, social, economic and governance perspective, and makes the information available that was gathered during field visits and literature reviews and is meant to serve as a background document. It is based on activities carried out under activity 2.1 (Lasage et al, 2009).

Chapter 2 gives a first impression of the region. In chapter 3 the climate, geology and hydrology are touched upon. Chapter 4 describes the traditional way of governing the resources in the Borana zone and the socio-economic characteristics. In chapter 5 the institutional setting of water and natural resource management is explained.

2 General characteristics

The Borana zone is one of 13 administrative zones within Ethiopia's Oromia state. It is located in the Southern part of the state (between 3°36 – 6°38'North latitude and 3°43'- 39°30' East longitude) and borders Kenya. Yabello is the capital town of the Borana zone and lies 570 km south of Addis Ababa. The zone covers 48,360 km^2 of which 75% consists of lowland, The zone frequently is exposed to droughts. The zone consists of eight districts covering 275 "Gendas" (the lowest administrative unit). There are 19 urban centres, of which 10 have town administration. The zone is inhabited by almost 1 million people (CSA, 2008).

The Borana rangelands cover about 1.9 million ha (. The region has a semi-arid savannah landscape, marked by gently sloping lowlands and flood plains vegetated predominantly with grass and bush land. The geology is composed of a crystalline basement with overlying sedimentary and volcanic deposits. People are predominantly involved in small-scale subsistence agriculture production and mainly on livestock husbandry.

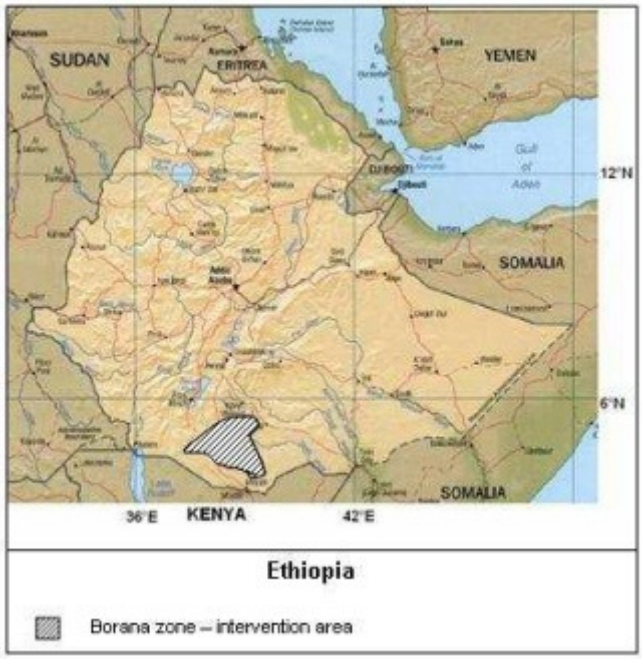

Figure 2.1 Location of case study area.

There are no perennial rivers and rainfall varies highly, both spatially and temporally. Rural communities in Borana have insufficient access to clean drinking water. They are largely dependent on open water sources of unreliable quality due to contamination from human or animal excrement and in some places from agriculture. Furthermore, the water sources experience high evaporation rates, frequently drying up early in the dry season. During the last decade numerous wells have been installed by the government and NGOs to improve peoples' access to drinking water. However, in large areas of the Borana Zone overexploitation has led to dropping groundwater levels and wells running dry.

Land degradation is another serious problem in the Borana Zone. Overexploitation of The main drivers of the exploitation of natural resources is one of the main causes, in its turn driven by poverty, rapid population growth, and increasing numbers of

livestock (Census, 2003), livelihood dependency on natural resources, and poor land-use. Agriculture is rain-fed and has a low productivity due to sub-optimal rainfall characteristics. Land degradation and deforestation result in a loss of agricultural productivity through soil deterioration and erosion. Bush encroachment is another problem for the majority of the pasture lands that are used for cattle. Due to the low water availability, low agricultural production, lack of infrastructure and poverty in general, malnutrition is widespread in the Borana Zone.

3 Physical characteristics

3.1 Current climate

Drought is a common phenomenon in many parts of Borana. The lowland parts are severely affected by recurrent droughts. The rainfall pattern is highly erratic according to the people living in the area, and the rains often do not occur at the expected time. Sometimes the intensity of rainfall is above normal and sometimes it is far below normal. This information was shared during several field interviews with local inhabitants. The monthly average figures for rainfall and temperature of the area are indicated in table 2.1 below. The data are taken from the National Meteorological Organization for stations found in different representative areas within Borana and average values are computed from this collected raw data.

Table 3.1 Average monthly rainfall and temperature in Borana.

	Months											
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Average Rainfall (in mm)	21	27	75	155	119	33	23	22	34	99	68	21
Average Maximum Temp. (in ^{0}C)	27.0	27.7	27.2	24.8	23.3	22.2	21.7	22.8	24.4	23.8	24.6	25.7
Average Minimum Temp. (in ^{0}C)	13.0	13.6	14.1	14.3	14.1	13.1	12.5	12.4	13.1	13.6	12.8	8.9

Currently mean annual temperatures lay around 19°C in the Borana zone. In general, the warmest period in the year is from March to May, while the lowest annual minimum temperatures occur between the months of November and January (Federal Democratic Republic of Ethiopia, 2001).

Over the last 50 years the average annual temperature in Ethiopia has risen with 1 degree (figure 3.1). There is no significant trend in precipitation for the country as a whole (Christensen et al., 2007). However, for Southwest Ethiopia the precipitation data from the period 1973-1997 seems to indicate a decrease in average precipitation (Figure 3.2) and an increase in interannual variability. A study by Verdin et al (2005) looked at seasonal trends in rainfall and they found that, nationally, the "Kiremt" rains (from June to September) have been fairly consistent since the 1960s but that the "Belg" rains (from February to May) have been decreasing consistently since 1990s. They argue that the decrease in the "*Belg*" rains may be part of a larger set of climatic changes in the Indian Ocean basin in which anomalies in the southern equatorial Indian Ocean lead to anomalous circulation, resulting in the reduction of rainfall over parts of the Greater Horn.

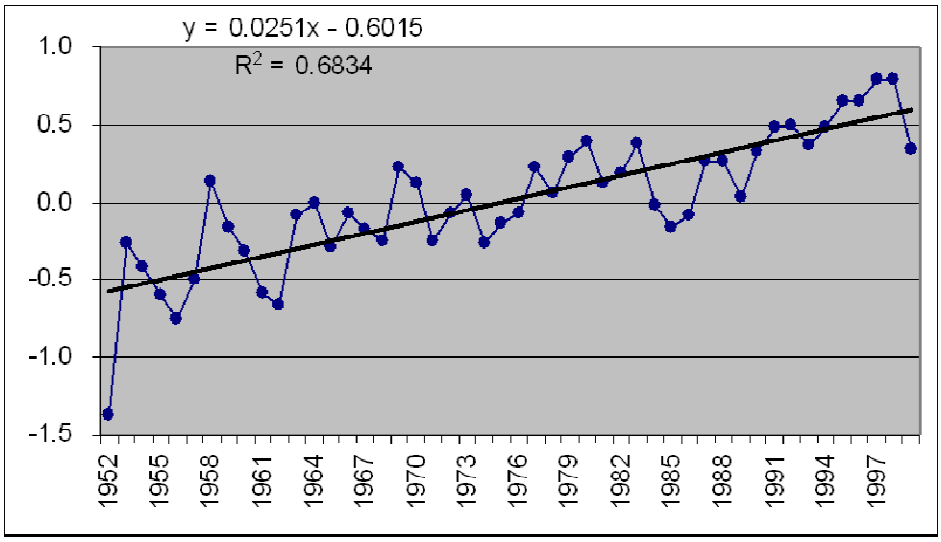

Figure3.1 Historic temperatures in Ethiopia (National Meteorological services Agency Addis Ababa Ethiopia).

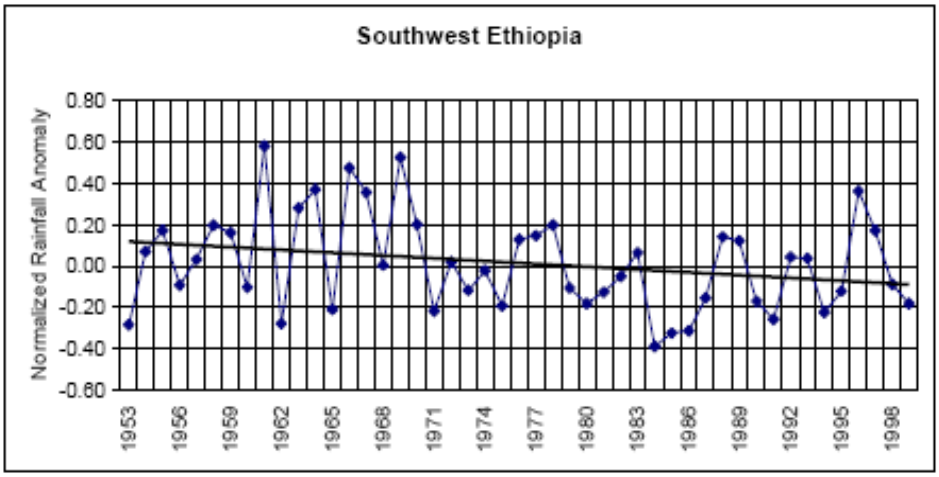

Figure 3.2 Average variability of annual rainfall over Southwest Ethiopia (Source: FDRE, 2001).

Ethiopia experiences three distinct seasons (FDRE, 2001). The dry season (or *bega*) extends from October through January. The *belg* season extends from February to May and represents the main rainy season for pastoral areas in the eastern and southern areas. The *kiremt* season is the main wet season for most parts of the country and extends from June to September. While the *kiremt* rains have been fairly consistent since the 1960s, the *belg* rains have been decreasing consistently since 1990s. In the Borana zone the dry season is named Boona, and the long wet season Gaana (see figure 3.3.

Months	J	F	M	A	M	J	J	A	S	O	N	D
Borana	Boona hagaya (long dry season)		Gaana (long rainy season)			Adolessa (short dry season)			Hagaya (short rainy season)			

Figure 3.3 Names of wet and dry seasons throughout the year in the Borana zone (after Riche et al, 2009).

3.2 Geology and soils

The area comprises two major litho-stratigraphic units ranging in age from Precambrian to Quaternary. Precambrian strata consist of crystalline rocks and associated intrusives, and Tertiary to Quaternary strata consists of volcano-sedimentary rocks, the superficial deposits are all Quaternary.

3.2.1 Precambrian crystalline rocks

The Precambrian crystalline rocks of the area comprise high-grade gneisses, schists, weakly to moderately metamorphosed sedimentary-, basic volcanic- and mafic-ultramafic rocks. The Precambrian crystalline rocks mostly occupy the eastern part, West of the line passing through Soda crater and western flank of Yabelo massif. Exposures are often extensive and continuous in the mountain ranges, blocky and fragmental in the ridges and hills, and patchy and discontinuous in the flat lying areas (Mab consult, 2009).

Banded gneiss and associated undifferentiated schists are the most wide spread crystalline basement rocks in the area. Continuous and extensive outcrop is common in the horsts while in the inselbergs outcrop is mainly discontinuous and patchy. Wide textural variation from massive through weakly foliated to distinctly foliated and from medium grained to coarse-grained variety is common on outcrop scale. Differential weathering gives the rock a typical saw-and-tooth appearance, which is distinct from far distance, and ellipsoidal cavities up to 50 cm deep. In general, the thickness and intensity of these mafic layers decrease towards east. The rock unconformably underlies the Cenozoic volcanic rocks and has concealed contact with other crystalline rocks due to soil cover. Closely spaced vertical and horizontal presumably tensional joints gave the rock (especially the quartzofeldspathic component) a slaby appearance. Moreover, sporadic concordant and/or discordant late stage very coarse grained (≤1cm); pink pegmatite veins ranging in thickness from few tens of millimetres to few meters intrude this unit (Mab consult, 2009).

3.2.2 Cenozoic volcanic rocks

Western part of the area, that is, west of a line passing through Soda crater, Dubuluk village, and western flank of Yabelo massif belongs to the broadly rifted zone of south western Ethiopia and predominantly covered by Cenozoic volcanic rocks. Volcanic rocks in the area are due to both central and fissural eruptions. The former includes large number of volcanic cones and craters producing volcanic rocks mainly consisting of pyroclastic fall deposit and vesicular to scoriaceous basalt, while the latter is represented by widespread bimodal sheet flows. The craters/maars have variable sizes and shapes ranging from few meters to tens of meters in diameter and nearly from circular to overlapping swarm of vents, respectively. Similarly the shape of the volcanic cones (i. e., cinder- and spatter cones) varies from circular to elliptical despite the presence of both breached and intact variety. Commonly their diameter is in the order of few tens of meters and convex-

upward and downward varieties are encountered. It is worth noting most of the aforementioned volcanic vents are situated on and/or near the principal boundary- or subsidiary normal faults.

The Cenozoic volcanic rocks are subdivided into two broad categories based on whether erupted before or after rifting, namely pre rift and post rift volcanics. The pre rift succession is represented by sub-horizontally piled up basaltic and salic (trachyte and trachybasalt) rocks overlying fault bounded tilted blocks. The post rift succession comprises widespread sheet of basaltic flows with variable textural attribute and pyoroclastic deposit.

3.3 Hydrology

The ephemeral drainage system of the Borana zone is located within the Genale-Dawa River basin. Groundwater levels are generally deep (<10m). To extract groundwater, the population of Borana are using traditional deep wells whose water retention potential varies with rainfall, the so-called 'singing wells'. These deep wells of Borana have existed for over 600 years and today they still serve as a crucial resource of the Borana pastoralist production system. Some reach to depths of over 30m below ground level.

Providing water under pastoral circumstances is difficult, primarily because of low population densities, nomadic culture and harsh environmental characteristics. Also, in providing new water sources (boreholes, ponds and cisterns or birka) in these semi-arid areas, there is a risk of the livestock population rising above the (variable) carrying capacity of rangeland, and a potential for aggravating the impact of catastrophic events such as droughts.

In principle access to all traditional watering points is free, and all types of water resources in Borana are the property of the local community.

There are different types of water sources in Borana. This existing water sources can be categorized into two main groups; the traditional types and the modern types.

Traditional water sources

These types include water sources that are identified and developed by the local people using their indigenous knowledge and experience, and include:

i. Traditional Wells or Singing Wells ("Tullas");
ii. Spring Fed Ponds;
iii. Open Surface Ponds ("Harros");
iv. Unprotected Perennial and Seasonal Springs;
v. Scoop Wells on Sandy Rivers;
vi. Shallow Wells ("Addadis").

Figure 3.3 Singing wells in Borana; Entrance road (top left), People lifting water standing on wooden steps and watering livestock with mud troughs (top right), Improved watering troughs and metallic ladder and steps (bottom left and right).

Figure 3.5 People taking water for domestic use and drinking from open surface ponds.

Figure 3.6 Very narrow access road to Dillo water source (top) and scoop wells on sandy seasonal river beds (bottom left and right).

b Modern/Improved water sources

These types of water sources are sometimes modernised with modern technologies designed and implemented by different experts which are not part of the local community. Most of these systems are new for the areas except those which are improvements over existing traditional water sources.

i. Bore Holes with motorized pumps (based on solar energy);

ii. Hand Dug wells with Hand Pumps;

iii. Cisterns with paved and open catchments;

iv. Roof top rain water harvesting systems;

v. Capped Springs with gravity distribution;

vi. Sand Dams;

vii. Rehabilitated and improved traditional water sources.

Figure.3.8 Rain water harvesting cisterns with open ground catchment provided with silt traps (left) and with paved ground catchment (right).

Figure 3.11 Sand dam filled with sand on upstream side (left) and water abstraction well by the side of the dam (right).

At the beginning of 2009 the overall clean water supply coverage in the Borana zone was 50.4%. The rural water supply coverage was 41.8% and the urban coverage was 89.4%. The plan of the Zonal Water Office was to raise the overall zonal water supply coverage to 62% by 2009, by raising the rural and urban water supply coverage to 50.8% and 96% respectively. But the actual achievement at the end of 2008 was 53% for the overall and 46.9% and 90.7% for the rural and urban coverage respectively (Zonal Water Resources Office Report, 2009).

Although a number of water supply schemes are implemented in different parts of Borana, many people and their livestock are still travelling long distances to get water. There is no perennial river flowing across the area and hence the burden on existing water sources is very high. As the people are pastoralists, the livestock ownership per household is high and consequently the daily water demand per capita is also high. This results in using existing water systems beyond the design capacity, causing them to wear down soon and to damage of mechanical parts.

4 Socio-economical characteristics

4.1 Population

The total population of the Borana zona is approximately 1,1 million (Borana zone water resources office, 2003), 84 percent living in rural areas and 16 percent living in urban areas (BZDPPD, 2003).The major ethnic groups are Borana Oromos and Guji Oromos, the former are living in the lowland areas and the latter in the highlands. The smaller ethnic groups in the zone are Gebra, Burji, Geri and others. Most of the inhabitants are followers of "Wakefeta" religion. The people have a dynamic and territorial palatal system called the Gada system. This system regulates social, economic, and political conditions of the people. Households belonging to the same clan or sub-clan are governed by their respective Hayu (headman) that operates under the leadership of Aba Gada (father of Gada). Important issues are discussed during regular village (olas) meetings. Traditionally the people are working in teams in for instance digging of wells, pond construction, closing pastureland, etc. The people also help each other in times of difficulties, like for instance during periods of drought and conflict. This contribution is called "Busa Gonafa".

4.2 Traditional Social Set up and the Geda System in Borana

In Borana the Geda system is the main social structure which is a complex, elaborate and all embracing social institution. This system generally deals with the relations within and between the generations. And more fundamentally, it is about how the Borana should live their lives. The use of existing grazing lands and water resources, and mobility of people and livestock in normal or in periods of disaster is governed by the *Geda* system. It also plays a large role in political affairs and conflict management and resolution. The old traditions of sharing in Borana ("Buusa Gonofa") have a profound impact in making poor households less vulnerable to drought. "Buusa Gonofa" is a social security system whereby people of same clan member contribute in various ways to those highly affected and vulnerable to natural calamities like drought, conflict and disease. The contribution types and rates are determined voluntarily by the contributors but sometimes also decided by the clan leaders or elders. The contribution can consist of for instance animals or fodder. If anybody denies that decision, he will be penalized and the strong social sanction will be applied to him.

The head or the leader of the Geda system is locally known as "Aba Geda". This leader heads all the Borana people which are divided into two major groups, "Saboo" and "Goona". Both are administered by the same Abba Geda and everyone is answerable firstly to his clans and sub-clans. In each of the two mentioned groups many clans locally named "Gossa" are included. There are 17 named clans in total in both major groups (Fasil et al, 2001).

Each Geda has a life span of 8 years and an Aba Geda must hold a general assembly known as "Gummi Gayo" once in his rule time. This meeting is usually held at the fourth year, i.e. midterm, of his leadership period. The main purposes of the meeting are to (Fasil etal, 2001);

- Evaluate the achievements of the Aba Geda and the Councilors.

Resolve different disputes and update existing local laws ("Seera") and cultural things ("Adaa").

"Adaa, Seera and Safuu" are the main traditional tools in the Geda system. "Adaa" is a form of social system by which the Borana people explain various features of the

society in terms of custom. It dictates the giving and receiving of gifts of animals, livestock herding and husbandry practices, access to water and pasture, participation in public events and rituals among others. “Seera” deals with the local traditional laws and “Safuu” deals with taboo and condemned habits.

Under the Aba Geda there are “Hayyuu”s which include “Hayyuu Garbaa” (counselors on rituals) and “Hayyuu Yuuba” (disputers on marriage and social security). Under the Geda Council there are Meda leaders (Meda is equivalent to Peasant or Pastoralist Association (PA) or Kebele), Aba Reera (cluster leaders), Aba Olla (village leaders) and then households. A number of households, on average 25, that are living close to each other and with in the same big compound form an “Olla” or village. And a collection of villages form “Reera” or cluster whose collection again forms Meda.

The Geda system governs the Boran’s use of natural resources and enables the various groups to coordinate their use of important resources like water. The Abbaa Geda is seen as the figurehead of the whole of Boran. As well as performing rituals, matters are referred to him and his council when a decision cannot be reached at a lower level. If there is conflict between ethnic groups, then he will be called upon to help restore peace. As the Abbaa Geda is responsible for dealing with matters of concern to the Boran and as matters of concern are often related to access to the resources (water, land and forests), the Abbaa Geda is the highest level of institution of natural resources management in Borana. The findings of different studies indicate that the *Geda* system in Borana still exists in principle although it is weakening in practice due to the influences of different natural and human impacts.

4.3 Community and Livestock Mobility

Mobility of livestock is the main strategy used by the pastoral community for risk management and efficient and communal utilization of the range resources. The mobility takes two forms in which the first type includes the movement of the satellite herds and locally called “Godaanssa Fooraa” and the second type is moving the herds to other regions, further away from the homestead as “Godaanssa Warraguda”. The second migration takes place during dry years.

4.3.1 Regular Mobility (“Godaanssa Fooraa”)

The most common type of mobility is regular mobility, in which certain family members (adult males, excluding the elderly) move with their livestock from their permanent settlement to other neighbouring communities in search of pasture and water. During the regular mobility, the villagers send a team called “aburu” or scouts, consisting often of men to identify locations suitable for mobility in terms of availability of pasture and water; the carrying capacity of the rangeland with estimations for the duration of stay; absence of livestock diseases in the area; the willingness of the hosting community to share the resources; etc. Based on the feedback of the “aburu”, decisions are made by the local traditional leaders and elders based on the resources (water and pasture) available around villages and the wider region on the direction of mobility and what types of animals and who will move with them. It considers the capacity of the animals to travel the anticipated distance, the available resource at homestead and the milk requirement of the people who remain at the semi-permanent settlement areas. Accordingly milking animals will be distributed between the two places based on the number of people who depend on them and how many milking animals are available.

Most of the time this movement takes place during rainy season to lowland areas where there are no permanent sources of water. During this period, the highlands have

time to grow new pasture. After exploiting the pasture and water in the new area, they either move to other places or go back to permanent water sources. This shows that duration of stay at a given place depends on the length of the rainy season.

4.3.2 Drought Year Mobility ("Godaansa Warraguda")

The second form of mobility is the movement of the family and whole herds that is usually done when there is acute drought when rains fail or conflicts arise. This type of mobility is locally known as "Godaansa Warraguda". It is movement of people and their herds to permanent water sources mainly to the nine traditional wells ("tulla saglan") found in different parts of the Borana area. "Tulla" areas are mostly protected from cultivation (not used for agricultural production), and the pasture is said to be able to accommodate many herds for quite some times without any irreversible environmental impacts, or degradation.

Herd mobility continues as water and grazing cannot be found at a certain place throughout a year. Mobility reduces overgrazing and soil degradation. Another important reason is that animals require changes of places to gain weight, conceive, and grow properly. Movement to lowland areas is important for this purpose. During this mobnility, the people accompanying the herds use the same water as source of drinking water as well as water for the animals.

The first type of mobility (regular mobility) does not as such influence the school attendance of children and participation of women in different socio-economic activities. This is because in this type of mobility usually men, whose age exceeded school age, move with their cattle to areas with good potential of pasture and water whereas women, children and elderly people remain at homestead practicing their regular activities.

The second type of mobility (Drought Year Mobility) has significant influence on the school enrolment of children and women's participation in various activities. This type of mobility enforces all the people irrespective of age and sex to move to new areas away from their original villages. Hence children will move away from schools and women are usually obliged to quit all the socio-economic activities which they used to take part.

The poor quality of drinking water results in serious health problems. Water-related diseases, such as cholera and diarrhoea, are among the major causes of child mortality and morbidity. Child mortality rate for the Borana Zone is 142 per 1000 live births (compared to 18 per 1000 for Europe). Fetching water for household consumption is the responsibility of women and girls wherever the water source is found. The distance to water sources during dry season varies from one area to another in Borana, but is usually within the range 10 to 20km and is travelled on foot. The other main problem is the insufficient water yield of the sources during dry periods, which makes the people to spend a long time around the water sources in addition to the long distance they have to travel.

Children in the Borana Zone have the lowest school enrolment rate in the country. Women and children are burdened with many responsibilities, such as fetching water, constructing traditional houses, gathering firewood, acquiring and preparing food, cleaning and child care. With water and firewood growing increasingly scarce, journeys to collect these become longer. Little time remains for additional activities which may produce some income and, importantly, enable education.

The enrolment of students in higher grades i.e. above grade 8 is small as compared to the enrolment in lower grades. This might be an indication that either since recently

more children start to go to school or that the dropout rate of students at higher grades is very high. The distribution of preparatory schools (grade 11-12) is very limited in the area. It can be seen in Annex I that only 5 districts of the existing 13 districts have preparatory schools.

4.4 Economic situation

The urban population is involved in private business, government employment or farming The agricultural sector is very important in the rural areas of the Borona zone. In the highlands people predominantly grow (cash) crops with some livestock for additional income. The people in the lowlands keep livestock as major economic activity, based on traditional pastoralist systems. The pastoralist grow some crops for own use in the valleys. These activities are stressed by factors like drought, pests, diseases, access to improved crops and livestock varieties, market access, etc. (BZDPPD, 2003). The Borana pastoral production was considered as one of the few remaining productive pastoral systems in East Africa until the early 1980s. Since then there has been evidence that the system is experiencing a decline in productivity, associated with periodic losses in cattle populations. Changes in land use and suppression of fire, which has been restricted since the 1980s by national policy, have resulted in the proliferation of bush encroachment and a general decline in fodder production. The creation of regional administrative boundaries has greatly reduced access to communal resources (Angassa and Oba, 2008).

The rural people are very vulnerable to droughts, such as the events in 2000 and spring 2008 show. During the drought of 2000 80% of livestock died and in 2008 a relief programme was executed supplying water and fodder to the communities. (BZDPPD, 2003). In Ethiopia there is a correlation between GDP growth and the amount of rain that falls in a year. Figure 4.1 shows a graph of IRI illustrating this.

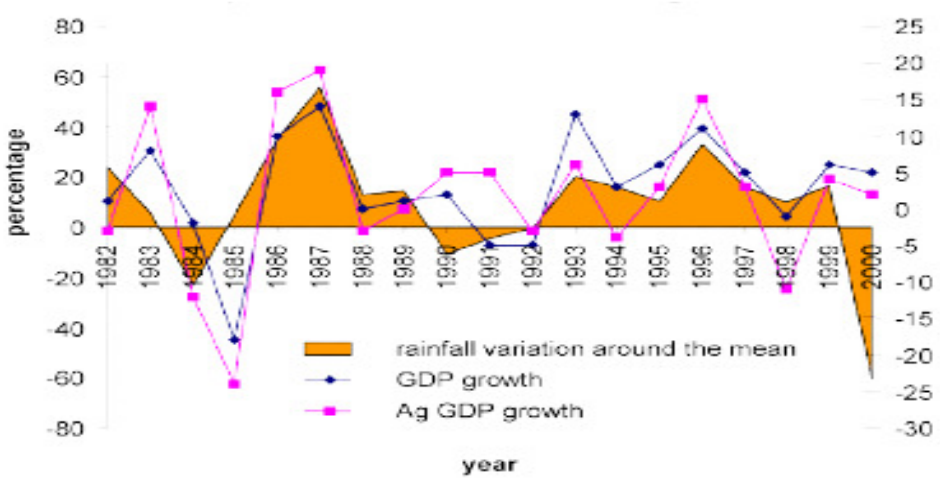

Figure 4.1 Patterns in rainfall and GDP growth in Ethiopia (IRI, 2006).

Community Economic Survey – Proportional Piling

Community group discussions have been organised in order to know the relative importance, contribution, and proportion of various indicators using proportional piling methodology. The group discussions were conducted in 4 selected districts of the Borana zone with representative members of the people living in the selected districts. The main purpose of the survey was to identify the source of income of the

people with the proportions to the different options they have. The results of these interviews are summarised in table 4.1.

55.4% of respondents replied that their livelihood or source of income is based on livestock where as 17.3%, 12.2%, and 15.1%, and 4.3% responded that their source of income is from grain, petty trade, and labour respectively. Nevertheless, there is huge disparity among Woredas (equivalent to District) regarding the source of livelihood. For instance, in Teltele livestock accounts for 83.3% of income while in Moyalle labour has a line share with 41.4%. Regarding the social safety net system, the community will allocate 4.9%, 4.4%, and 6.7% of the total livestock for gift, loan, and dowry respectively. Concerning the proportion of livestock species kept, cattle, camel, and shoats comprise of 49.5%, 15%, and 26.9% respectively where as donkey and horse constitute 6% and 2.9% correspondingly.

Table 4.1 Relative contribution/importance of livelihood indicators in Borana.

Indicators	**Variables**					
Sources of income/Livelihood system (%)	Livestock	Grain	Petty trading	Labor		
Yabello	60	22	10.7	7.3		
Teltele	83.3	11.7	5			
Dire	50.3	18.3	19.7	11.7		
Moyalle	28	17.3	13.3	41.4		
Sub total	55.4	17.3	12.2	15.1		
The roles of livestock in the social safety net system (%)	Gift	Loan	Dowry	Self with held		
Yabello	2.7	3.3	9.7	84.3		
Teltele	5.7	5	6.7	82.6		
Dire	5	7	6.3	81.7		
Moyalle	6.3	2.3	4	87.4		
Sub total	4.9	4.4	6.7	84.0		
The relative livestock species kept (%)	Cattle	Shoat	Camel	Horse	Donkey	
Yabello	53.3	20.4	21.7	2.3	2.3	
Teltele	66.7	27.6			5.7	
Dire	38	28.7	16.3	8.3	8.7	
Moyalle	40	30.7	22		7.3	
Sub total	49.5	26.9	15.0	2.7	6.0	
Which species provides milk? (%)	Cattle	Camel	Goat			
Yabello	62.7	28.7	8.6			
Teltele	80		20			
Dire	44	40.3	15.7			
Moyalle	29.7	54	16.3			
Sub total	54.0	30.8	15.2			
What do you do with the milk? (%)	Consumption	Sale	Preservation	Given to Relatives		
Yabello	60	23.4	8.3	8.3		
Teltele	63.3	10	21.7	5		
Dire	51.3	23.7	10.7	14.3		
Moyalle	16.3	68.3	9	6.4		
Sub total	47.7	31.4	12.4	8.5		
Relative availability of milk by seasons (%)	Long rain	Short rain	Long dry	Short dry		
Yabello	71.7	20	0	8.3		
Teltele	80	13.3	1.7	5		
Dire	53.3	25	11.3	10.4		
Moyalle	57	22.3	10.7	10		
Sub total	65.5	20.2	5.9	8.4		

How does livestock leave the herd? (%)	Disease	Predators	Sell	Raid	Gift	Drought
Yabello	36.7	9.5	22.7	12.3	6.8	12
Teltele	38.5	6.4	15.4	1.3	15.4	23
Dire	23.6	6	18	6.4	6	40
Moyalle	23.4	4.3	9.1	10.7	2.5	50
Sub total	30.6	6.6	16.3	7.7	7.7	31.1
How does livestock join the herd? (%)	Purchase	Gift	Raid	Natural breeding		
Yabello	70	30				
Teltele	65.7	34.3				
Dire	62.3	31.4	6.3			
Moyalle	67.7	26.3	6			
Sub total	66.4	30.5	3.1			

With regard to the source of milk, cows provide 54% of milk in the area where as camel and goat contributes 30.8% and 15.2% of the total source of milk. Households use 47.7% of milk production for direct consumption while 31.4% will be sold. Besides, 12.4% and 8.5% of it will be allotted for preservation (for making of butter and cheese) and given to relatives respectively. However, there is difference among Woredas regarding sale of milk. In Teltele Woreda, the community only supplies 10% of milk production for market whilst it is 68.3% in Moyalle. With regard to the seasonal availability of milk by seasons, 65.5% of the total milk production is available in the long rainy season while the short rain contributes 20.2% of milk production. Short dry and long dry seasons contribute 8.4% and 5.9% of the total milk production in the area.

Regarding livestock offtake, drought takes the line share by contributing 31.1% where as disease and sale contributes to 30.6% and 16.3% respectively. Livestock sell only accounts for 13.7% of livestock offtake. Concerning livestock asset rebuild, participants of the FGD in all Woreda mentioned that natural breeding constitutes 100% of the livestock asset rebuild.

5 Institutional characteristics

Ethiopia is a federal republic, with a president as head of state and a prime minister as head of the cabinet (CIA world fact book). The country has 5 levels of government (see table 1).

Table 5.1 Governmental structure of Ethiopia.

Governmental level	Governmental body
Federal level	Ministry
Regional level	Bureau
Zonal level	Department
District level	Office / desk
Kebele level	Agent / administration office

In Ethiopia the Federal Ministry of Water Resources (MoWR) is the ministry responsible for the study, development, design, and management of water. Often, responsibilities are shared with the Ministry of Agriculture and Rural Development (MoARD) and/or the National Regional State Bureau of Agriculture and the Rural Development (BoARD). The latter is mainly responsible for watershed management implementations and follow-up in Ethiopia; this can be with or without external support. Other governmental organisations that deal with water related topics are GSE (Geological Service Ethiopia) and National Meteorological Services Agency. The latter has a special taskforce on climate change.

Important partners of the Ethiopian government on water related topics are the USGS (United States Geology survey) and the Red Cross/Red Crescent. Many NGOs are active in Ethiopia; a complete list is accessible on www.univ-lille1.fr/pfeda/Ethiop/Infos3ngo_e.htm#3.

Ethiopia finished their Climate Change National Action Programme on Adaptation (NAPA) in June 2007. The main goals in this programme are assessing climate change impacts on development goals and indentifying the needs to be able to cope with climate change. The top five of projects are listed below (NAPA, 2007):

1. Promoting drought/crop insurance program in Ethiopia;
2. Strengthening/enhancing drought and flood early warning systems in Ethiopia;
3. Development of small scale irrigation and water harvesting schemes in arid, semi-arid, and dry sub-humid areas of Ethiopia;
4. Improving/enhancing rangeland resource management practices in the pastoral areas of Ethiopia;
5. Community based sustainable utilization and management of wet lands in selected parts of Ethiopia.

Besides the NAPA several other policy and program documents are relevant to the project: Plan for Accelerated and Sustainable Development to end Poverty (PASDEP), Environmental policy of Ethiopia, Agriculture and Rural Development Policy and Strategy, Water resources Management Policy, National Policy on Disaster Prevention and Preparedness.

The Goals of the national programmes are translated in zonal and regional programmes. However, this takes some time, so not all the national goals are part of the regional programmes at present. Adaptation as a topic is starting to gain importance on the national policy agenda. This year a specific fund for adaptation

projects has been made available by the Ethiopian government. The goal of this fund is to implement show case adaptation projects; rainwater harvesting is one of the topics (Personal communication EHRA).

5.1 Zonal level

On the zonal scale the following offices are active in Borana:

- Zonal administration office (may be called department);
- Zonal water office;
- Zonal capacity building office;
- Zonal pastoral and rural development office;
- Zonal planning and economic office (AfD submits plans at this office and they will say with which other office they need to collaborate).

The zonal water office became active in the region in the 1990s and has worked since then on supplying safe drinking water to the population. Currently approximately 47% of rural and 91% of urban people are covered with safe water supply (personal communication mr. D. Duguma, MoWR).

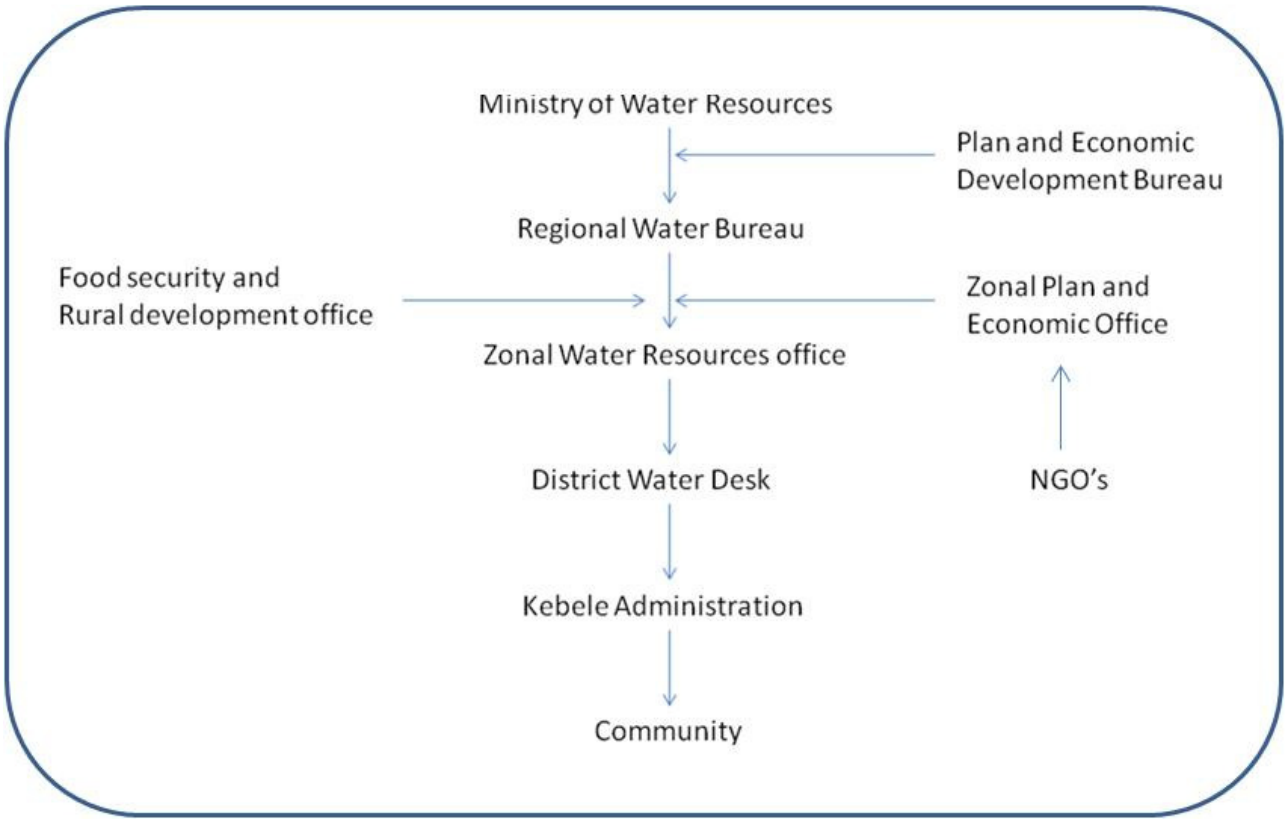

Figure 5.1 Organisations involved in water management in Borana zone.

The activities on water are coordinated by the zonal water office. The organisation and responsibilities are shown in *Figure 5.*1. NGOs are active in the country and on average have a good cooperation with ministries; they have to submit their plans and reports to the Zonal Plan and Economic office. The ADAPTS mission report Borana provides an overview of the most active NGOs in the region. On zonal level the different actors are in contact with each other leading to good cooperation on some fields. Especially during times of drought the cooperation goes well. The following organisations are active in water management in the region:

Table 5.2 Organisations active in the Borana zone and which relevant for water management.

Actor	Water & Climate	Cooperation
Minstry of water resources	On the level of civil servants they mainly focus on making water available to the people. They worked on several climate related projects, but these were funded by foreign donors. On ministry level the level of the minister climate plays a more important role.	Civil servants are willing to cooperate when funds are available. There are no links between the NGOs and the ministry on national level. The minister is active on international cooperation an climate and water.
Zonal water resources office	Supervision on all water projects implemented in the zone. Are interested in Rainwater Harvesting, but allocate large part of budget for boreholes and piping. RWH and small scale projects are mentioned in Strategic plan 2003-2006, but no funds available. They approve project proposals of NGOs on small scale RWH. Main governmental office to work with.	Are in contact with all the parties involved in water issues. Have overview of activities. Repair broken structures when people bring it to their attention. Cooperation is very good during acute drought relief activities.
Action for Development (AfD)	They work on several topics. For water they aim especially on reducing the impacts of droughts and rural water supply. Want to know more about the possible impacts of CC on Ethiopia, because they lack knowledge on this topic.	Involved communities are very happy with them. They are approachable for communities who want to have improved water sources, or other measures that AfD implements. Good communication with the ministries and they appear to be in contact with the main other NGOs in the region.
CISP	They work on several water projects. Not clear how much they take climate change into account	During periods of drought they have contact and discuss who gives food relief in which part of the region.
CARE	They take part in different types of activities where water development and relief services are some among others. Not clear how climate change is taken into consideration	They have good communication with the local communities and different governmental offices. They have active involvement in relief services.
ERHA	ERHA is an Ethiopian non-governmental organisation founded in 1999. It works to promote rainwater harvesting (RWH) in Ethiopia through advocacy, networking, research and capacity building of its stakeholders	ERHA cooperates with AfD on several implementation projects and in WH training activites.
People	Main concern is to have enough water during the dry period and to have enough water to grow their crops. Are not very active with climate change.	Most communities know their way to the NGOs and water office. It appears the NGOs are more responding to their requests than the water office.

There are two water management systems being practiced; the modern water management systems - common on modern type of water schemes - and the traditional management systems that are common on the traditional water sources.

a. Modern Water Management System

- Zonal Water Office designs systems and conduct maintenances;

- District water offices conduct close monitoring during implementation and operation;
- Water committee formed by participation of these stakeholders and the beneficiaries;
- Bylaws developed and trainings given for water committee, care takers and operators;
- Fee norms set (can be piece rate or quota rate);
- Collected money kept at the hand of the treasurer or saved at bank;
- It is the mandate of the water committee to properly manage the water system and cover operational and maintenance costs from money collected during water distribution.

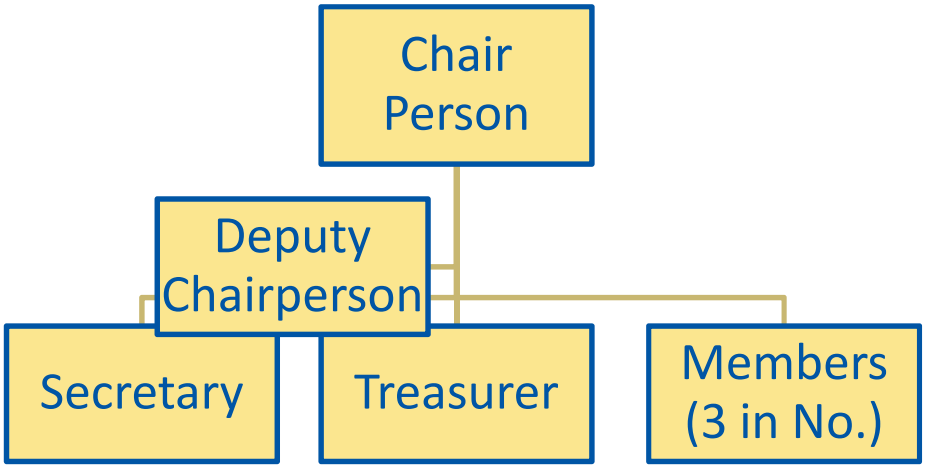

Figure 5.2 Structure of water committee in Modern Water Management system.

b. Traditional Water Management System

- Geda system is the back bone of the traditional management system
- Aba Geda is the figure head of Geda Sytem and he rules only for 8 years and will be replaced by another one.
- General assembly conducted at 4th year of his rule time (Gummi Gayo)
- There are 8 Council Members in which are ruled by the Aba Geda.
- All existing traditional management systems are governed by the Geda system.
- Each water source has “Aba konfi” or “Aba Ella” this person has the ownership right over the water sources.
- This person assigns mangers called “Aba Heregas” and “Aba Guyas” (2 to 3 in number) for conducting the day to day water management activities.
- There are strict operation rules and contribution systems which are done either in kind, labor or sometimes in cash.
- Rote cycle for each user is determined by the managers which depend on the amount of available water and the existing demand.

New water users need permission from the water managers and “Aba Konfi” or “Aba Ella”.

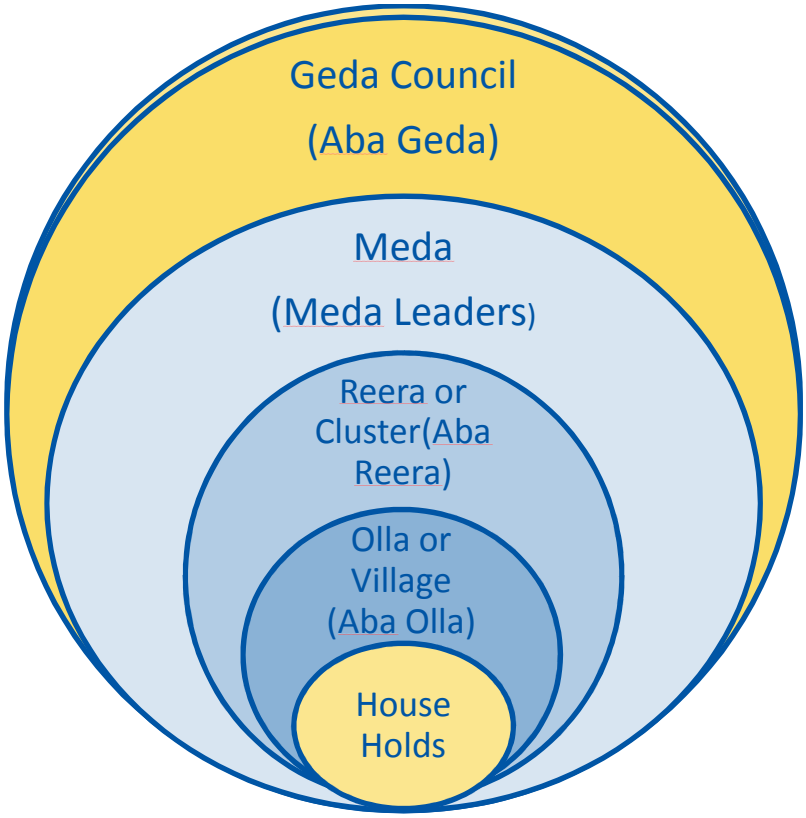

Figure5.3 Traditional Management Set Up in Borana.

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Annex A

Table I.1 Gross School enrolment data in Borana Zone for the year 2008/2009 academic year - Grade 1-8.

No.	District	Plan			Achievement			Achievement By %age		
		Male	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
1	Gelana Abaya	22453	19679	42132	21266	12386	33652	94.7	62.9	79.9
2	Arero	4283	4833	9116	3099	2729	5828	72.4	56.5	63.9
3	Bule Hora	30390	26138	56528	27934	19104	47038	91.9	73	83.2
4	Dire	5426	5375	10801	3928	3875	7803	79.8	86.5	82.9
5	Dillo	936	899	1835	2064	1576	3640	102.2	175.3	198.6
6	Dhaas	1680	1532	3212	1349	1350	2699	80.3	87.5	83.7
7	Dugda Dawa	9390	6779	16169	6786	3656	10442	72.2	53.8	64.5
8	Melka Soda	6451	4951	11402	5518	1968	7486	81.9	36.9	62.4
9	Miyo	5722	5519	11241	3900	3617	7517	68.2	65.5	66.9
10	Moyale	5787	5497	11284	4488	4185	8673	68.2	65.5	66.9
11	Teltelle	6383	5434	11817	3945	4208	8153	80.1	76.1	67.4
12	Yabello (Rural)	6846	6886	13732	5288	5330	10618	74.2	76.3	75.3
13	Yabello (Town)	2445	2383	4838	2079	2023	4102	81.7	84.1	82.9
	Zonal	**108202**	**95905**	**204107**	**91644**	**66007**	**157651**	**84.7**	**68.8**	**77.2**

Table I.2 Gross School enrolment data in Borana Zone for the year 2008/2009 academic year - Grade 9-10.

No.	District	Plan			Achievement			Achievement By %age		
		Male	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
1	Gelana Abaya	1485	396	1881	1371	348	1719	92.3	87.9	91.4
2	Arero	299	97	396	254	89	343	85	91.8	86.6
3	Bule Hora	3258	1394	4652	2597	914	3511	79.7	65.6	75.5
4	Dire	536	226	762	589	206	795	109.9	91.2	104.3

5	Dillo	-	-	-	-	-	-	-	-	-
6	Dhaas	31	22	53	56	18	74	180.6	81.8	139.6
7	Dugda Dawa	568	163	731	568	163	731	100	100	100
8	Melka Soda	87	16	103	120	25	145	137.9	156.3	140.8
9	Miyo	378	101	479	386	102	488	102	101	102
10	Moyale	688	232	920	801	281	1082	116.4	121.1	117.6
11	Teltelle	417	146	563	345	109	454	82.7	74.7	80.6
12	Yabello (Rural)	-	-	-	-	-	-	-	-	-
13	Yabello (Town)	1008	568	1576	1199	670	1869	18.9	118	118.6
	Zonal	**8755**	**3361**	**12116**	**8139**	**2921**	**11060**	**93**	**86.9**	**91.3**

Table I.3 Gross School enrolment data in Borana Zone for the year 2008/2009 academic year - Grade 11-12 (Preparatory Class)

No.	District	Plan			Achievement			Achievement By %age		
		Male	**Female**	**Total**	**Male**	**Female**	**Total**	**Male**	**Female**	**Total**
1	Gelana Abaya	298	82	380	59	7	66	19.7	8.5	17.4
2	Arero	-	-	-	-	-	-	-	-	-
3	Bule Hora	963	268	1231	139	12	151	14.4	4.5	12.3
4	Dire	237	88	325	64	3	67	27	3.4	20.6
5	Dillo	-	-	-	-	-	-	-	-	-
6	Dhaas	-	-	-	-	-	-	-	-	-
7	D/Dawa	-	-	-	-	-	-	-	-	-
8	M/ Soda	-	-	-	-	-	-	-	-	-
9	Miyo	-	-	-	-	-	-	-	-	-
10	Moyale	436	113	549	165	11	176	37.6	9.7	32.1
11	Teltelle	-	-	-	-	-	-	-	-	-
12	Yabello (Rural)	-	-	-	-	-	-	-	-	-
13	Yabello (Town)	600	281	881	300	16	316	50	5.6	35.9
	Zonal	**2534**	**832**	**3366**	**719**	**46**	**765**	**28.4**	**5.5**	**22.7**