

Zavedení holistického managementu krajiny a „Climate Smart Agriculture“ v Arba Minch Zuria Woreda, SNNPR, Etiopie

Příloha 3

Aktivita 1.1: Analýza stávajícího systému managementu přírodních zdrojů v AMZW

Current status of natural resources management in Arba Minch Zuria

Woreda

1. Background of Arba Minch Zurea woreda

Arba Minch zurea woreda is found in the Southern Nations, Nationalities and Peoples Region (SNNPR), geographically situated between 37° 23' 51.37'' Eastern longitude and 5° 55' 16.24'' northern latitude in Gamo-Gofa zone and has a land area of 967.7km². The woreda, is divided into 29 Kebeles, As part of the Gamo Gofa zone it found in the Great Rift Valley, Arba Minch Zuria woreda is bordered on the south by the Dirashe woreda, on the west by Bonke, on the north by Dita and Chench, on the northeast by Mirab Abaya, on the east by the Oromia Region, and on the southeast by the Amaro special woreda. This woreda also includes portions of two lakes and their islands, Abaya and Chamo, Nechisar National Park is located between these lakes.

2. Population

The population projection made by BoFED using the 2007 Population and housing census of Ethiopia hints that, the total population of the Woreda in the year 2014/15 is 205205 persons. The number of male and female population was 102521(58.7 percent) and 102684 (41.3percent), respectively. The crude population density of the woreda is 212 persons per square km.

The five largest ethnic groups reported in Arba Minch Zuria were the Gamo (69.53%), the Amhara (7.94%), the Wolayta (6.75%), the Zayse (6.02%), and the Oromo (3.64%); all other ethnic groups made up 2.28% of the population.

3. Climate

3.1. Trends of Rainfall

The climate of the Arba Minch Zurea woreda ranges from tropical to alpine due to its great difference in altitude and topographical elevation.

Rainfall pattern is bimodal, erratic and unreliable, with the mean annual precipitation ranging from 750 mm – 1300 mm depending on altitude and moisture bearing seasonal air current. ‘*belg*’ (long rainy season) and ‘*meher*’ (short rainy season) are the two rainfall seasons. The *main* rains are from April to May, while the small rains are from September to October. The temperature of the area depends on the agro-ecological location.

According to (Defaru Debebe. et al, 2013), the rainfall trends of Arba Minch zuria woreda were shown the same trend over time. However, there are diverse ranges of factors that limit the smallholders’ agricultural production in Arba Minch zuria woreda: amongst these most agricultural production problems in the area are rainfall variability-amount and distribution which cause drought/moisture stress, delayed planting date and end season drought; extreme weather phenomena, dry spells and heavy rains– causing flooding, water logging and siltation of sediments in lower watercourses; low level of technology adoption; declining soil fertility, etc.

3.2. Trend of Temperature

The information of climatic data indicate that the temperature is shown decreasing trend in the Meher season (June, July and August). The average minimum and maximum temperature of the Arba Minch zuria woreda were ranging from 17.3⁰c – 30.6 ⁰c.

According to the different information, the minimum and maximum temperature trends of the area were shown variation when compare to the current versus to the two decades before. This temperature variation can cause increased evapotranspiration, shorter growing periods, drying of the soil, increased pest and disease pressure. Climate change is also expected to cause increased variability of temperature and rainfall, increased intensity and frequency of extreme events, including droughts, floods and storms.

3.3. Agro-ecology zones

There are four agro-ecology zones in the woreda, which relate foremost to the varied topography of the woreda as some 20% are high steep hills, 60% are medium steep slopes and the remaining 20% are flat plains. The hilly 80% of the woreda is exposed to serious land degradation and soil and water conservation activities are widely practiced even on communal lands.

Generally, about 50.8% is wet/moist kolla, 10.8% is wet/moist Dega, 0.21% is Wurch (Alpine) and 38.2% is wet moist weyna dega.

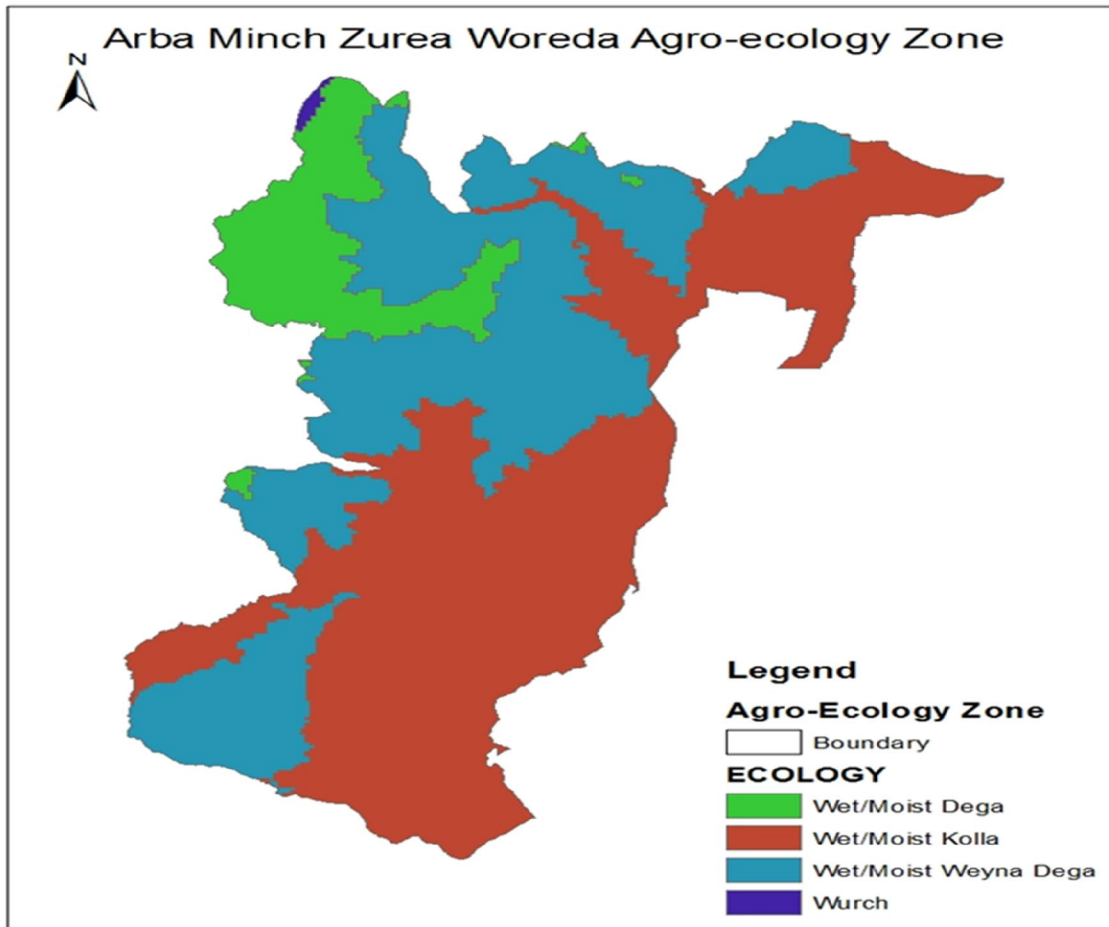


Fig. 1 Agro-ecology zones of Arba Minch zurea woreda

4. Land Cover and Land Use

The land cover/land use of the Arba Minch Zurea woreda is dominated by Intensively Cultivated Land with perennial and annual crops which comprises 54.7% of the land area and by Bush land which comprises 33.33% of the land area, the other land use moderately cultivated with perennial and annual crops 4.7%, Grass land 3.59%, State farm 1.5%, Broad leaved forest 1.2%, and Lakes 0.95%, as shown in Table 1.

Table 1: Land Cover of Arba Minch Zurea woreda

Land cover	Area (ha)	%
Intensive Cultivated Land (Annual and Perennials)	52960.03	54.73
Moderately Cultivated Land (Annual and Perennials)	4503.2	4.7
Bush Land	32254.35	33.33
Grass Land	3478.36	3.59
State Forest	1504.6	1.5
Broad Leaved Forest	1139.1	1.2
Lakes	922.29	0.95
Total	96761.93	

Intensively cultivated land is particularly concentrated in the western part of the woreda and some parts around the southern woreda, moderately cultivated land in association with open Grass land, Lakes and Bush land predominates found around the south west of the woreda. There are some small areas of Broad leaved forest on the basin flanks around Lakes Abaya, Grass land predominates with some areas of State frames in valley bottoms and Bush land is dominant on the centre of the Woreda starting from Dega Ocholo and Lante kebele in the north east and to Wezeqa kebele almost to Zeyise demibele kebele in the south west according to Land Cover and Land Use map figure 2.

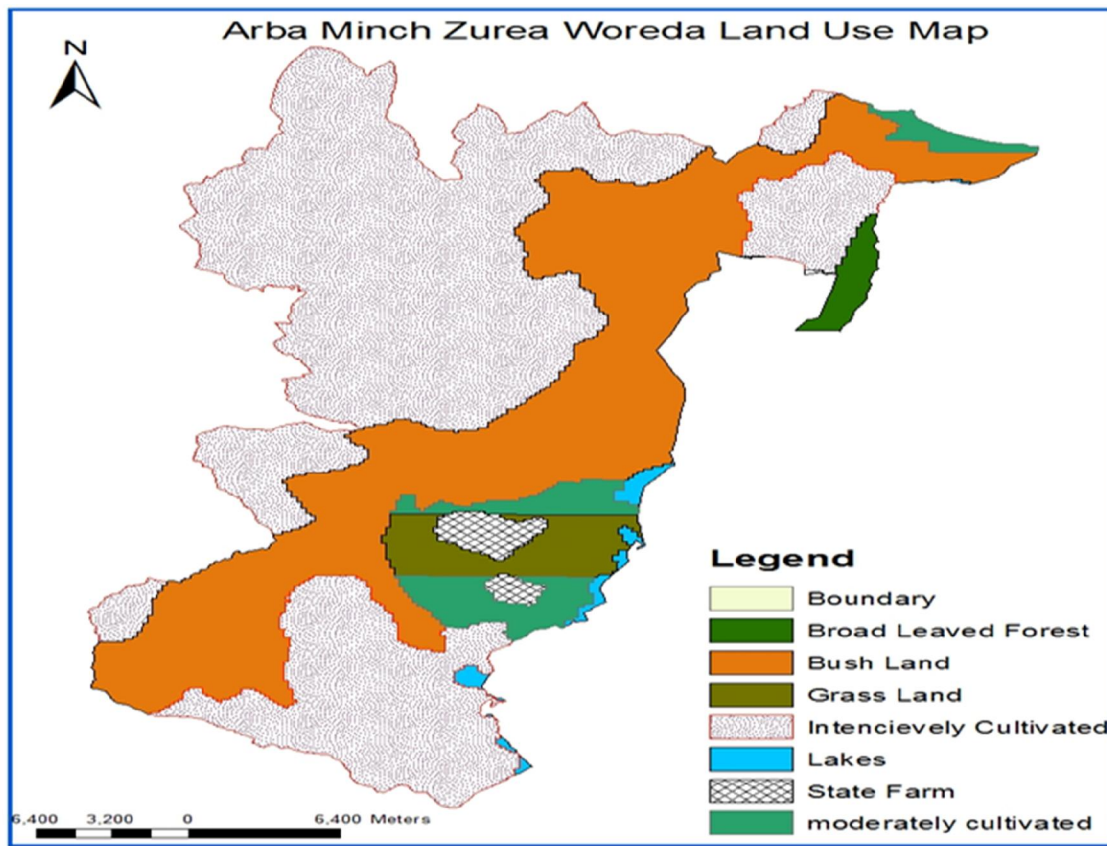


Fig.2 Land Cover and Land Use map

5. Soil Types

A total of 8 Major Soil Groups comprising 59 Soil Units have been mapped as Soil Mapping Units, which are based on the main soil type, associated soils, texture and slope.

In the northwest of the Arba Minch Zurea worda the soils are largely Acrisols (young soils with poorly developed horizons but well drained and relatively fertile) and the south west of the worda there is a large area of shallow Leptosols, The majority of the northwest uplands of the Arba Minch Zurea worda kebeles hills around Zegeti Bakole, are Acrisols with small patches of Nitisols, and There are large patches of Vertisols and Fluvisol associated with alluvial fans around Lakes Abaya and Chamo in the north east and south east, the southwest low land kebeles of Arba

Minch Zurea worda is dominated by the Solonchaks (saline soils) and xerosols according Table 2 and map figure 3.

Table 2: Soil Types and their coverage

Arba Minch Zurea woredas Major Soil Group	Area (ha)	%
Acrisols	28237.74	29.2
Vertisols	21425.3	22.14
Xerosols	12356.15	12.8
Fluvisols	9468.35	9.8
Solonchak	8666.5	8.95
Nitosols	7290.41	7.5
Leptosols	6904.2	7.13
No data	1460.81	1.5
Water	952.47	0.98
Total	96761.93	

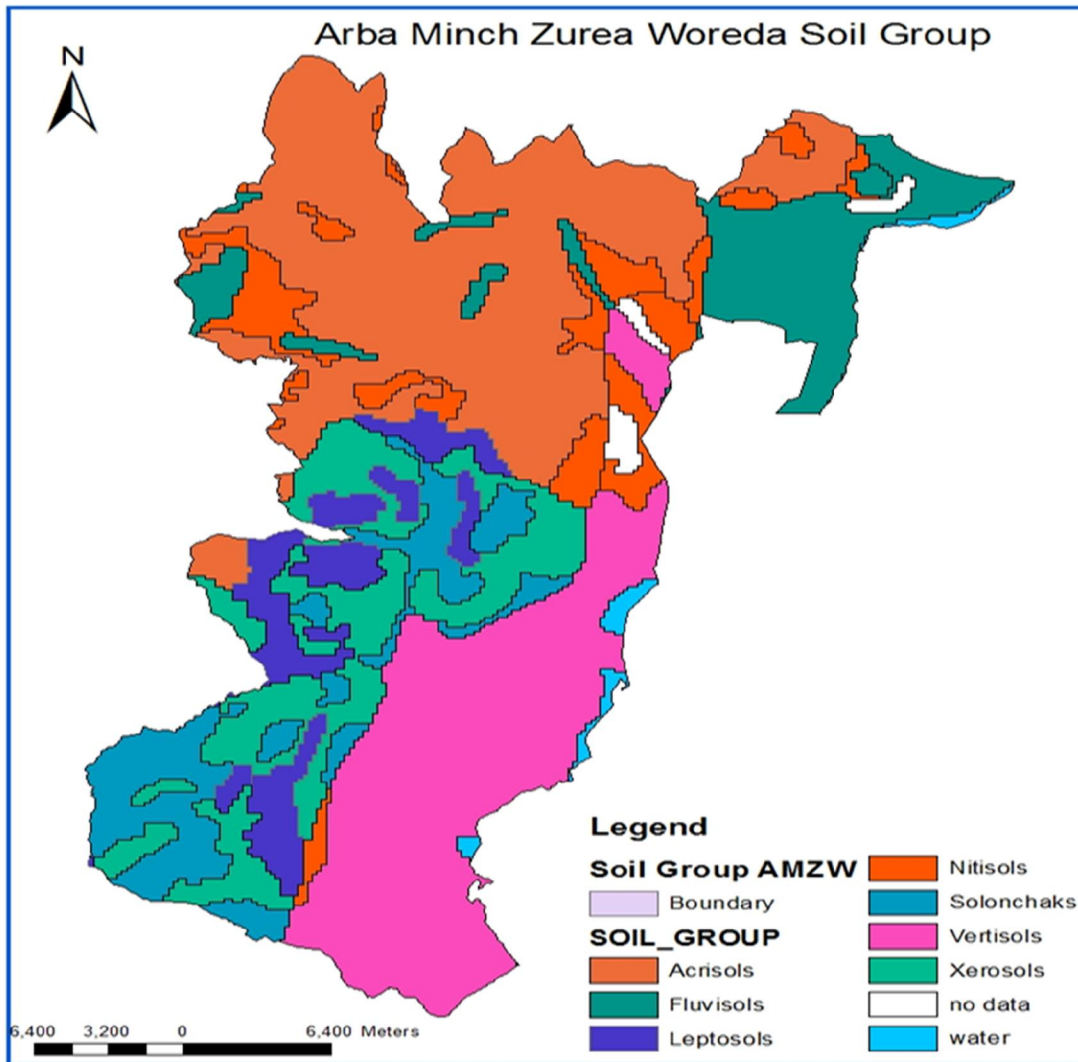


Fig. 3 Soil Types Map

6. Description of Farming System, Crop production and Livestock population of the Arba Minch zurea woreda

6.1. Crop production and area under major crops

Crops and cropping activities are essentially determined by rainfall pattern and distribution. The bimodal rainfall distribution results into two cropping seasons, locally named as '*belg*' and '*meher*' cropping seasons. The *belg* rain (Short rains) is useful for short duration crops; and for the land preparation and germination of long season '*meher*' crops. About 80 percent of the total crop

production, comes from *meher* (long rainy season) crops, **mainly maize and sorghum**. Two third of the '*belg*' crops are composed of small cereals like barley and wheat; vegetables like potato; and Pulses like haricot beans; which are grown exclusively in midland and highland areas.

The major crops produced in the different agro-ecologic zones of the woreda include several annual and perennial crops. Annual crops include cereals, pulses, oilseeds and vegetables. Perennials are cash crops, which include coffee and fruits trees. Among cash crops, fruit is by far the most important source of income, while coffee is the second important cash crop. Among the annual crops, cereals account for 87 percent of the total cultivated land and over 76 percent of the gross output. The remaining proportion goes to pulses and oil seeds. Among cereals, maize takes a significant amount of the cultivated land followed by **sorghum**. This means that maize and sorghum are the most important staple food crops grown in the woreda. Maize grows in the highland and mid-highland areas, while sorghum is most suited to lowlands and mid-highlands.

6.2. Livestock Population

Livestock plays a vital role in the social and economic life of the people in Arba Minch zurea worda. Livestock serve as the major sources of draught power, organic fertilizer, food, cash income, transport, prestige, improved shock absorbing capacity and are principal form of saving and investment. The distribution of livestock is affected by climate, disease prevalence, population distribution, farming system and types of land use.

In 2014 the number of livestock existing in the woreda was 26,987 oxen, 32,056 cows, 30,714 heifers and calves, 35,226 sheep, 20,894 goats, 1,871 donkeys, 16,091 horses, and 933 mules. All of the above mentioned livestock were local varieties. The cattle is mainly free grazing (about 65% of all cattle), mainly practiced on the plains. Stall feeding is conducted near people's homes and on private plots in the highlands and slopes. Stall feeding on the plains is only practiced for

fattening of livestock, which are given banana and enset leaves. The free grazing happens in forests, on farm lands, on plains and along road sides.

6.3. The current dominant farming system of Arba Minch zurea woreda

Mixed farming system (crop-livestock integration) prevails as a dominant economic activity in the Arba Minch zurea woreda. Depending on the agro-ecological location, there are different soil management and farming systems of different land use types. The farming practices are dominantly of monocultures cash crops (banana monoculture), mixed farming of banana with mango (poly-culture), and subsistence farming of maize, other cereals and cotton. Four land use types were selected based on the information obtained from woreda office of agriculture and natural resource development. Accordingly, subsistence-farming system (maize field); representative virgin land; monoculture farming system (banana monoculture field), and mixed farming system (banana-mango mixed field) were considered and used as pedons excavation sites.

6.3.1. Subsistence Farming System

Based on the information from the woreda office of agriculture and natural resource development, the subsistence farming fields were continuously cultivated for about more than three decades. Currently, the fields are used for medium maturing maize grown by smallholder farmers under low input. In this system rotation between maize and cottons is a common practice.

6.3.2. Representative Virgin Land

The field identified as representative virgin land has no recorded of cropping history. The remnants of forests in some patches and pockets were converted into crop cultivation.

6.3.3. Monoculture Farming System

The system represents smallholders' farm field under banana monoculture cultivation owned by market-oriented farmers. The fields were used for cultivation of banana crops for more than ten years. Generally, this type of monoculture banana farming system in the area is managed with low inputs, and practiced by preparing low mound or ridge for planting and maintaining the soil fertility and to avoid weeds and pests from the banana plantation.

6.3.4. Mixed Farming System

Banana and mango were identified as the dominant fruit crops under traditional production system in the area. The fields of banana and mango were further intercropped with short season crops such as maize, pepper and tomato in the spaces between the two main crops for the first 3-5 years. Then after, the dominant crop will be mango, which will develop to pure stand in 12 to 15 years according to different information.

7. Livelihood zone of Arba minch zurea woreda

The livelihood zoning and Profiles presented here offer an analysis rural food security on a geographical basis. A brief description of each zone is provided, including an analysis of the position of different wealth groups within the zone. It is envisaged that this product will be useful on three levels, 1, An introductory guide to food security in the zones 2, Early warning and food security monitoring and, 3, Policy development

Generally, Arba Minch zurea woreda classified in to tow Livelihood zone, these are Chamo-Abaya Irrigated Banana Livelihood Zone and Maize and Root Crop Livelihood Zone

7.1. Chamo-Abaya Irrigated Banana Livelihood Zone:

This is a lowland zone, characterized by irrigated banana production, not all kebeles have access to irrigation, and there the main cash crop is cotton. As regards bananas, the profitable bulk

production of this perishable luxury item is based on access to the main road via Awassa to Addis Ababa, which runs through the main part of the zone from the main local center of Arba Minch: i.e. the majority of the bananas are sold in the largest urban market of the country. Raw cotton is also sold in Awassa and Addis for processing, whence some of it returns to the big local garment factory in Arba Minch. The dominant food crop from the relatively large landholdings of the zone is maize, together with haricot beans and sweet potatoes. Middle and better-off households are usually self-sufficient in staple foods, although they sell some of their stock and buy preferred but more expensive items on the market, such as teff. Abundant pastures allow even poor households to keep three to five cattle, and fattened oxen gain added value because of the direct road access to Awassa and Addis. The zone is essentially food secure and is indeed one of the most prosperous in the Region (although there are income differences between those who have irrigation and those who don't, and poor households have received some food aid). However, the area suffers from erratic rainfall, including sometimes extensive dry periods in the rainy season which diminish irrigation, but also from floods which damage both irrigated and rain fed production.

7.2. Maize and Root Crop Livelihood Zone:

This is an extensive zone of hilly and undulating midland and upper lowland terrain. It is highly food insecure due to a combination of factors: high population density, therefore small landholdings for the majority of households; low soil fertility; frequent rainfall irregularities and with poor roads and market access, as well as poor coverage with health and education services. Fewer than one in five households are normally self-sufficient in staple food production, whilst the very poor fifth and the poor third of households have respectively received food aid amounting to about 9% and 5% of their annual basic food in the reference year.. The food crops are maize, enset, sweet potatoes, taro, teff, and yams. Enset and root crops is an important hedge against losses of the less drought-resistant maize; but need forces the poorer majority of households to cut

their onset before it matures (after 4 years), so that two-thirds of the potential food from a plant is lost. Although all wealth groups sell crops to some extent, none makes as much as half of annual earnings from this. It is livestock and butter sales that bring the biggest portion of cash to the better-off and middle groups; at the same time butter sales bring in some 20% of the annual cash earnings of the poor and very poor, and this is made possible by the system of caring for the stock of richer owners in return for a share of the milk and sometimes the progeny. The very poor also gain about 20% of their income from selling firewood and collected grasses. However by far the main source of cash for all the poorer households is casual employment, including migrant work on state farms in Jinka, Awash, Shashamene and Ziway.

8. Institutional and Implementation Arrangements

The implementation of the current natural resource management take place through the existing government structures from the regional to the local or community level institutions. This is follow suit of the natural resource management implementation structure.

REGIONAL: the overall coordination and implementation of the natural resource management implementation is facilitated by the Regional Bureau of Agriculture and Natural Resource Development (BoANRD) in collaboration with other relevant Authority like Environmental protection and forest Authority. The BoANRD is use the organization structure and institutional mechanisms established to coordinate all natural resource management projects financed by the Government and development partners.

ZONAL: Natural resource management implementation is led by the Zone Department of Agricultural and Natural Resource Development (ZDoANRD). ZDoANRD is responsible for approving annual work plans and progress reports to provide necessary guidance on natural

resource management implementation, and at the beginning of the fiscal year to endorse the annual plan to the Woredas.

WOREDA AND KEBELE: On-the-ground implementation of the natural resource management would be undertaken jointly by Woreda office of Agriculture and Natural resource Development (WoANRD) through the Woreda Watershed Development Committee (WWDC), the Kebele Watershed Development Committee (KWDC), and communities. The WWDC and KWDC would assist communities in: (i) developing annual work plans for submission to the Zone for endorsement and integration into the Regions' work plans (ii) facilitating community participation in watershed planning and rehabilitation; (iii) training; (iv) monitoring and evaluation; (v) dissemination of innovations natural resource management implementation.

Regional Institutional Arrangements of Natural Resource Management

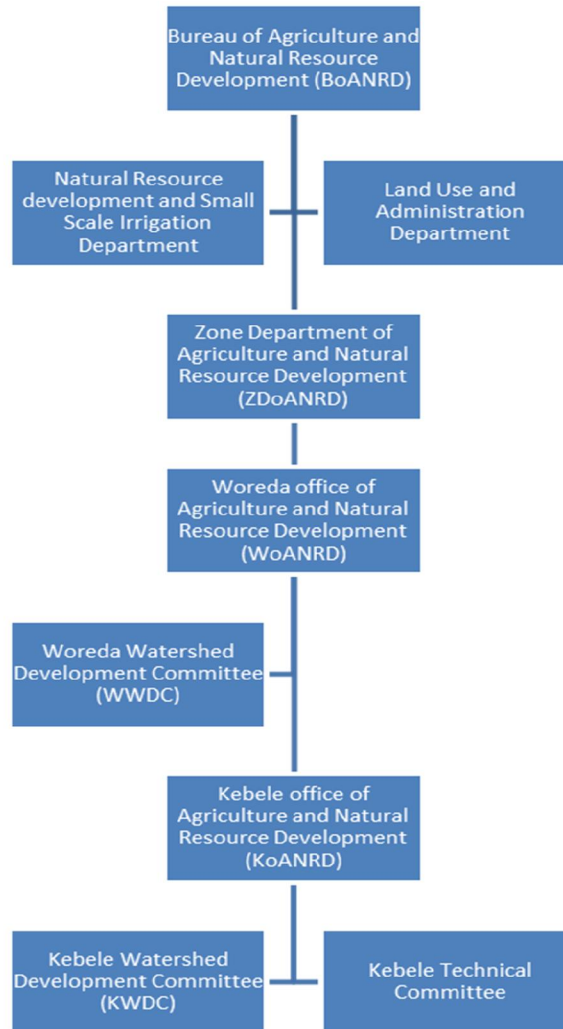


Fig. 4 Regional Institutional Arrangements of Natural Resource Management

9. Overview of natural resources management in Arba Minch zurea woreda

It is nearly three decades since modern technologies of land management have been introduced in Arba Minch zurea woreda, and long traditional land management measures have been practiced in

different parts of Arba Minch zurea woreda. The traditional as well as introduced practices, as a matter of fact have been concentrated in the lowlands and mid highlands of the country, which are characterized by low and erratic rainfalls, degraded lands and recurrent failure of crop production. Many best practices have evolved in these areas but there is no recorded evidence which explains about their usefulness and applicability in other areas. Moreover, scaling up of the practices has been largely constrained by lack of methods to evaluate and test them for wider scale applicability. The trend show that, despite the availability of many best practices in land management they are highly localized, and are not being expanded to other areas, while land degradation due to soil erosion, forest clearing and burning are advancing at an alarming level. A number of projects and programs have been implemented and financed by local and international NGOs, development partners and various Government Organizations, with varying levels of successes and failures but these have not been documented.

Table 3: Framework analysis of the underlying causes of deforestation and forest degradation vis-à-vis societal situation in Arbaminch Zuria woreda. Adapted from REDD⁺ Secretariat, Ministry of Environment and Forest.

Specific drivers	Agent	Underlying causes					
		Biophysical & environment	Livelihoods & technical	Infrastructure	Socio-econ & economic.	Institutional & Policy	Trend now
Negative drivers							
Altitude, steep slopes & soil texture	Nature	Topographical risks for erosion & degradation	Most local people are aware of these risks	70% of households use small-scale irrigation systems	Most rural population is aware, but youth groups & outside investors ignore	Many policies and directives are in place, but still some ignorance	Due to increasing population the trend is at least the same
Pests in crop fields	Poor small-holder farmers	Fruit flies & cereal stem boring beetles	Crop yield reduction cause farmers to expand farms	This woreda is rather remote	Farmers need more income from somewhere	No support from woreda authorities on this issue	Constant problem
Livestock grazing	Small-scale farmers	Livestock free graze on all type of lands on low lands	stall feeding practiced in highlands & slopes	Only local varieties of livestock	Still quite much livestock per average household	Livestock policies are weak and not updated	Constant trend
Fuel wood collection, charcoal production	Small-scale farmers, charcoal makers	Forests are stated to be protected but Fuel wood collection & charcoal burning widely practised	Farmers and town people use native tree forest products	Roads ease transportation. No check points near towns	Many people lack other income source & thus charcoal burning is only option	Woreda authorities are not up to their mandate vis-à-vis forest protection	Overpopulation cause high pressure on forests
Lack of income opportunities & over population	Local people	Forests are exploited	People have no choice than produce charcoal & some NWFPs	Roads ease transportation to towns	Urban youths and men without options	Many policies and directives are in place, but too much overpopulation	Increasing problem
Impact of closed areas on other forest lands	Local population	Closed forests & pastures cause pressure on other lands	There is high demand for grazing and forest use	Roads ease transportation to towns	Overpopulation and lack of income options	Many policies and directives are in place, but too much overpopulation	Increasing problem in open forests

Positive mitigating activities							
Soil and water conservation	Poor small-holder farmers	Terracing & various other SWC operations are common	People work for free or through community initiatives	Building of terraces, culverts etc.	Local people are highly aware about environment protection	Promoted by SLM and Woreda agriculture office	Degradation has been substantially reduced
Watershed management practices	Poor small-holder farmers	Some 7 million nursery seedlings planted annually. Survival rates are stated as high	Farmers are given seedlings and seeds to plant on degraded and forest lands	There are 29 tree nurseries one per kebele in the woreda	Nurseries use forest tree seeds collected by youth community forest initiatives	Woreda agriculture office, SLM & Church project have quite good supervision	Increasing or on same level annually
Closed areas from grazing and tree cutting	Urban youths	Substantial re-generation in closed areas	Most rural people follow well the restriction	Closed areas are demarcated	Urban people is still a problem as rules are violated	Functioning extension service among rural people	Substantially improving situation
Agroforestry home gardens	Poor small-holder farmers	Fruit trees and other crops are combined in home gardens	People get income several times in a year from multi-crops	Intensive irrigated cultivation on small farm lands with fertilizers	Many households have adopted this kind of cultivation	Promoted by the woreda agricultural office	Increasing with irrigation
Non-wood & alternative energy sources	Poor small-holder farmers	Electricity, crop residues, solar panels, energy efficient stoves & biogas	Most people understand the need to reduce fuel-wood use	Support with solar panels & biogas installation purchase	10% of households use these energy sources	Energy policies still need some upgrading for solar panels & efficient stoves	Substantially reducing pressure on forests

10. The current system of natural resources management in Arba Minch zurea woreda

The current system of natural resources management in Arba Minch zurea woreda is conducted by Mass Mobilization, Mass Mobilization, is an approach pursued to implement Natural Resource Management (NRM) technologies by organizing land users to undertake NRM activities without incentives being involved.

Description of Mass Mobilization

It involves the process of mobilizing and organizing land users in the community (men, women, and youth) who are able-bodied to participate in NRM activities. Land users participating in mass mobilization are required to form NRM groups. Plan for NRM is made at the woreda level and then distributed to kebeles and or sometimes each kebele proposes plan, which is later approved by the woreda. Each member contributes free labor of 20 days every year to undertake land management technologies (past) and this contribution is increased to account for 40 days a year since 2009.

The specific objective is to make land users participate in the management of land by implementing improved technologies. NRM measures control runoff and enhance rainfall water percolation. The approach involves organizing land users in NRM groups. The land users organize in two groups which are formed known as development team and a sub group called a one to five. A development team group comprises 20-30 members while the one to five groups is 6 members. Women and men participate equally in the one to five and in leading the team.

Activities undertaken by mass mobilization are mostly carried out on degraded lands. Every day the group evaluates its activities. They also participate on the discussions of the plan.

There is a leader for each group at Gotte level (the lower administrative unit) who supervises activities of the groups.

All land users in the community are expected to participate in the implementation of the technologies through the mass mobilization approach. The approach area is defined by administrative and as well as watershed boundaries. The Kebele and woreda administrators, woreda specialists and development agents coordinate the implementation and planning of the approach.

Objectives and target

Aware, organize and initiate land users to participate in NRM activities that aim at controlling soil erosion, which causes land degradation and encouraging land users to contribute free labor for implementing the NRM technologies introduced.

The specific objectives are: I) promote the awareness of land users on land degradation problem and II) show the importance of NRM measures which protect cultivated lands from erosion, retain soil moisture and improve fertility of soils.

Decision making

Mainly NRM specialists in consultation with land users make decisions on the choice of NRM measures. Some community members are found not willing to contribute free labor for NRM activities in the past but currently many land users are convinced of the benefits of mass mobilization. Mainly NRM specialists in consultation with the community leaders make decisions on the methods and approaches for the implementation of the NRM Technology.

Decisions for implementing NRM technology at the household level is made by both men and women. The resource poor are involved in decision making at the community level. All community members participate equally in decision-making at the community level.

Framework for the approach

Traditional rules exist for protecting and managing natural resources. There are community bylaws that encourage and prompt community members to participate in NRM activities and protect the

assets created. The community recognizes traditional rules and large members of the community abide by it. The regional government has recently issued Land Use and Administration Proclamation that bestow responsibilities and obligations on the community to manage their land. The proclamation enforces the rights for proper use and penalty for not practicing the legislation. A land user will not have right to use the land if he fails to apply conservation measures on the land or lets the land to degraded and loose its productivity.

There is a policy provision that encourages farmers to practice conservation on their land. The regional, zone and woreda government provides technical and material support to land users willing to conserve their lands. For implementing NRM activities community members are organized in groups and they participate in all stages of planning, implementation, monitoring and evaluation.

The government initiated the approach and specialists designed it. The Regional Bureau of Agriculture and Natural Recourse Development (BoANRD) coordinates the NRM program and the Zone and Woreda Office of Agriculture and Natural Recourse Development is responsible for implementing and mobilizing land users to participate in the implementation. Development agents, kebele chairman, leaders of women and youth associations, the head of economic sector in Tabia Administration and two knowledgeable land users are represented in land management committee that mobilizes and leads the community for mass mobilization.

Participation

Specific target groups: land users, NRM specialists / extension workers and politicians / decision makers. Land users mobilized by the approach include all wealth categories (better-off, average and the poor). The attitude of the majority of land users towards the approach is positive. Some attitudinal changes were observed on land users who did not have positive attitudes in the beginning but after having observed the results of the NRM technology, their attitudes has changed

and have later developed positive image towards the approach. Land users are more interested in getting immediate benefit from the technology. Land users are keen to plans of short period and few of them think of long term plans, particularly in regards of maintaining the fertility of land and pass it on to their descendants.

Table 4: Methods applied for involving land users at different phases

Phases	Methods of engagement	Action
Initiation	Public meetings	General assembly meeting called for awareness creation and informing about the development plan.
Planning	Training	Train NRM commission members. They plan the activities which is later endorsed by the general assembly
Implementation	Free labor	20 days/yr
Monitoring and evaluation	Measurements / observation / reporting	Each activity is measured by the team leader and the other committee members.

Direct subsidies

Labor from the land users is the most important input of the investment. It is mostly voluntary although initiations are taken by policy makers and the technical people. Hand tools and planting materials (seeds and seedlings) are provided by the local government and donors. The approach has moderately supported the establishment and functioning of local institutions.

Table 5: Responsibility and level of contribution

Responsible	Item	% contribution
Community / local	Labor and material	95
Government	Training and work tools support	5

Impact

The approach helped to carry out NRM technologies in considerably large area in short time because almost all land users participated in contributing labor for the work. This promoted the individuals understanding about land degradation problems better and encouraged them to contribute voluntary labor to NRM activities. Land users obtained knowledge and motivation to carry out NRM activities on their plots and also maintained NRM measures applied on their land. Forest and woodlands are also addressed by this approach and a considerably large area of plantation is undertaken pursuing this approach.

Implementation progress

Over the last few years the implementation progress has increased. Similarly, land users attitudes and working spirit has changed positively and more land users are convinced of the advantages of the approaches. Moreover, the approach has helped in strengthening and encouraging the formation and functioning of local institutions such as kebele associations, community conservation groups and various social groups.

11. The Current Land Use Patterns of Arba Minch zurea woreda

The deferent research data revealed that, assessing past-to present land use patterns associated with the crop cultivation helps to understand which agricultural effects expanding crop production. According to the deferent research data showed that there is a progressive shift among land use

patterns in the last several years, and provided information on major changes in crop cultivation in Arba Minch zure woreda. Most of natural forests and cultivable lands were converted into crop cultivation, whereas smallholders' cultivation was progressively increased and influenced by resettlement expansion of human population. Parts of mountain tops that were previously covered by grass and bushes were deforested because of shortage of farmland in the highlands, absence of other alternative livelihood diversification strategies to rural-urban migrants, and rampant rural poverty and unemployment. This is due to the increasing demand for crop and grazing land, and wood for fuel and construction. The distribution of the land use in Arba Minch zurea woreda has been changing greatly over time because of subsequent cultivation after deforestation due to high population and economic pressures, and infrastructure and irrigation development.

The data obtained from information and personal communication that in the mountains and escarpments between lowland catchments and highland areas, previously covered by grass, bushes and trees were also disappearing from those places. Particularly, in the parts of the border areas near Lake Abaya and Chamo which was previously covered with forest was cleared.

Apart from the degradation, the Arba Minch zurea woreda was remarkably well covered by recently introduced fruit trees and crops. There was a breakthrough in production and transforming the livelihoods of the inhabitants from survival level to elevated way of life at lowlands in the irrigated kebeles; fast changes are taking place now in farming systems, peoples' lifestyles, breaking of traditional systems. For example, improved farming methods such as mulching, intercropping, and shifting cultivation were also well practiced. For example, enclosures of hillside and degraded areas were also maintained the land available for livestock production, grazing and browsing. Although such enclosed hillsides recover vegetation very quickly, protecting soil, the introduction of cut and carries systems for grass on these hillsides for livestock use.

On the other hand, climate change can offer new opportunities for productive and Sustainable Land Management (SLM) practices, such as reforestation, improved water management, integrated soil fertility management, conservation agriculture, agroforestry, improved rangeland management and others as a result of changing biophysical conditions. SLM can also reduce vulnerability and help people adapt to climate change. For example, according to Arba Minch zurea woreda office of Agricultural and Natural Resource Development Department were reported that farmers investing in soil and water conservation measures as their most common response to maintaining forestland. Many SLM practices can increase soil organic carbon, and reduce the need for coping measures, like changing crops and livelihoods, clearing new lands for agriculture and migration.

The SLM practices reduce the variability of agricultural production (for example, soil and water conservation and organic practices that improve soil moisture holding capacity or integrated pest management practices that reduce vulnerability to pests), while others can help to diversify agricultural income (for example, agro-forestry or crop rotations).

12. Analysis of policies, programmes and related national and regional priorities

The Government of Ethiopia has formulated a series of policies, strategies and programmes to promote agricultural development to achieve food and nutrition security and build resilience.

The Government implemented the first Growth and Transformation Plan (GTP) from 2010 to 2015 and has developed a second Plan, GTP II, for the period 2016–2020. The overarching objective of GTP II is the realization of Ethiopia’s vision of becoming a middle income country by 2025. GTP II considers the agriculture sector as one of the major sectors driving growth in the country, and therefore focuses on improving agricultural production, productivity and commercialization (including crop and livestock subsectors); reducing the degradation of natural resources and

improving their productivity; reducing vulnerability to disasters; and building disaster prevention, preparedness and mitigation capacity through ensuring food security.

The Government of Ethiopia has also developed an Agriculture Sector Policy and Investment Framework (PIF) for the period 2010–2020. The PIF provides a strategic framework for the prioritization and planning of investments that will drive Ethiopia’s agricultural growth and development. It is designed to operationalize the Comprehensive Africa Agriculture Development Programme (CAADP) Compact signed by the Government and development partners. Hence, Government priorities set under GTP II feed into the Government’s commitment to the implementation of the PIF.

A disaster risk management (DRM) policy has recently been developed by the Government of Ethiopia, which provides a framework with the aim to enable vulnerable populations to withstand impacts and reduce damage caused by hazards and disasters. The Government also recognizes climate change as an important strategy with development challenge and has accordingly developed a climate-resilient green economy (CRGE) the goal of minimizing greenhouse gas emissions that contribute to climate change. Furthermore, recognizing that nutrition requires a multi-sectorial approach to achieve desired impacts, the Government has developed a National Nutrition Strategy and Programme. The National Nutrition Programme has two components: service delivery, mainly focusing on cost-effective, direct nutrition interventions; and strengthening the implementation of nutrition-sensitive interventions, which promotes the strong link between agriculture and nutrition.

12.1 National Policy and Strategy Played about land use Administration and NRM

There are policy and strategies support natural resource management implementation. This includes (i) policies on natural resource management (ii) environment and related acts (iii) policy on biodiversity conservation and (iv) police on land use and administration.

The policies and acts issued at federal and/or regional level provide institutional support for the conservation for the natural resource in general and ecological biodiversity in particular. Federal development policies adopted at regional level suit the letter's specific circumstance and provide legal frame work for their implementation.

12.2 The FDRE Constitution

The Federal Democratic Republic of Ethiopia constitution issued in August 1995 has several provisions, which have direct policy, legal and institutional relevance for the appropriate implementation of environmental protection and rehabilitation action plans to avoid, mitigate or compensate the adverse effects of development actions. Article 40 of the constitution proclaims that land and natural resources are commonly owned by the people of Ethiopia and shall not be subject to sale or other means of exchange. It stipulates the rights of Ethiopian farmers and pastoralists to obtain land for cultivation and for free grazing without payment and the protection against eviction from their possession.

In articles 43, 44 and 92 referring the rights for development and environmental obligations, the following are important provisions of the constitution:

- People have the right to improved living standards and to sustainable development,
- People have the right to full consultation and to the expression of views in the planning and implementations of environmental policies and projects that affect them directly
- People have the right to commensurate monetary or alternative means of compensation, including relocation with adequate state assistance for persons who have been displaced or whose livelihoods have been adversely affected as a result of State programs
- The people and the state have common responsibility/obligation to protect the environment
- The state endeavors to ensure all people live in a clean and healthy environment

- The state shall ensure that the design and implementation of development projects will not damage or destroy the environment.

12.3 Regional states constitutions:

Regional states have their own constitutions upholding the federal constitution in its entirety and constituting their regional particulars. All the regional state constitutions have addressed land and natural resources management and environmental protection. The regional states constitutions state that:

- The regional governments are entrusted to administer land and natural resources in the name of the people and deploy for the common benefit of the same;
- The regional governments and all citizens of the regions are responsible for the conservation of natural resources and the environment;
- Concerned communities shall be given opportunity to express their opinions in the formulation and implementation of policies in relation to the environment.

12.4 Environmental Policy of Ethiopia

The environmental policy of Ethiopia, approved in 1997, is aimed at guiding sustainable social and economic development of the country through the conservation and sustainable utilization of the natural, man-made and cultural resources and the environment at large. The policy lists specific objectives encompassing wide range of environmental issues to be addressed through the adoption of the policy. It also provides overarching environmental guiding principles to be adopted to harmonize the environmental elements in sectorial, cross-sectorial and other policies. The policy clearly outlined the sectorial environmental policies, relevant to environmental management among others are: (i) Soil Husbandry and Sustainable Agriculture; (ii) Forests, Woodlands and Trees; (iii) Genetic, Species and Ecosystem Biodiversity; (iv) Water Resources; (v) Energy Resources; (vi) Human Settlement, Urban Environment and Environmental Health.

12.5 Regional Environmental Protection Agencies (REPAs):

Regional Environmental Protection Agencies (REPAs):the Proclamation No. 295/2002 decrees that each national regional state shall establish an independent regional environmental agency or designate an existing agency that shall, based on the Ethiopian Environmental Policy and Conservation Strategy and ensuring public participation in the decision making process. REPAs are responsible for:

- Coordinating the formulation, implementation, review and revision of regional conservation strategies, and,
- Environmental monitoring, protection and regulation.
- Ensuring the implementation of federal environmental standards or, as may be appropriate, and issue and implement their own no less stringent standards.
- Preparing reports on the respective state of the environment and sustainable development of their respective states and submits the same to the Authority.

12.6 Biodiversity Conservation and Research Policy

The biodiversity policy was approved in 1998 and it provides policy guidance towards the effective conservation, rational development and sustainable utilization of the country's biodiversity. The policy objectives accentuate public participation in biodiversity conservation, development and utilization, and also ensure that communities share from the benefit accrued from the utilization of the genetic resources and their traditional knowledge. The policy consists of comprehensive provisions on the conservation and sustainable utilization of biodiversity, and it underlines the requirements for implementers to adopt during planning and operational phase of projects and for those projects engaged in biological resource utilization to follow ESIA procedures.

13. Proclamations and Environmental Guidelines

13.1. Proclamations

Environmental Protection Organs Establishment Proclamation, No. 295/2002

The proclamation was made to re-establish the Federal Environmental Protection Authority, to establish Sectorial Environmental Units and Regional Environmental Protection Agencies. The former FEPA is established to formulate policies, strategies, laws and standards, which foster social and economic development in a manner that enhance the welfare of humans and the safety of the environment, sustainable development projects and to spearhead in ensuring the effectiveness of the process of their implementation.

The former *Federal Environmental Protection Authority*, among others, has the powers and duties to:

- Coordinate measures to ensure that the environmental objectives provided under the Constitution and the basic principles set out in the environmental Policy of Ethiopia are realized;
- Prepare, review and update, or as necessary, cause the preparation of environmental policies strategies and laws in consultation with the competent agencies, other concerned organs and the public at large and upon approval, monitor and enforce their implementation;
- Liaise with competent agencies in the field of environmental protection and rehabilitation and support them in capacity development;
- Establish a system for environmental impact assessment of public and private projects, as well as social and economic development policies, strategies, laws, and programs s
- Provide advice and support to regions regarding the management and protection of the environment

13.2. Environmental Impact Assessment Proclamation, NO. 299/2002

The Environmental Impact Assessment Proclamation was decreed in December, 2002 in order to make ESIA a mandatory procedure for projects to be undertaken by the government, public or private entities that require environmental impact analysis. The Proclamation elaborates on considerations with respect to the assessment of positive and negative impacts and states that the impact of a project shall be assessed on the basis of the size, location, nature, cumulative effect with other concurrent impacts or phenomena, trans-regional context, duration, reversibility or irreversibility or other related effects of a project. Based on directives or guidelines pursuant to this proclamation, projects will be categorized as:

- Projects that are not likely to have negative impacts, and thus do not require environmental impact assessment; and
- Projects those are likely to have negative impacts and thus require environmental impact assessment.

As per the procedures in the proclamation, a proponent is required to undertake a timely environmental impact assessment, assess the possible adverse impacts of the proposed project, and propose the means of mitigation, and shall submit the study report to the relevant body (Federal or regional EPA) for review and decision. It is also a requirement that ESIA reports be prepared by an expert that meet the requirements specified under any directive issued by the Authority (regional/federal).

Jurisdictions in the Proclamation: The regional environmental agency in each region shall be responsible for the evaluation and authorization or any environmental impact study report and the monitoring of its implementation if the project is not subject to licensing, execution and supervision by a federal agency and if it is unlikely to produce trans-regional impact.

13.3 Rural land Administration and Use Proclamation, No. 456/2005

The main aim of the Proclamation is to conserve and develop natural resources in rural areas by promoting sustainable land use practices. In order to encourage farmers and pastoralists to implement measures to guard against soil erosion, the Proclamation introduces a Rural Land Holding Certificate, which provides a level of security of tenure. The MoANR is tasked with implementing the Proclamation by providing support and co-coordinating the activities of the regional governments. Regional governments have an obligation to establish a competent organization to implement the rural land administration and land use law. Accordingly under the BoANRD the land use and land administration core process are currently responsible for rural land administration. The Proclamation states that if a land, that has already been registered, is to be acquired for public works or for investment, compensation commensurate with the improvements made to the land shall be paid to the land use holder or substitute land shall be offered. The Proclamation imposes restrictions on the use of various categories of land, for example wetland areas, steep slopes, land dissected by gullies, etc.