

EASTERN NILE TECHNICAL REGIONAL OFFICE



**NBI – Institutional Strengthening Project
PROJECT DELINEATION AND PRIORITIZATION**

**NBI – Institutional Strengthening Project
PROJECT DELINEATION AND**

PRIORITIZATION

ABBAY SUB-BASIN

MAIN REPORT

(FINAL)

10th December, 2012

CONTENT

Contents

EASTERN NILE TECHNICAL REGIONAL OFFICE.....	1
LIST OF ACRONYMS AND ABBREVIATIONS.....	iii
DISCLAIMER.....	iv
ACKNOWLEDGEMENTS	iv
1. BACKGROUND.....	6
2. OBJECTIVES AND SCOPE	7
3. APPROACH AND METHODOLOGY.....	8
4. NATIONAL SETTING	9
4.1 Bio-physical and Socio-economic Setting.....	9
4.2 Administrative Structure.....	11
4.3 National and Regional Policy Framework	12
4.4 Overview of Situation and Issues.....	13
5. REVIEW OF PROJECT PROFILES AND DELINEATION OF INVESTMENT PROJECTS.....	15
PROFILE 1. INTEGRATED WATERSHED MANAGEMENT – ABBAY SUB-BASIN, CHEMOGA CATCHMENT, ETHIOPIA IN AN AREA OF HIGH POTENTIAL BUT DEGRADING RESOURCE BASE	15
Profile 2: INTEGRATED WATERSHED MANAGEMENT – ABBAY SUB-BASIN, FINCHA'A CATCHMENT, ETHIOPIA IN AN AREA OF HIGH POTENTIAL BUT DEGRADING RESOURCE BASE	21
PROFILE 3. INTEGRATED WATERSHED MANAGEMENT – ABBAY SUB-BASIN, JEMA CATCHMENT, ETHIOPIA IN AREAS OF LOW AGRICULTURAL POTENTIAL AND DEGRADING RESOURCE BASE	28
PROFILE 4. INTEGRATED WATERSHED MANAGEMENT – ABBAY SUB-BASIN, JITA (UPPER BESHILLO) CATCHMENT, ETHIOPIA IN AN AREA OF LOW AGRICULTURAL POTENTIAL AND DEGRADING RESOURCE BASE.....	34
6. RANKING AND PRIORITISING PROPOSED PROJECTS.....	41
6.1 Purpose of Ranking and Prioritising	41

6.2	List of Criteria	41
6.2.1	Provisional List of Criteria for Project Selection	41
6.2	Extended List of Criteria for Ranking and Prioritizing Proposed Projects	42
6.3.1	Process	44
6.3.2	Comparative Assessment of Projects by individual criteria.....	44
6.3.3	Sub Criteria Assigned Weighting Factor	44
6.3.4	Applying Weighting Factors to the Four Main Criteria	46
6.4	Results of Ranking and Prioritisation	46
ANNEX 1. TERMS OF REFERENCE		53

LIST OF ACRONYMS AND ABBREVIATIONS

CRA	Cooperative Regional Assessment
EDRI	Ethiopian Development Research Institute
ENSAP	Eastern Nile Subsidiary Action Programme
ENTRO	Eastern Nile Technical regional Office
EWDCD	Ethiopian Wildlife Development & Conservation Directorate
FAO	Food and Agricultural Organization
GEF	Global Environmental Fund
IDEN	Integrated Development of the Eastern Nile
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
Km	Kilometre
Km ²	Square kilometre
MoA	Ministry of Agriculture
MCM	Million Cubic Meters
MWR	Ministry of Water Resources
NBI	Nile basin initiative
NTEAP	Nile Transboundary Environmental Action Programme
T	ton
UNDP	United Nations development Programme
WBISPP	Biomass Inventory & Strategic Planning Project
WCGA	Wildlife Conservation General Administration
WSM	Watershed Management

DISCLAIMER

The maps in this Report are provided for the convenience of the reader. The designations employed and the presentation of the material in these maps do not imply the expression of any opinion whatsoever on the part of the Eastern Nile Technical Office (ENTRO) concerning the legal or constitutional status of any Administrative Region, State or Governorate, Country, Territory or Sea Area, or concerning the delimitation of any frontier.

ACKNOWLEDGEMENTS

The Consultant wishes to thank all staff in the Bureaus of Agriculture who generously gave of their time and experience in delineating the four Watersheds. He also wishes to thanks ENTRO for the support provided during the implementation of the Project.

1. BACKGROUND

The results of the Trans-boundary, Distributive and Cooperative Mechanisms Analyses of Eastern Nile Watershed Management Cooperative Regional Assessment (CRA) provided a broad understanding of:

- the baseline conditions in each watershed, root causes of land degradation on national level and lessons from past experience in watershed management,
- each of the selected sub-basins as "*integrated*" watershed systems,
- the challenges and opportunities for cooperative watershed management,
- the cumulative costs and benefits of alternative watershed management interventions,
- the potential distribution of costs and benefits under alternative benefit sharing scenarios, and
- the nature and scope for generating regional public goods¹ through the watershed management project(s).

The Watershed Management CRA terms of reference called for the identification:

through analysis, the next round of watershed management projects, that are promising from a local livelihoods as well as a regional benefits point of view and are rational in view of anticipated multipurpose developments in the Eastern Nile region .

The Distributive Analysis identified a comprehensive set of watershed management interventions to be implemented within Ethiopia, Sudan and Egypt. The majority of these had substantial in-country benefits in terms of reducing poverty, sustaining livelihoods and arresting the decline in the integrity of the natural resource and environmental base of the countries concerned. A number of these had regional and global benefits. Many of the interventions identified were, or were likely to be in the future, integral parts of on-going development programmes.

The Cooperative Mechanisms Analysis examined a continuum of increasing levels of potential cooperation amongst the three riparian countries of the Eastern Nile Basin. These ranged from uni-lateral action with no cooperation through coordination (e.g. of information collection and sharing), collaboration, collaborative research or collaborative Watershed Management Planning) to Joint Activities (e.g. administration of Trans-boundary National Parks). Within this framework many of the interventions outlined in the Distributive Analysis required a relatively low level of cooperation between the riparian countries, notwithstanding downstream (i.e. regional or Global benefits that could accrue to them.

A number of criteria were identified to enable a selection to be made of a first round set of potential projects from those identified in the Trans-boundary Analysis and outlined in the Distributive Analysis.

- Support and enhance cooperation among the three Riparian Countries in sustainable watershed management,
- Local, National, Regional and where possible Global benefits would accrue to the projects, and

- The projects would where possible support other IDEN Projects and other NBI projects.
- The projects would address threats to Environmental and Natural Resource Hotspots

The "Benefits" criterion was broad in its interpretation. Benefits included positive impacts on (i) poverty reduction, (ii) support to sustainable livelihoods and reducing vulnerability, (iii) reducing or arresting natural resource degradation. Benefits accruing to these development goals are inextricably linked and were thus, considered together. Benefits were also assessed at the local/national, Regional/Eastern Nile Basin and the Global scales. All selected Projects have benefits at all three levels. All Projects selected also support to a greater or lesser extent on-going or proposed Projects within the NBI or ENSAP framework.

Two sets of follow-on projects were identified:

- National Investment Projects
- Cooperative Knowledge Development Projects.

The main criteria for the selection of the Investment Projects was that they addressed current threats to natural resource degradation in ways that negatively impacted on local household livelihoods and also negatively impacted on downstream river users.

This Consultancy is concerned with four of the Investment Projects located within the Abbay Sub-basin within Ethiopia

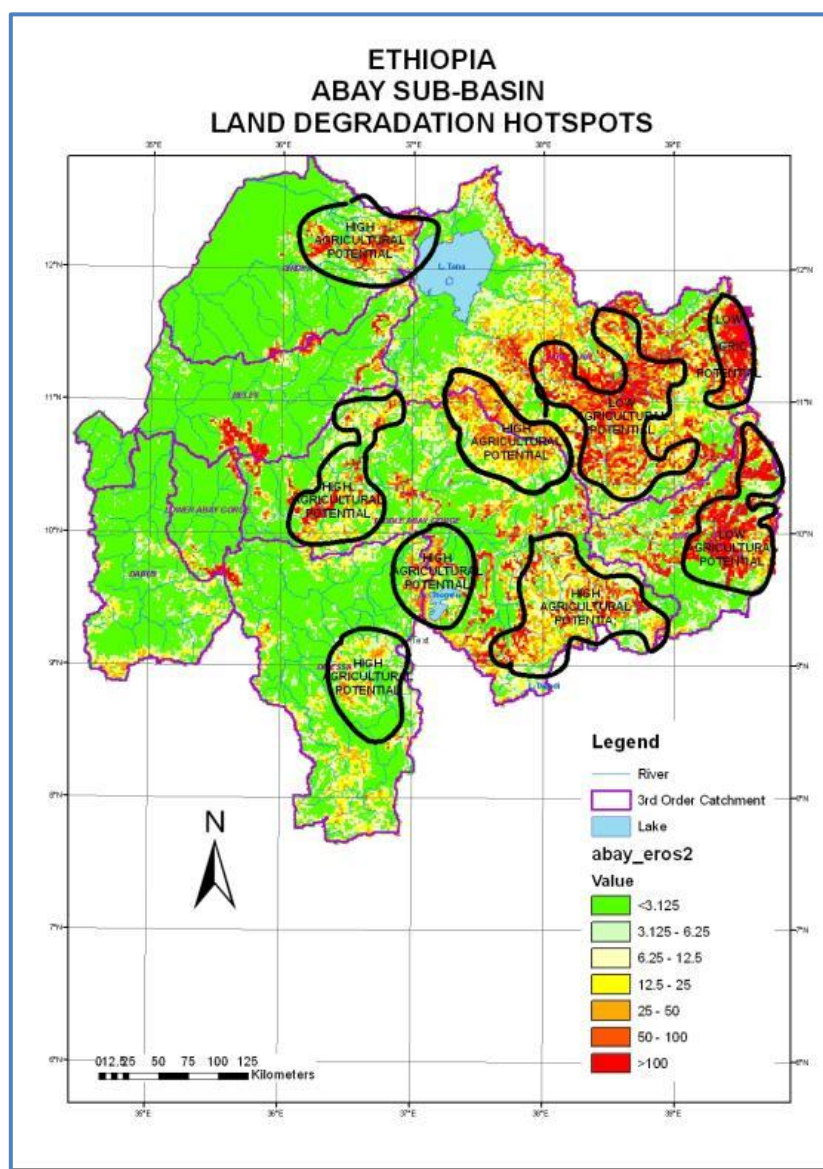
2. OBJECTIVES AND SCOPE

The objective of the study is:

“to define watershed investment projects from the broadly identified “hot spot” areas by the CRA Study for Watershed Management for detailed project preparation. The assignment involves the delineation of each hot spot area into sub-watersheds of manageable size and to prioritize them on agreed criteria.”

The Watershed Management CRA identified a number of land degradation hotspots in the Abbay Basin. These are areas of increasing population pressure on a degrading natural resource base, increasing food insecurity, with increasing household inability to invest in sustainable land management practices due to declining household and community natural, physical, social and human capital assets. The selected hotspots are located in areas of both low and high agricultural potential where land degradation processes (erosion and soil nutrient depletion) are severe and of long standing.

Four watershed management projects have been selected by ENTRO for delineation, project development and prioritization. Each delineated sub- watershed is described in terms of socio-economic and biophysical characteristics. Full reports have been compiled and it is envisaged that ENTRO will subsequently mobilize resources for the eventual preparation of the prioritized projects in collaboration with the ENSAP Teams.



Map 1. Abbay Basin: Land Degradation Hotspots

3. APPROACH AND METHODOLOGY

Stakeholder participation and the adoption of an integrated watershed management approach were essential elements that were adopted in the approach.

The delineation of the target sub-watersheds was undertaken through a document review and field assessment. This involved reviewing the information provided by ENTRO including:

- Country Analysis Reports for Ethiopia,
- Trans-boundary Analysis Reports for the Abbay- Blue Nile Sub-basin,
- Distributive Analysis,
- Watershed management in the Eastern Nile Basin: Constraints and Challenges, and
- Project profiles.

An important activity of the assignment was the development of a list of criteria for prioritizing and ranking the ten Projects. This was undertaken in a sequential manner. An initial list of criteria was developed from the criteria that were used in the original CRA Watershed Management Programme Report. This provided guidance on the type and level of information to be collected for the purpose of micro-catchment delineation. The criteria were subsequently refined through a process of consultation with relevant stakeholders.

Additional information was collected on the four sub-watersheds. This information was obtained through a document review and field data collection. This was reviewed, analyzed and collated. Information was collected on past and on-going projects and programmes in each of the sub-watersheds to determine lessons learnt and allow focused assessments of issues, challenges and project interventions.

From the above analysis a provisional delineation of each project was made into Watersheds of manageable size (i.e. 1,000 – 2,000 km²).

Key issues, challenges and potentials for each of the four micro-watersheds were identified from the documentary and field information analysis and from the Stakeholder consultation.

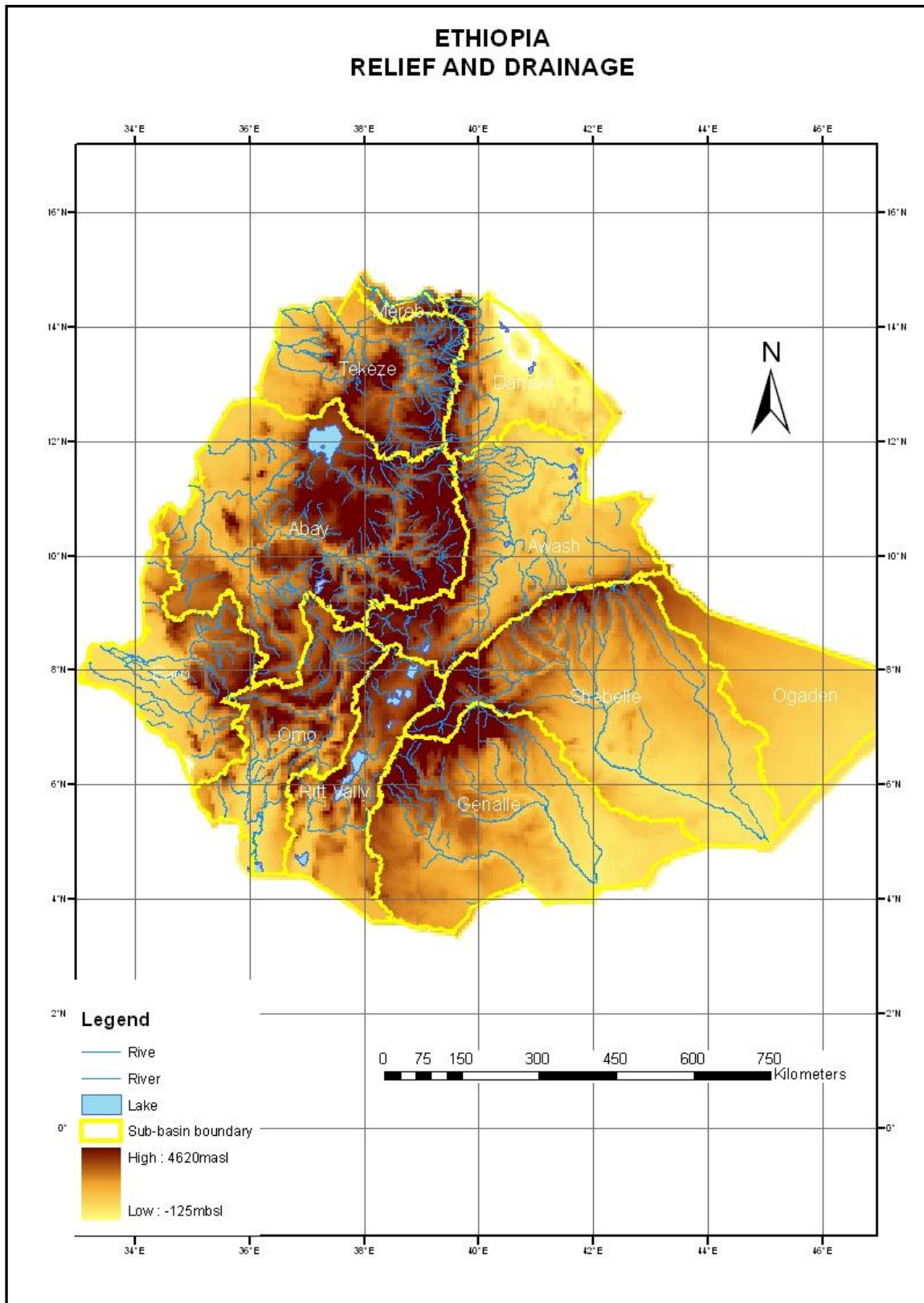
4. NATIONAL SETTING

4.1 Bio-physical and Socio-economic Setting

With a surface area of 1.1 million square kilometers, Ethiopia is located in the northeastern part of Sub-Saharan Africa between latitudes 3° and 15° north. The estimated population in 2010 was 79.8 million, the second highest in Sub-Saharan Africa. Some 84 percent of the population are rural (Population Census Commission, 2010). The estimated rural population growth rate (1995-2007) was 2.6 percent per annum and the urban rate was 4.5 percent. These growth rates are projected to decline between 2000 and 2030. Nevertheless the total population is projected to rise to 129 million by 2030.

The Highlands¹ form a broad plateau between 1,500 and 2,500 masl with isolated peaks rising as high as 4,600 masl. They cover 43 percent of the total area. The favorable climatic conditions of the Highlands sustain 88 percent of the population (Map 2). The Highlands account for 95 percent of the cultivated land, and also support 75 percent of the cattle population of 33 million. Most crop cultivation in the Highlands uses the plough and has a history stretching over many millennia. Ethiopia is one of the 12 Vavilov centres of crop genetic diversity, being a main genetic diversity center for crops such as arabica coffee, enset, niger seed, sorghum, finger millet, durum wheat, barley and many others. Given the erosion of genetic material elsewhere in the world, this diversity is assuming an increasing global importance.

¹ "Highlands" in Ethiopia is land over 1,500 meters above sea level.



Map 2. Ethiopia: Relief and Drainage

Surrounding the highlands on all sides are the lowlands. To the east, southeast and south they are semi-arid to arid with an annual rainfall below 600 mm. These lowlands are inhabited by transhumant pastoralists who herd cattle and sheep (mainly grazers), and goats and camels (mainly browsers). In the Western Lowlands rainfall is much higher but the prevalence of trypanosomiasis precludes

livestock production. This factor, together with the prevalence of human tropical diseases not found in the Highlands, has meant that until recently these areas were sparsely populated. However, under increasing population pressure in the Highlands these areas are now increasingly being settled.

In the high rainfall areas of the southwest and southeast highlands the original vegetation of the highlands was broad-leaved montane high forest. Further north with lower rainfall this changed to a mixed coniferous forest (*Podocarpus* spp. and *Juniperus* spp.) and woodland. In the driest parts of the north this in turn gave way to low *Juniperus* woodland. However, millennia of expanding settlement and clearing for agriculture has left only 3.6 percent of the Highlands covered with forest. The semi-arid lowlands of the east, southeast and south support a cover of *Acacia-Commiphora* woodland and shrubland. Increasingly these Lowlands are the source of fuelwood and charcoal for the highlands. In the wetter western lowlands this is replaced by *Combretum-Terminalia* woodland, with extensive areas of Lowland Bamboo (*Oxytenanthera abyssinica*).

In the Highlands severe population pressure, poor cultivation practices, steep lands and overgrazing by livestock has led to accelerated soil erosion that now affects more than 50 percent of the cultivated area. Some 95 percent of the cultivated area is farmed by smallholder farmers with average holdings of less than 2 hectares. In many areas an increasing proportion of the rural population have no land. With frequent droughts, each year more than 6 million people require food assistance.

The household energy requirements of this large and fast growing population are supplied almost entirely from traditional energy sources. Biomass energy at the national level provides more than 96.9 percent of the total domestic energy consumption: 78 percent from woody biomass, 8 percent from crop residues, and 11 percent from animal dung. Modern energy provides only 3.1 percent of energy consumption. This has serious implications for the natural resource base. Because of the scarcity of fuelwood many households burn dung and crop residues. The use of dung precludes its contribution of the soil nutrient pool, exacerbating declining crop yields due to soil erosion. The burning of crop residues precludes their use as livestock feed for a livestock population barely meeting its energy requirements for maintenance.

4.2 Administrative Structure

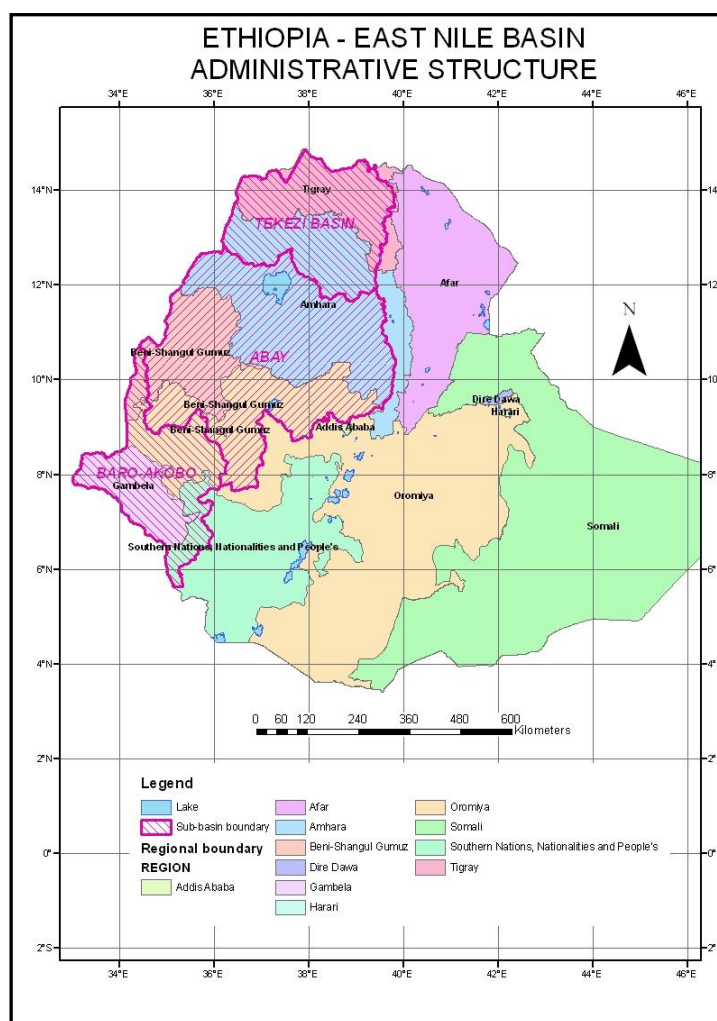
In 1991 Ethiopia adopted a federal structure of government with 9 Regional States, the City Administration of Addis Ababa and the Dire Dawa Administrative Council (see map 3).

Many fiscal and administrative powers of the central government were devolved to the Regions. Within the Baro-Akobo, Abay and Tekezi River Basins there are six Regional States:

- Tigray
- Amhara
- Beneshangul-Gumuz
- Oromiya
- Southern Nations, Nationalities and Peoples (SNNP)
- Gambela

Within each Region there is a three tiered structure of Government:

- Region
- Wereda
- Rural Farmers Association (Kebele)



Map 3. Ethiopia: Administrative Structure and East Nile Sub-basins

In Oromiya and SNNP Regions there is a fourth tier - the Zone. The area of the Farmers Association may be sub-divided into smaller areas for the administration of natural resources (e.g. Development Team).

The ministries at the federal level are generally mirrored at the Regional level and to a lesser extent at the woreda level. Ministries at Regional are referred to as "Bureaus" and Wereda levels to "Offices". The most relevant ministries/bureaus for watershed management include:

- Agriculture and Rural Development
- Water Resources
- Finance and Economic Planning
- Federal Environmental Protection Authority and Regional Environmental Protection, Land Administration and Use Authorities
- National Disaster Prevention and Preparedness Commission and Regional Food Security Programme Coordination and Disaster Prevention Offices

4.3 National and Regional Policy Framework

A substantial body of policies and policy instruments are already in place with a direct or potential bearing on natural resource management and watershed management. In general, these have been

adopted at the regional level.

The main policies and proclamations are:

- Conservation Strategy of Ethiopia (CSE) (1997)
- Agricultural Development Led Industrialisation (ADLI) (1992)
- Ethiopian Water Resources Management Policy (1999)
- Subscription to the Millennium Development Goals (2000)
- Sustainable Development and Poverty Reduction Programme (SDPRP) (2002)
- Food Security Strategy (2002)
- New Coalition for Food Security Programme (2004)
- Rural Development Policy and Strategies (2003)
- Productive Safety Net Programme – Programme Implementation Manual (2009)
- Plan for Accelerated and Sustainable Development to End Poverty (2005) more recently superseded by the National Growth and Transformation Programme (2009)
- Water resources policies and legislation
- Environmental Policy and legislation
- Rural Land Administration and Land Use Proclamations

4.4 Overview of Situation and Issues

The country's population is currently approximately 64 million. The rate of population growth is expected to decline from 3 to close to 2 percent per annum by 2030, when the country's population will reach between 120 to 130million people. Some 85 percent reside in the rural areas and most are dependent on agriculture or pastoralism for their livelihoods (Alemneh Dejene, 2003).

The high seasonality of rainfall over the Ethiopian Highlands, which is confined to a period of three to five months results in commensurate seasonality in river flows. The peak flows are able to transport very high sediment loads during these periods and lead to the high sedimentation rates in Sudan and Egypt.

The highlands of the Abbay River Basin contain many areas with structural food deficits which suffer frequent reductions in crop production due to low rainfall. The key issues are soil degradation, livestock feed deficits, fuelwood wood consumption rates in excess of sustainable yield, burning of dung and accelerated soil nutrient breaches and poor non-farm employment opportunities (Hagos, Pender and Gebreselassie, 1999). Nevertheless, in recent years the uptake of soil and water conservation measures has been impressive and in many areas of Tigray the rate of adoption exceeds 40 percent of farmers². This has been mainly due to the visible impacts of the increase in soil-water conservation, risk reduction and significant crop yield increases. Communal grazing land management systems are in place in 80 percent of the villages. On-farm tree planting however lags behind that in the Amhara Region, possibly due to a ban on tree planting in croplands.

The proximate causes of infield soil erosion are reasonably well known although the science of the linkages between erosion and deposition in the landscape, sediment delivery to streams and total sediment yields with increasing basin size is less certain. An understanding of the underlying causes is still imperfectly understood, notwithstanding the impressive amount of research work undertaken over the past decade, particularly with the African Highlands Initiative (Pender, 2005). Underlying many of these is the almost total dependence on the natural resource base by the rural population. The results of research to-date may be briefly summarized as:

² See figure 3 "Terracing in the Ethiopian Highlands", in Mahmud Yesuf & J. Pender "Determinants and Impacts of land management Technologies in the Ethiopian Highlands: A Literature Review - Draft", EEPFE and IFPRI.

- The profitability of land management technologies is very important, though not the only factor influencing adoption or non-adoption.
- ++Risk is also a very important consideration. Profitability becomes more important for technologies that are risk increasing (e.g. chemical fertilizer) than those that are risk reducing (SWC investments in moisture stressed areas).
- In the context of imperfect markets and institutions the suitability and feasibility of land management interventions in different locations and farmer circumstances are very context dependant making generalisations difficult. The numerous potential factors include: agro-ecological conditions; nature of the technology; land tenure relations; household endowments of natural, human, social and financial assets. Better market access appears to be associated with less SWC investment but more use of fertilizer.
- Land tenure insecurity and limited transfer rights appear to discourage land management investments, but the results are mixed. It appears to have less impact on the adoption of inputs (e.g. fertilizer) than long-term investments (e.g. SWC structures).
- The impact of the degree and type of household livelihood assets on investment decisions is mixed.
- The Malthusian argument of the negative impacts caused increasing population pressure, and Boserup argument for population induced agricultural intensification may both be correct in the Ethiopian situation. Farmers do respond to population pressure with intensified production, but this may not be sufficient to prevent resource degradation and increasing poverty. In this respect, Ethiopia compares poorly with the situation in Machakos, Kenya described by Tiffen et al (1994).

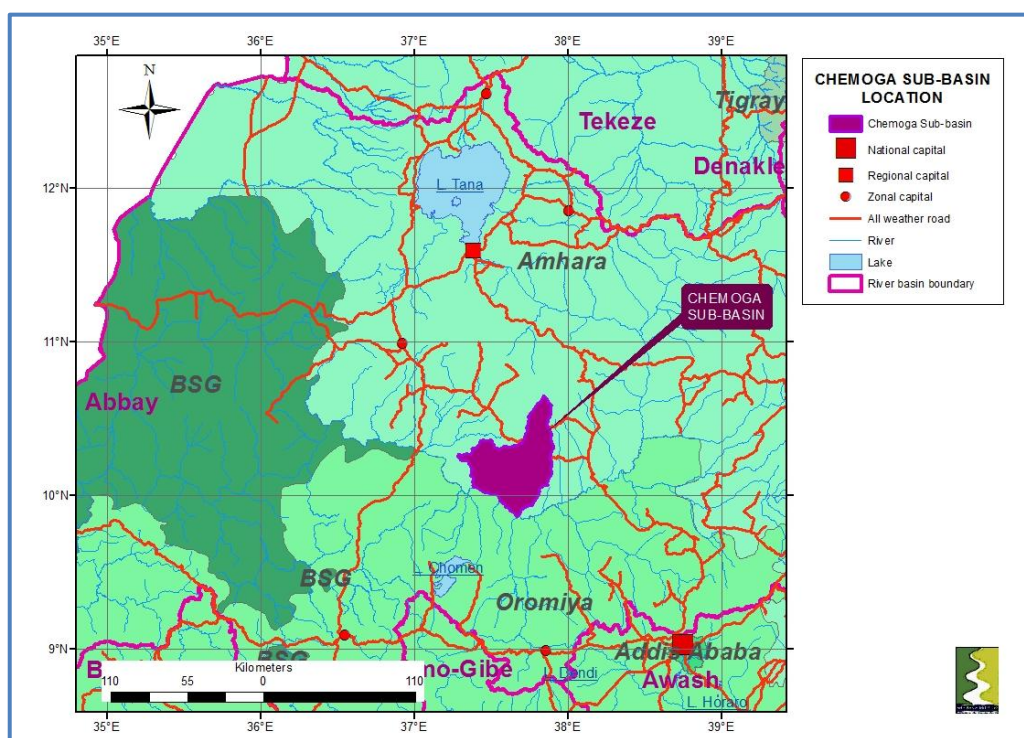
5. REVIEW OF PROJECT PROFILES AND DELINEATION OF INVESTMENT PROJECTS

PROFILE 1. INTEGRATED WATERSHED MANAGEMENT – ABBAY SUB-BASIN, CHEMOGA CATCHMENT, ETHIOPIA IN AN AREA OF HIGH POTENTIAL BUT DEGRADING RESOURCE BASE

Location

The Chemoga Catchment is located on the southern flanks of the Choke Mountain Chain and is some 2,738 km² in extent. It is sub-divided into 3 Watersheds

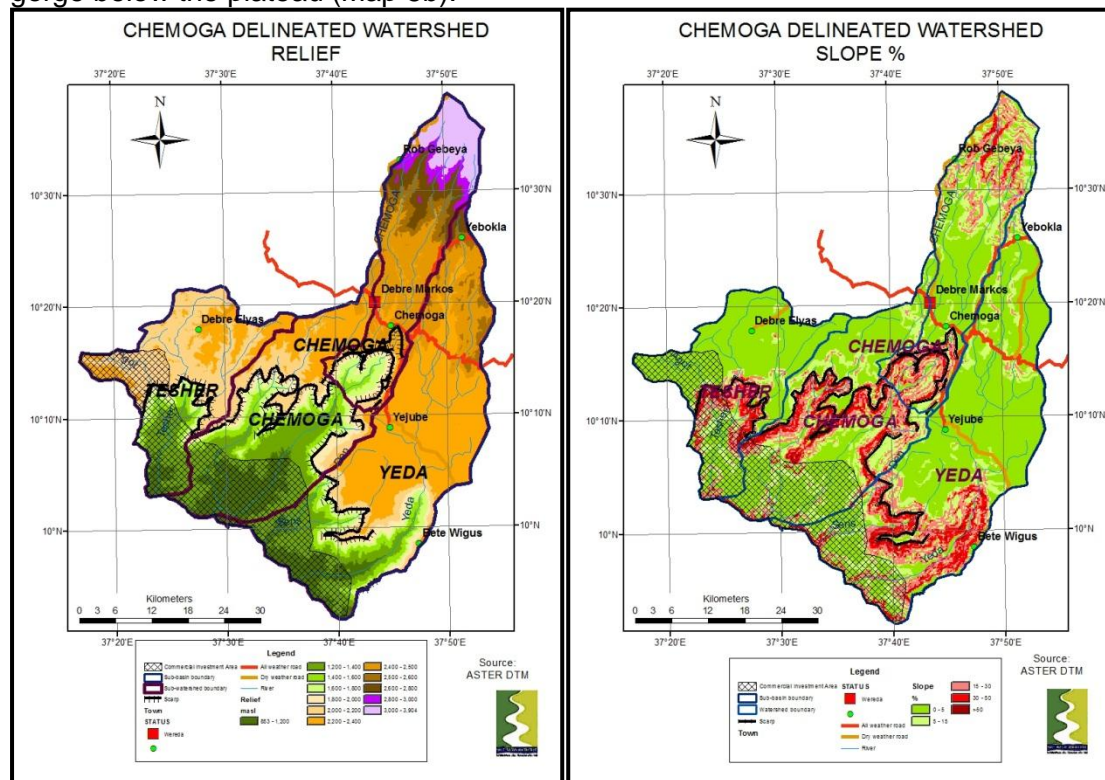
WATERSHED	AREA (HA)
CHEMOGA	120,875
TESHER	49,708
YEDA	103,006
TOTAL	273,589
LESS COMMERCIAL FARM AREA	71,200
NET WATERSHED AREA	202,389



Map 4. Location of Chemoga Watershed

Summary Description of the Chemoga Delineated Watershed

The upper part of the watershed is part of the Mount Choke mountain range and rises to 3,900masl (Map 5a). This falls to a wide plateau between 2,000 and 2,400masl, which terminates abruptly at the edge of the Abbay gorge. The gorge is between 2,000masl falling to 850masl at the Abbay River. The steepest slopes are found in the upper parts of the Sub-basin above the flat plateau and in the gorge below the plateau (Map 5b).



Map 5a Relief.

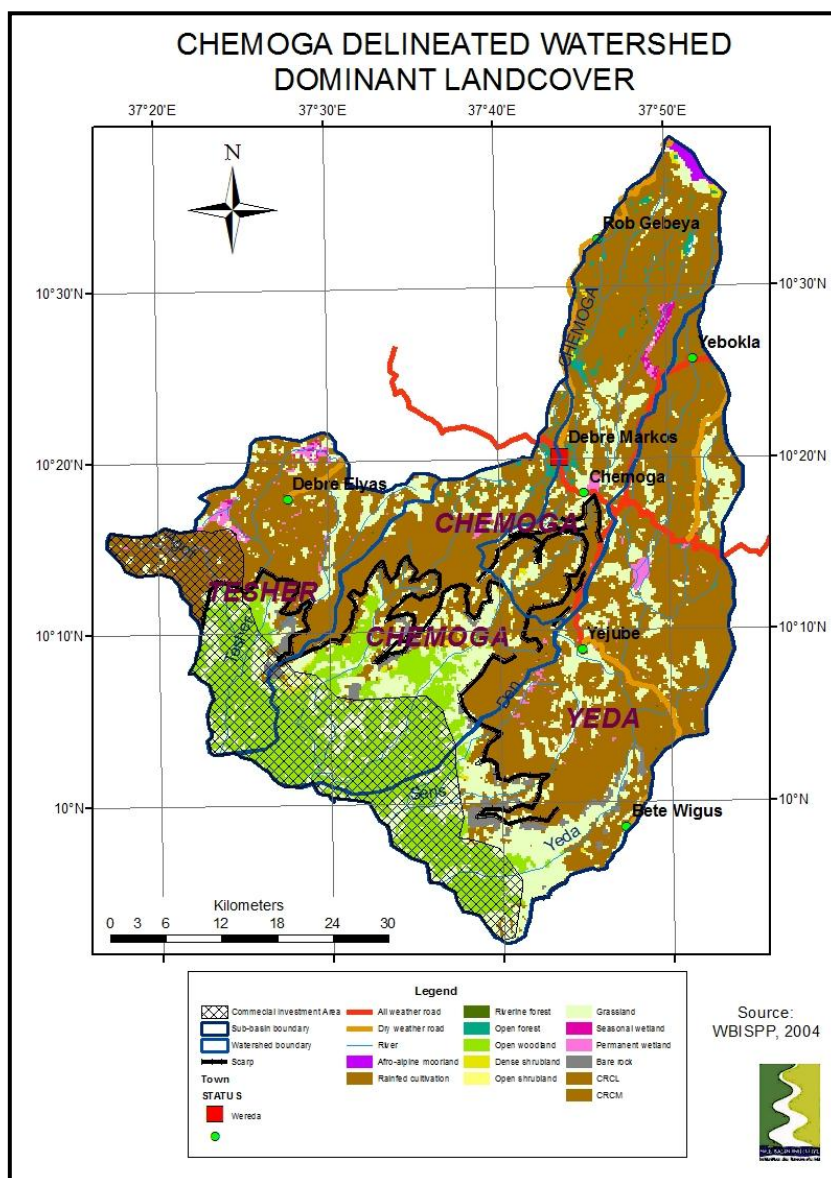
Map 5b. Slope (%)

The areas and percent of total area of the dominant landcover classes are shown in table 1 and their distribution in Map 6. The most widespread landcover is rainfed cultivation covering nearly 60 percent of the Sub-basin. Grassland and open woodland make up 21 and 15 percent of the area. The remaining 4 percent of the area is covered rock, wetland, plantation shrubland and riverine forest.

Table 1. Chemoga Sub-basins: Dominant Landcover (km2)

Landcover type	Ha	%
Rainfed cultivation	162,427	59.3%
Grassland	57,325	20.9%
Open woodland	40,967	14.9%
Bare rock	4,249	1.6%
Wetland	3,881	1.4%
Plantation	2,578	0.9%
Dense shrubland	1,569	0.6%
Afro-alpine moorland	737	0.3%
Open shrubland	204	0.1%
Riverine forest	156	0.1%
TOTAL	274,093	

The rainfed cultivation is confined to the highland and plateau areas with the grassland and woodland located in the Abbay gorge.



Map 6. Dominant Landcover

Objectives

The objective of this Project is to provide support to the Regional Government to arrest severe land degradation hotspots within areas of low agricultural potential in the Chemoga Catchment of the Abbay Sub-basin, strengthen household and community livelihood strategies and contribute to the alleviation of poverty.

Information Present

Information on the Abbay Basin is available in the WSM CRA Country Report on Ethiopia (Abbay Sub-basin), the Trans-boundary Report on the Abbay—Blue Nile Sub-basin, the Distribution Analysis Report (chapter on Abbay-Blue Nile Sub-Basin and the Ethiopian Ministry of Water

Resources (MWR) Abbay Basin Master Plan.

Additional Information

Much research work has been undertaken on soil erosion by (i) the Soil Conservation Research Project (SCRIP) supported by the University of Berne, Switzerland and (ii) by the University of Makelle supported by the University of Leuven, Belgium. Both projects provide a wealth of information on soil loss rates, their impact on crop production and the efficiency of SWC structures.

Lessons learnt

Lessons learnt over the past two decades clearly indicate the need for a participatory approach to watershed management, that interventions must be mutually reinforcing and closely integrated and that a wide range of supporting interventions are required that address the wider issues of reducing market transaction costs and increasing market integration, as well as improving access to social infrastructure (education and health), micro-credit and skills training, capacity building and support to micro, small and medium scale enterprises among others.

Other Projects/Programmes in the Chemoga Watershed

Amhara Region has a comprehensive government soil and water conservation (SWC) programme through support to Communities and households. However, the Delineated Watershed falls outside the Productive Safety Net Programme (PSNP) of the Ethiopian Food Security Programme and outside the Sustainable Land Management Programme which operated in the higher potential areas of Ethiopia.

Key Issues

The Catchment exhibits problems of severe soil erosion on the steep slopes of Choke Mountain and waterlogging on the flat plateau areas below the mountain. Uptake of physical soil conservation structures has been slow with farmers complaining of loss of land to structures and temporary waterlogging behind physical structures. Population densities are high and population support capacities have been reached or exceeded in a number of woredas. Livestock feed shortages are acute exacerbated by inaccessibility of poorly drained wetlands and croplands in the wet season.

Nevertheless, the catchment has a number of potentials for developing sustainable livelihood opportunities including small and medium scale irrigation and water harvesting together with adoption of a wider range of crops (fruit trees, vegetables), biological soil erosion control measures; improved in-field drainage using broad beds; increased forage and trees through area enclosure and planting of multi-purpose trees; on-farm forage development and livestock improvement including dairying. Sustainable development of small and medium scale irrigation will be dependent on effective watershed management being implemented in the upper catchment.

These areas provide the greatest potential for agricultural development and are already some of the food surplus producing areas. A wide range of marketable agricultural production strategies are available. However, these areas are experiencing severe soil erosion and soil nutrient mining and declining soil fertility levels. With high population densities farm sizes are small. A key strategy is to intensify crop and livestock production taking advantages of synergies between crop and livestock production.

Project Stakeholders

Primary Project Stakeholders: These include the following:

- Rural agricultural households residing within the Chemoga Watershed with land holdings for cropping and access to communal grazing and forested lands;
- Landless rural households residing within the Chemoga Watershed who have access to communal lands for collection of fuelwood, medicinal herbs and water;
- Staff of the Bureau of Agriculture and Rural Development who will receive technical and logistical support.

Secondary Project Stakeholders: include:

- Operators of the Millennium dam who will benefit from reduced rates of sedimentation in the reservoir.

Technological Interventions by Development Domain

HIGHLAND: High Agricultural Potential (Low moisture stress risk) (a) Good Market Access (b) Poor market Access: Located above 1,600masl

(a) Overall Strategies: High Market Access

The opportunities for marketable agricultural development in this Domain are good with their good access to the Debre Markos market. Use of external inputs is likely to be profitable to farmers (Pender et al., 1999). Marketable agricultural products can include low value, high volume and perishable products. These could include crops such as tomatoes, potatoes, cabbage, milk and dairy products and honey production. The strategy for own-consumption agricultural production should be to ensure food security.

(b) Overall Strategies: Low Market Access

The opportunities for marketable agricultural development in this Domain are good with their good access to the Debre Markos market. Use of external inputs may be privately unprofitable (to farmers) but may be economically cheaper than importing food into the area (Pender et al., 1999). Marketable agricultural products will be limited to high value, low volume and non-perishable products. These could include crops such as onions and peppers, small livestock such as sheep and goats, and honey production. In parts of Ethiopia improved goat production by women has proved very successful, particularly for women-headed households. The strategy for own-consumption agricultural production should be to ensure food security. The long-term Government strategy is to improve accessibility to markets through feeder road and farm to market road construction and market access will improve.

(b) On-farm Interventions

Improved Soil Husbandry: The use of manure and compost increases soil organic matter and nutrients and increases water holding capacity. This intervention requires sufficient quantities of manure and residues, and labour. These interventions need to integrate with improved animal husbandry interventions.

Chemical fertilizer: This will be confined to areas with good market access and to cash crops (teff,

vegetables).

Improved tillage: Contour ploughing assists in reducing runoff and soil movement.

Grass Strips: The very high rainfall intensities and high overall rainfall cause waterlogging behind physical structures. Vetiver grass strips have proved very success in these high rainfall areas as they allow excess surface water to filter through slowly.

On-farm Forage Development: Backyard improved forage: forage grasses (e.g. including but not limited to *Pennisitum purpureum*, *Panicum maximum*), tree legumes (*Leucaena leucocephala*) and pigeon pea. The focus of the intervention is on improving small ruminant productivity.

On-farm Tree development: In areas with good market access trees for timber and fuelwood as well as fruit trees (citrus, avocado and mango) would be promoted. In areas with poor market access on-farm tree production for timber will be for own consumption only. However, there is the potential for fruit trees as citrus, avacados and mangos will bear transport costs.

On-farm Water Harvesting: Rainfall is variable and there is potential for water harvesting interventions to provide domestic and livestock water supplies as well as backyard irrigated vegetables.

(c) Interventions on Communal Lands

Cut-off Drains: A pre-requisite for in-farm soil conservation measures is a cut-off drain above cultivated areas. Even by themselves they can reduce in-field run-off and soil movement.

Road and track drains: run-off from roads needs to be controlled with small check dams and safe outlets to streams.

Gully Stabilization: This requires the integrated stabilization of both the gully and its watershed area. This will require a combination of livestock exclusion (in both watershed area and gully), and vegetative and structural measures (check dams, etc) within the gully. This intervention can be integrated with a communal forage development programme.

Communal Forage Development: To be effective and sustainable this best undertaken at the sub-kebele (tabia) level. This intervention usually requires some form of area closure with cut-and-carry, or controlled grazing or controlled hay production and harvesting. The site of the intervention can vary from steep and degraded hillsides, poorly drained valley bottoms, and stream edge buffers. A key object is to reduce livestock movement. The process of natural re-generation can be supplemented with over-sowing of herbaceous (*Pennisitum purpureum*, *Panicum maximum*) or tree legumes (*Leucaena leucocephala*) and pigeon pea but this increases costs. The intervention can also be integrated with communal tree production.

Small-scale Supplementary Irrigation: For high value non-perishable marketable crops (onions, garlic, peppers) using supplementary irrigation for maximum area (given good storability season price fluctuations are small).

(d) Other On-farm Strategies

Honey production: In densely populated areas where land is short honey production is not affected by land or cash constraints. Improved hive can substantially increase production.

(e) Other Strategic Interventions***Improving Rural and Urban Domestic (traditional/biomass) Energy Systems.***

The focus here is on domestic biomass (or “traditional”) energy sources. “Modern” energy sources are considered only in respect of their role as substitutions for biomass sources.

A number of strategies are proposed. In summary these are:

- a. Improved Mitads:** The annual reduction in wood use for mitad baking is 20%.
- b. Lakech Charcoal Stove:** publicity campaigns by Regional Bureaus of Rural Energy to maintain the momentum of stove adoption.
- c. Improved ceramic 'gounziye' Stove** with an annual fuelwood saving of 30%.

Improving Rural-urban socio-economic linkages in the context alternative livelihoods.

Experience in Ethiopia and elsewhere suggest a number of possibilities for small and medium sized urban centres (Barret et al. 2001, World Bank, 2004). These include:

- Increasing rural agricultural income by acting as demand and market nodes for agricultural produce from rural hinterlands.
- Reducing costs and improving access to a range of public and private services and goods from within and outside the immediate region by acting as a centre for production, processing and distribution of goods and services to rural hinterlands.
- Becoming centres for growth and consolidation of non-farm economic activities and employment for rural residents through the development of small and medium size enterprises or the relocation of branches of large private or public enterprises.
- Attracting rural migrants through the demand for non-farm labour.

Profile 2: INTEGRATED WATERSHED MANAGEMENT – ABBAY SUB-BASIN, FINCHA'A CATCHMENT, ETHIOPIA IN AN AREA OF HIGH POTENTIAL BUT DEGRADING RESOURCE BASE

Location

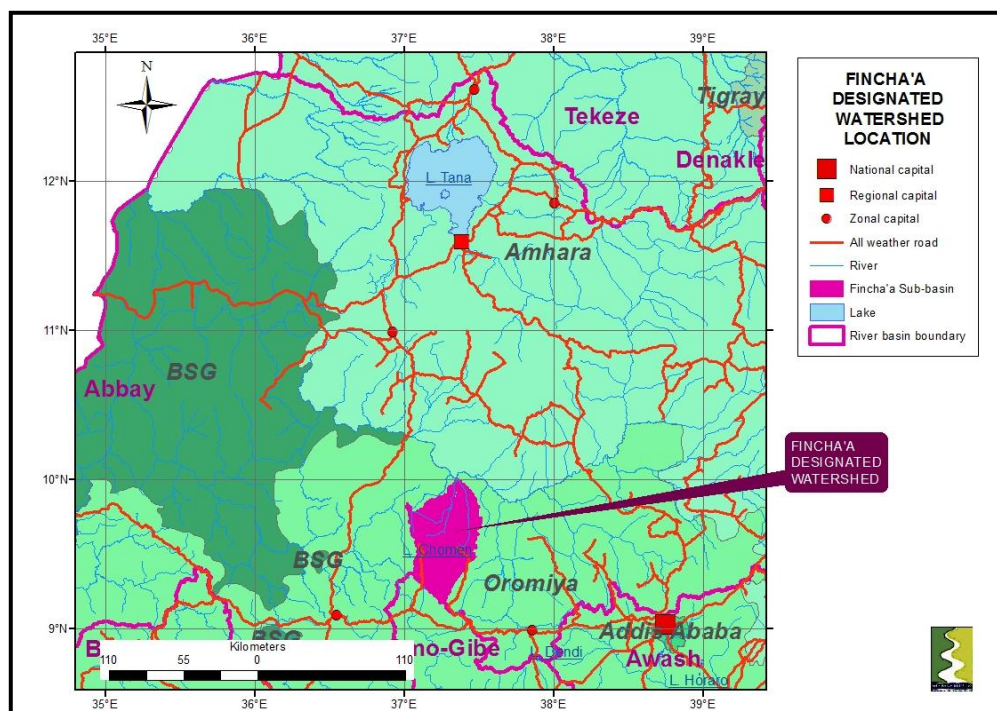
The Fincha'a Sub-basin is located in the southern part of the Abbay Sub-basin. The area of the Sub-basin is 3,241km². It is sub-divided into 3 Watersheds: Fincha'a, Nedi and Mita.

NAME	AREA (KM²)
Fincha'a	813
Nedi	954
Mita	1474
TOTAL	3241

A Field Visit wa undertaken in November 2012 to delineated exactly the Watershed for Watershed Management activities under the Project. The delineated Watershed comprises the Fincha'a, Nedi

and Mita Watersheds.

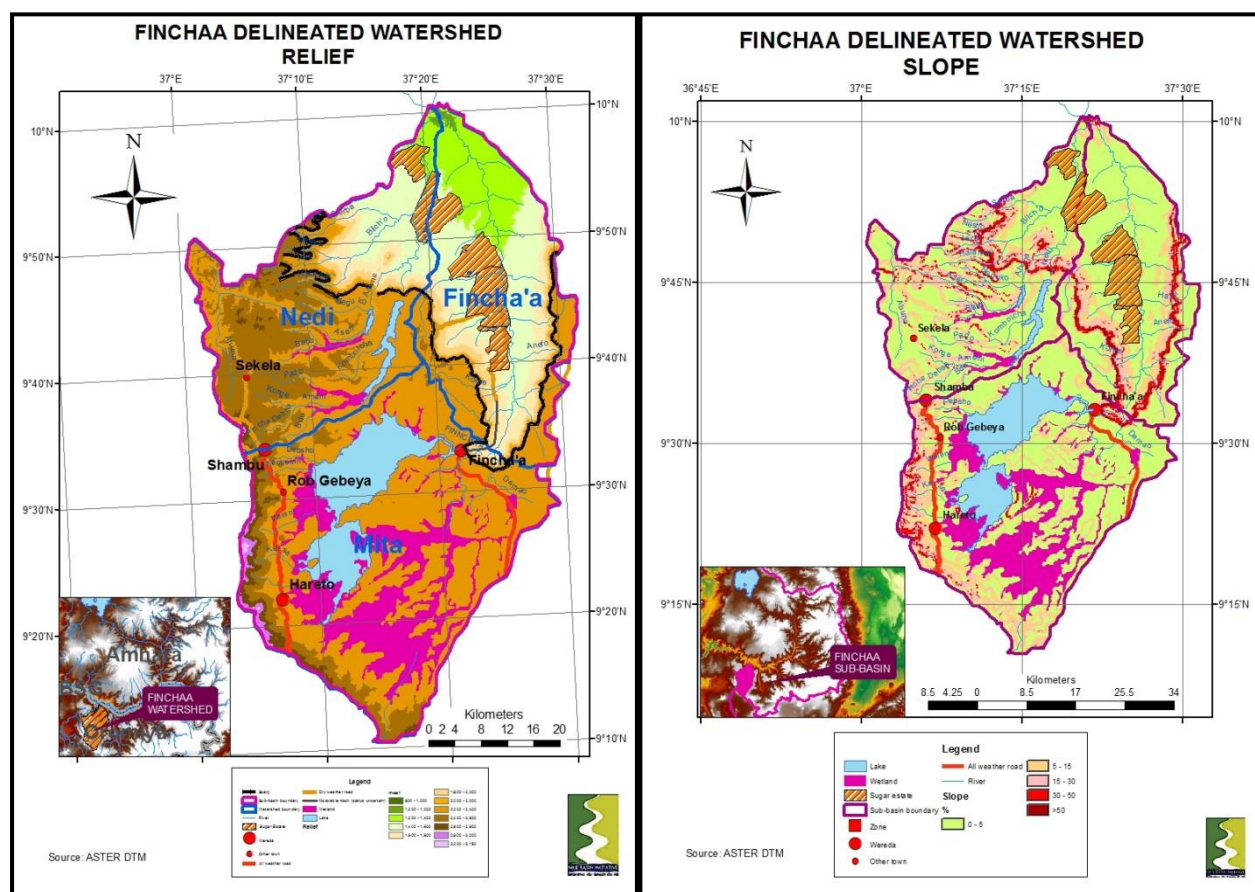
The Fincha'a Catchment is located to the south of the Abbay Gorge and is some 3,081 km² in extent. It is the location of the Fincha'a Multi-purpose dam that provides water storage for hydro-power development as well as water for the Fincha's large-scale Sugar estate. Within the upper catchment is Lake Chomen formed behind the Fincha'a dam and the extensive Chomen Swamps – an area of wetland of considerable hydrological and biodiversity value. The agro-climatic potential of the upper catchment is good with relatively high and reliable rainfall. However, the lower catchment is located within the Abbay Gorge where rainfall is significantly less with a much higher variability.



Map 7. Fincha'a Delineated watershed: Location

Summary Description of the Fincha'a Delineated Watershed

The relief comprises a ridge of high ground (3,000masl) following the sub-basin boundary on the western and northwestern sides. Below the ridge is a plateau between 2,000 to 2,400masl. This terminates as a steep scarp down to the Fincha'a Lowlands from 800 to 1,600masl. (Map 7a). Steep slopes are found along the ridge, the scarp and on foothills in the Nedi watershed (Map 7(b)). The Mita watershed is characterized by flat slopes, wetlands and lakes. The watershed along the eastern edge is very shallow and in places indistinct.



Map 7a Relief.

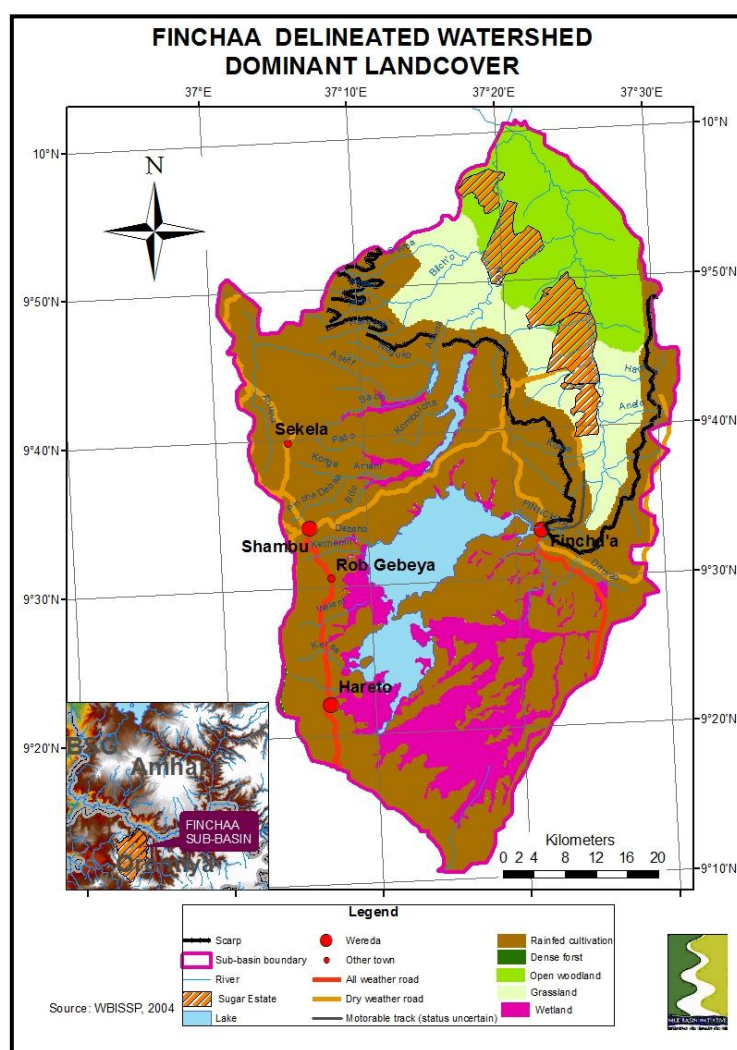
Map 7b. Slope (%)

The areas and percent of total area of the dominant landcover classes are shown in table 2 and their distribution in Map 9. The most widespread landcover is rainfed cultivation covering 57 percent of the Sub-basin. Wetland, open woodland and grassland make up 15, 12 and 10 percent of the area. The remaining 6 percent of the area is covered with water with a very small area of forest.

Table 2. Finchaa Sub-basins: Dominant Landcover (km2)

Landcover type	Area (ha)	Area (%)
Rainfed cultivation	217,135	57%
Wetland	55,889	15%
Open woodland	44,433	12%
Grassland	37,084	10%
Water	23,185	6%
Dense forest	381	0%
TOTAL	378,107	

The rainfed cultivation is confined to the watershed ridge and plateau areas with the grassland and woodland located in the Abbay gorge. There is a large area of wetland and water in the southern part of the plateau. The lakes are the result of by two dams: both for hydro-electric generation. Prior to the building of the dams the lake area was covered by wetland, grassland and cultivation (Bezuayehu Tefera and Sterk, 2006).



Map 8. Dominant Landcover

Objectives

The objective of this Project is to provide support to the Oromiya Regional Government to arrest severe land degradation hotspots within areas of high agricultural potential in the Finchaa Watershed in the Abbay Sub-basin, strengthen household and community livelihood strategies and contribute to the alleviation of poverty.

Reason for Selection

The Watershed Management CRA has identified a number of land degradation hotspots in the Abbay Sub-basin. These are areas of increasing population pressure on a degrading natural resource base, increasing food insecurity, with increasing household inability to invest in sustainable land management practices due to declining household and community natural, physical, social and human capital assets. Whilst the selected hotspots are located in areas of relatively high potential land degradation processes (erosion and soil nutrient depletion) are severe.

Information Present

Information on the Abbay Basin is available in the WSM CRA Country Report on Ethiopia (Abbay Sub-basin), the Trans-boundary Report on the Abbay—Blue Nile Sub-basin, the Distribution Analysis Report (chapter on Abbay-Blue Nile Sub-Basin and the Ethiopian Ministry of Water

Resources (MWR) Abbay Basin Master Plan. Lessons learnt

Lessons learnt over the past two decades clearly indicate the need for a participatory approach to watershed management, that interventions must be mutually reinforcing and closely integrated and that a wide range of supporting interventions are required that address the wider issues of reducing market transaction costs and increasing market integration, as well as improving access to social infrastructure (education and health), micro-credit and skills training, capacity building and support to micro, small and medium scale enterprises among others.

Other Projects/Programmes in the Finchaa Watershed

No externally supported WSM projects are located within the Watershed

Key Issues

The watershed provides potential for agricultural. A wide range of marketable agricultural production strategies are available. However, the Watershed is experiencing severe soil erosion and soil nutrient mining and declining soil fertility levels. Construction of two dams for irrigating large-scale sugar cane production and the ensuing Lakes displaced a large number of people onto the steep slopes of the high ridge to the south. With high population densities farm sizes are small. A key strategy is to intensify crop and livestock production taking advantages of synergies between crop and livestock production.

Project Stakeholders

Primary stakeholders include the following:

- Rural agricultural households residing within the Finchaa Watershed with land holdings for cropping and access to communal grazing and forested lands;
- Landless rural households residing within the Finchaa Watershed who have access to communal lands for collection of fuelwood, medicinal herbs and water;
- Staff of the Bureau of Agriculture and Rural Development who will receive technical and logistical support.

Secondary Project Stakeholders include:

- Operators of the Millennium dam who will benefit from reduced rates of sedimentation in the reservoir.

Technological Interventions by Development Domain

HIGHLAND: High and Medium Agricultural Potential (Low to Medium moisture stress risk) Poor market Access: Located above 1,600masl

Overall Strategies: Low Market Access

The opportunities for marketable agricultural development in this Domain are good with reasonable access to the Nekemte market. Use of external inputs may be privately unprofitable (to farmers) but may be economically cheaper than importing food into the area (Pender et al., 1999). Marketable agricultural products will be limited to high value, low volume and non-perishable products. These could include crops such as onions and peppers, small livestock such as sheep and goats, and

honey production. In parts of Ethiopia improved goat production by women has proved very successful, particularly for women-headed households. The strategy for own-consumption agricultural production should be to ensure food security. The long-term Government strategy is to improve accessibility to markets through feeder road and farm to market road construction and market access will improve.

(b) On-farm Interventions

Improved Soil Husbandry: The use of manure and compost increases soil organic matter and nutrients and increases water holding capacity. This intervention requires sufficient quantities of manure and residues, and labour. These interventions need to integrate with improved animal husbandry interventions.

Chemical fertilizer: This will be confined to areas with good market access and to cash crops (teff, vegetables).

Improved tillage: Contour ploughing assists in reducing runoff and soil movement.

Stone terraces: These are more efficient in retain soil moisture than bunds or grass strips. In many parts of the two Development Domains surface stones are readily available. The high rate of adoption indicates that many farmers appreciate their use for soil and soil moisture conservation.

On-farm Forage Development: Backyard improved forage: forage grasses (e.g. including but not limited to *Pennisetum purpureum*, *Panicum maximum*), tree legumes (*Leucaena leucocephala*) and pigeon pea. The focus of the intervention is on improving small ruminant productivity.

On-farm Tree development: In areas with good market access trees for timber and fuelwood as well as fruit trees (citrus, avocado and mango) would be promoted. In areas with poor market access on-farm tree production for timber will be for own consumption only. However, there is the potential for fruit trees as citrus, avocados and mangos will bear transport costs.

On-farm Water Harvesting: Rainfall is variable and there is potential for water harvesting interventions to provide domestic and livestock water supplies as well as backyard irrigated vegetables.

(c) Interventions on Communal Lands

Cut-off Drains: A pre-requisite for in-farm soil conservation measures is a cut-off drain above cultivated areas. Even by themselves they can reduce in-field run-off and soil movement.

Road and track drains: run-off from roads needs to be controlled with small check dams and safe outlets to streams.

Gully Stabilization: This requires the integrated stabilization of both the gully and its watershed area. This will require a combination of livestock exclusion (in both watershed area and gully), and vegetative and structural measures (check dams, etc) within the gully. This intervention can be integrated with a communal forage development programme.

Communal Forage Development: To be effective and sustainable this best undertaken at the sub-kebele (tabia) level. This intervention usually requires some form of area closure with cut-and-carry, or controlled grazing or controlled hay production and harvesting. The site of the intervention can vary from steep and degraded hillsides, poorly drained valley bottoms, and stream edge buffers. A key object is to reduce livestock movement. The process of natural re-generation can be

supplemented with over-sowing of herbaceous (*Pennisitum purpureum*, *Panicum maximum*) or tree legumes (*Leucaena leucocephala*) and pigeon pea but this increases costs. The intervention can also be integrated with communal tree production.

Small-scale Supplementary Irrigation: For high value non-perishable marketable crops (onions, garlic, peppers) using supplementary irrigation for maximum area (given good storability season price fluctuations are small).

(d) Other On-farm Strategies

Honey production: In densely populated areas where land is short honey production is not affected by land or cash constraints. Improved hive can substantially increase production.

(e) Other Strategic Interventions

Improving Rural and Urban Domestic (traditional/biomass) Energy Systems.

The focus here is on domestic biomass (or “traditional”) energy sources. “Modern” energy sources are considered only in respect of their role as substitutions for biomass sources.

A number of strategies are proposed. In summary these are:

- a. **Improved Mitads:** The annual reduction in wood use for mitad baking is 20%.
- b. **Lakech Charcoal Stove:** publicity campaigns by Regional Bureaus of Rural Energy to maintain the momentum of stove adoption.
- c. **Improved ceramic 'gounziye' Stove** with an annual fuelwood saving of 30%.

Improving Rural-urban socio-economic linkages in the context alternative livelihoods.

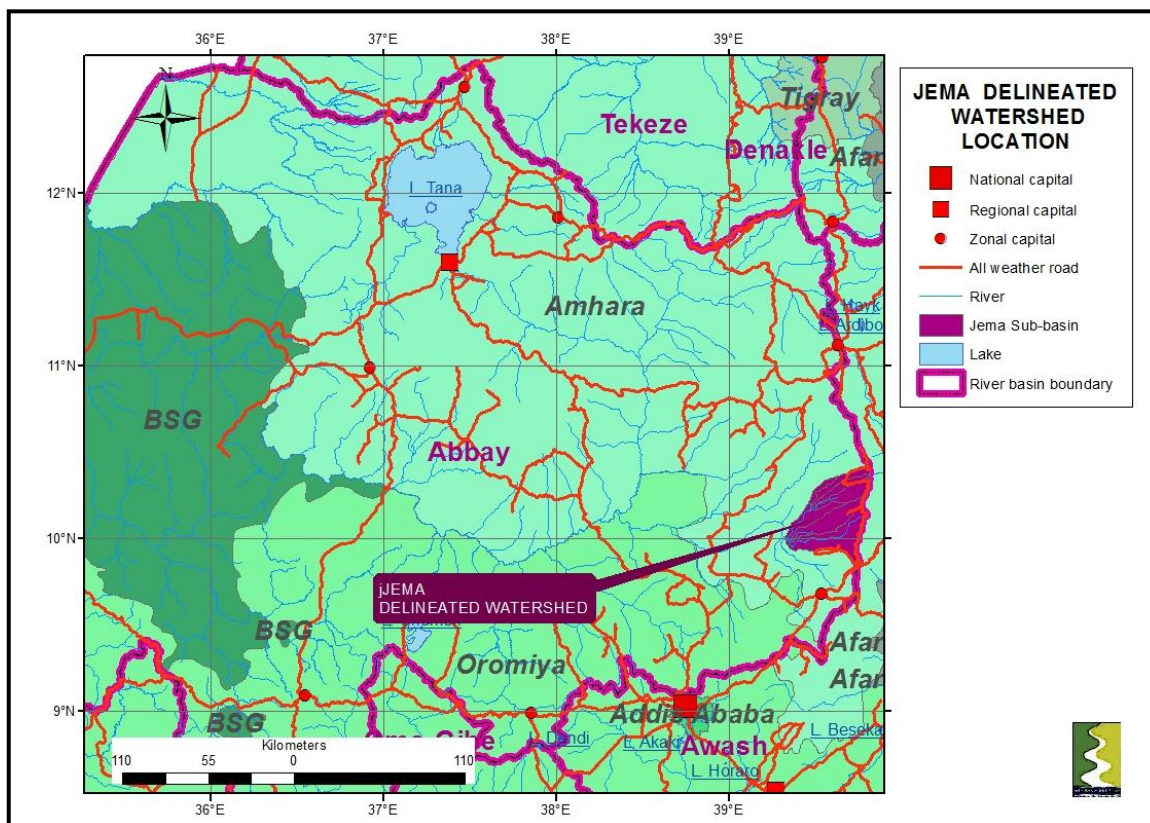
Experience in Ethiopia and elsewhere suggest a number of possibilities for small and medium sized urban centres (Barret et al. 2001, World Bank, 2004). These include:

- Increasing rural agricultural income by acting as demand and market nodes for agricultural produce from rural hinterlands.
- Reducing costs and improving access to a range of public and private services and goods from within and outside the immediate region by acting as a centre for production, processing and distribution of goods and services to rural hinterlands.
- Becoming centres for growth and consolidation of non-farm economic activities and employment for rural residents through the development of small and medium size enterprises or the relocation of branches of large private or public enterprises.
- Attracting rural migrants through the demand for non-farm labour.

PROFILE 3. INTEGRATED WATERSHED MANAGEMENT – ABBAY SUB-BASIN, JEMA CATCHMENT, ETHIOPIA IN AREAS OF LOW AGRICULTURAL POTENTIAL AND DEGRADING RESOURCE BASE

Location

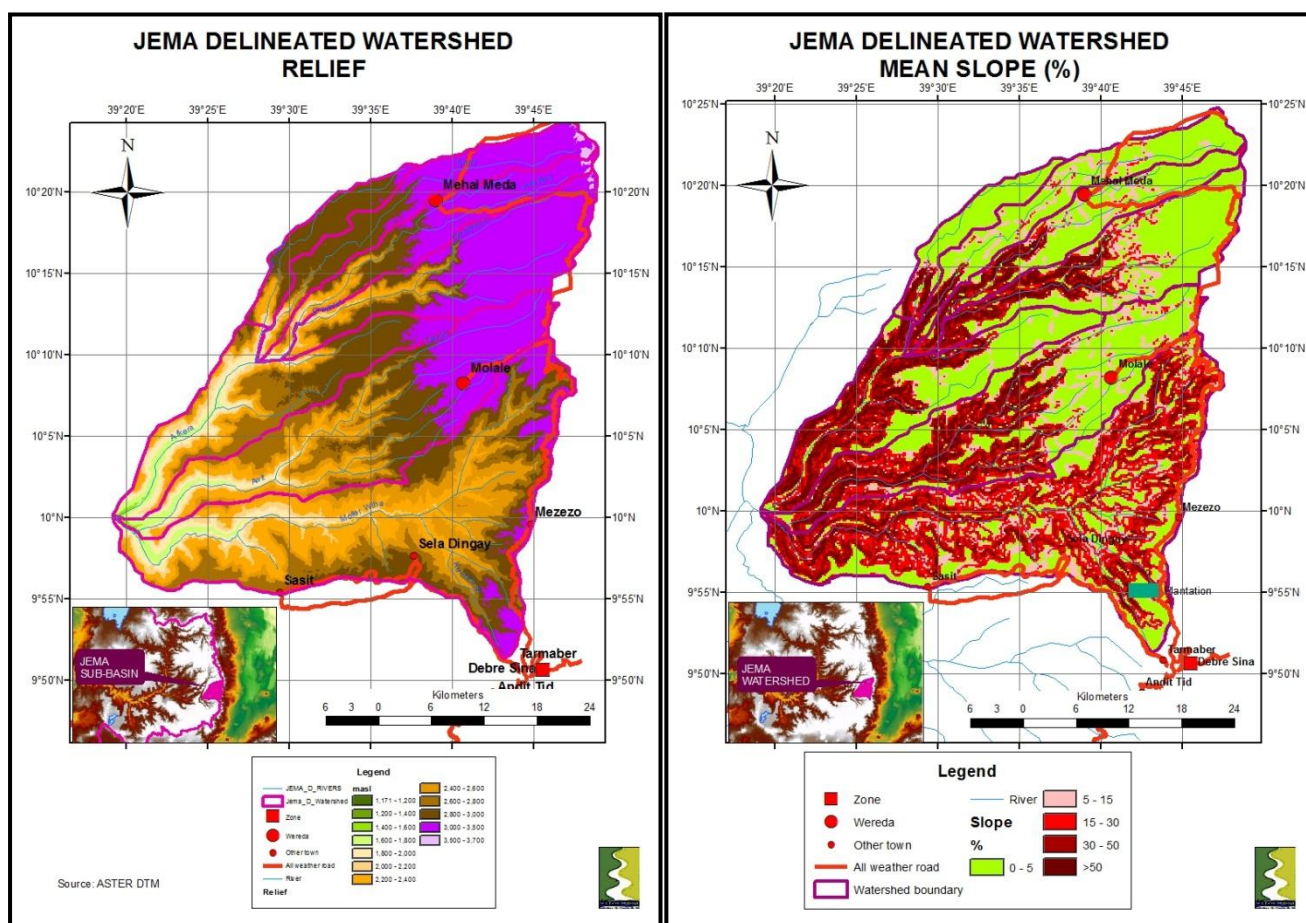
The Jema Delineated Watershed is located in the southern part of the Abbay Delineated Watershed. The area of the Delineated Watershed is 3,241km². It is sub-divided into 4 Watersheds: Jema, Mofer Wiha, Angerwasha and Chacha.



Map 9. Jema Delineated Watershed: Location

Summary Description of the Jema Delineated Watershed

The relief comprises a ridge of high ground (above 3,000masl) following the Delineated Watershed boundary on the eastern side. Below the ridge is a plateau between 2,500 to 3,000masl. This plateau is deeply dissected by the Jema River and its tributaries down to 1,200masl. (Map 10a). Steep slopes are found along the ridge and the deeply dissected rivers and streams whilst the plateau comprises broad flat topped table-lands.



Map 10a Relief.

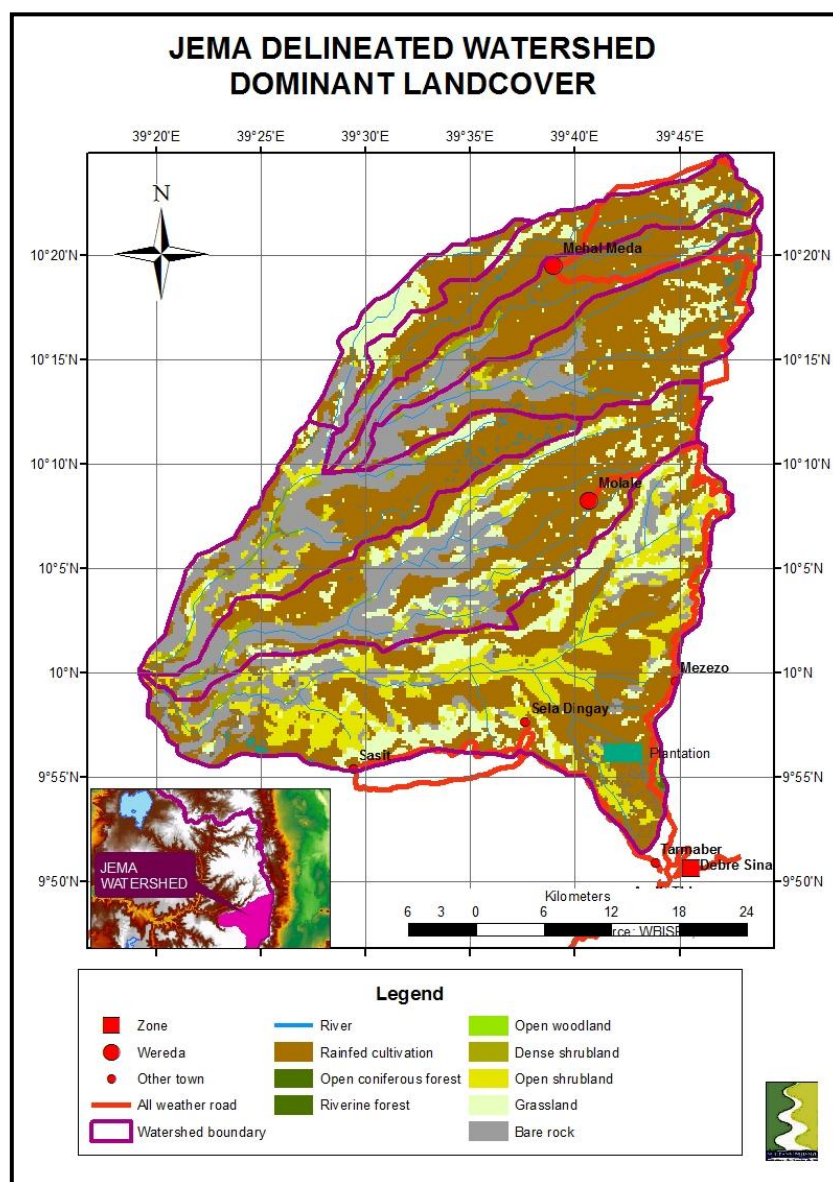
Map 10b. Slope (%)

The areas and percent of total area of the dominant landcover classes are shown in table 3 and their distribution in Map 11. The most widespread landcover is rainfed cultivation covering 61 percent of the Delineated Watershed

Table 3. Jema Delineated Watersheds: Dominant Landcover (km2)

Landcover	Area (km2)	Area (%)
Rainfed cultivation	3,558	61%
Grassland	988	17%
Bare rock	778	13%
Open shrubland	419	7%
Bare soil	50	1%
Plantation	7	0%
Open forest	6	0%
Open woodland	1	0%
TOTAL	5,807	

The rainfed cultivation is confined to the plateau areas with the grassland and woodland located in the gorges and on the high ridge along the eastern edge of the Delineated Watershed.



Map 11. Dominant Landcover

Reason for Selection

The Jema Catchment is extremely degraded and is of low agro-ecological potential because of the low and variable rainfall. The incidence of poverty is very high. Notwithstanding its proximity to Debre Birhan the catchment is relatively inaccessible with high transport costs due to the much dissected terrain.

Objectives

The objective of this project is to provide support to developing a participatory two tier approach to sustainable development and management of Sub-catchments and their Micro-catchments in the Delineated Jema Watershed implement Community level Micro-catchment Management Plans. The project would also support the establishment of the higher level institutional procedures and organization to facilitate coordination at the Sub-catchment level. These interventions will support sustainable livelihoods and contribute to poverty alleviation.

Information Present

Information on the Abbay Basin is available in the WSM CRA Country Report on Ethiopia (Abbay Sub-basin), the Trans-boundary Report on the Abbay—Blue Nile Sub-basin, the Distribution Analysis Report (chapter on Abbay-Blue Nile Sub-Basin and the Ethiopian Ministry of Water Resources (MWR) Abbay Basin Master Plan.

Lessons Learnt

Lessons learnt over the past two decades clearly indicate the need for a participatory approach to watershed management, that interventions must be mutually reinforcing and closely integrated and that a wide range of supporting interventions are required that address the wider issues of reducing market transaction costs and increasing market integration, as well as improving access to social infrastructure (education and health), micro-credit and skills training, capacity building and support to micro, small and medium scale enterprises among others.

Key Issues

The Watershed has a relatively low potential for agricultural development because of low and highly variable rainfall and is included some of the main food deficit areas. In recent years the Belg has failed causing a considerable reduction of food supply. The range of marketable agricultural production strategies are lower than the high potential areas. These areas are experiencing severe soil erosion and soil nutrient mining and declining soil fertility levels. With high population densities farm sizes are small.

A key strategy is the conservation of soil moisture to reduce risk of crop failure as well as to reduce the risk of using inorganic fertilizers. Soil and water conservation structures should be integrated with other improved crop and soil husbandry measures. Some form of crop insurance may be feasible in these areas. Small urban centres such as Mehel Meda and Molale may provide opportunities for non-farm employment. Where access is poor the opportunities for agricultural development for marketable produce in these areas are much more limited.

The strategy for own-consumption agricultural production should be to ensure food security. Marketable agricultural products will be limited to high value, low volume and non-perishable products. These could include crops such as onions and peppers, small livestock such as sheep and goats, and honey production. In parts of Ethiopia improved goat production by women has proved very successful, particularly for women-headed households. The long-term Government strategy is to improve accessibility to markets through feeder road and farm to market road construction.

Other programmes

One key on-going project is the Productive Safety Net Programme (PSNP) and the Household Asset Building Programme (HABP) both part of the overall Food Security Programme.

Project Stakeholders

Primary stakeholders include the following:

- Rural agricultural households residing within the Jema Watershed with land holdings for cropping and access to communal grazing and forested lands;
- Landless rural households residing within the Jema Watershed who have access to communal lands for collection of fuelwood, medicinal herbs and water.

- Staff of the Bureau of Agriculture and Rural Development who will receive technical and logistical support.

Secondary Project Stakeholders include:

- Operators of the Millennium dam who will benefit from reduced rates of sedimentation in the reservoir.

Technological Interventions by Development Domain

HIGHLAND: Medium Agricultural Potential (Medium moisture stress risk) Poor market Access:
Located above 1,600masl

(a) Overall Strategies: Low Market Access

The opportunities for marketable agricultural development in this Domain are good with their reasonable access to the Debre Birhan market. Use of external inputs may be privately unprofitable (to farmers) but may be economically cheaper than importing food into the area (Pender et al., 1999). Marketable agricultural products will be limited to high value, low volume and non-perishable products. These could include crops such as onions and peppers, small livestock such as sheep and goats, and honey production. In parts of Ethiopia improved goat production by women has proved very successful, particularly for women-headed households. The strategy for own-consumption agricultural production should be to ensure food security. The long-term Government strategy is to improve accessibility to markets through feeder road and farm to market road construction and market access will improve.

(b) On-farm Interventions

Improved Soil Husbandry: The use of manure and compost increases soil organic matter and nutrients and increases water holding capacity. This intervention requires sufficient quantities of manure and residues, and labour. These interventions need to integrate with improved animal husbandry interventions.

Chemical fertilizer: This will be confined to areas with good market access and to cash crops (teff, vegetables).

Improved tillage: Contour ploughing assists in reducing runoff and soil movement.

Stone terraces: These are more efficient in retain soil moisture than bunds or grass strips. In many parts of the two Development Domains surface stones are readily available. The high rate of adoption indicates that many farmers appreciate their use for soil and soil moisture conservation.

On-farm Forage Development: Backyard improved forage: forage grasses (e.g. including but not limited to *Pennisetum purpureum*, *Panicum maximum*), tree legumes (*Leucaena leucocephala*) and pigeon pea. The focus of the intervention is on improving small ruminant productivity.

On-farm Tree development: In areas with good market access trees for timber and fuelwood as well as fruit trees (citrus, avocado and mango) would be promoted. In areas with poor market access on-farm tree production for timber will be for own consumption only. However, there is the potential for fruit trees as citrus, avocados and mangos will bear transport costs.

On-farm Water Harvesting: Rainfall is variable and there is potential for water harvesting interventions to provide domestic and livestock water supplies as well as backyard irrigated vegetables.

(c) Interventions on Communal Lands

Cut-off Drains: A pre-requisite for in-farm soil conservation measures is a cut-off drain above cultivated areas. Even by themselves they can reduce in-field run-off and soil movement.

Road and track drains: run-off from roads needs to be controlled with small check dams and safe outlets to streams.

Gully Stabilization: This requires the integrated stabilization of both the gully and its watershed area. This will require a combination of livestock exclusion (in both watershed area and gully), and vegetative and structural measures (check dams, etc) within the gully. This intervention can be integrated with a communal forage development programme.

Communal Forage Development: To be effective and sustainable this best undertaken at the sub-kebelle (tabia) level. This intervention usually requires some form of area closure with cut-and-carry, or controlled grazing or controlled hay production and harvesting. The site of the intervention can vary from steep and degraded hillsides, poorly drained valley bottoms, and stream edge buffers. A key object is to reduce livestock movement. The process of natural re-generation can be supplemented with over-sowing of herbaceous (*Pennisitum purpureum*, *Panicum maximum*) or tree legumes (*Leucaena leucocephala*) and pigeon pea but this increases costs. The intervention can also be integrated with communal tree production.

Small-scale Supplementary Irrigation: For high value non-perishable marketable crops (onions, garlic, peppers) using supplementary irrigation for maximum area (given good storability season price fluctuations are small).

(d) Other Strategies

Honey production: In densely populated areas where land is short honey production is not affected by land or cash constraints. Improved hive can substantially increase production.

(e) Other Strategic Interventions

Improving Rural and Urban Domestic (traditional/biomass) Energy Systems.

The focus here is on domestic biomass (or “traditional”) energy sources. “Modern” energy sources are considered only in respect of their role as substitutions for biomass sources.

A number of strategies are proposed. In summary these are:

- d. **Improved Mitads:** The annual reduction in wood use for mitad baking is 20%.
- e. **Lakech Charcoal Stove:** publicity campaigns by Regional Bureaus of Rural Energy to maintain the momentum of stove adoption.
- f. **Improved ceramic 'gounziye' Stove** with an annual fuelwood saving of 30%.

Improving Rural-urban socio-economic linkages in the context alternative livelihoods.

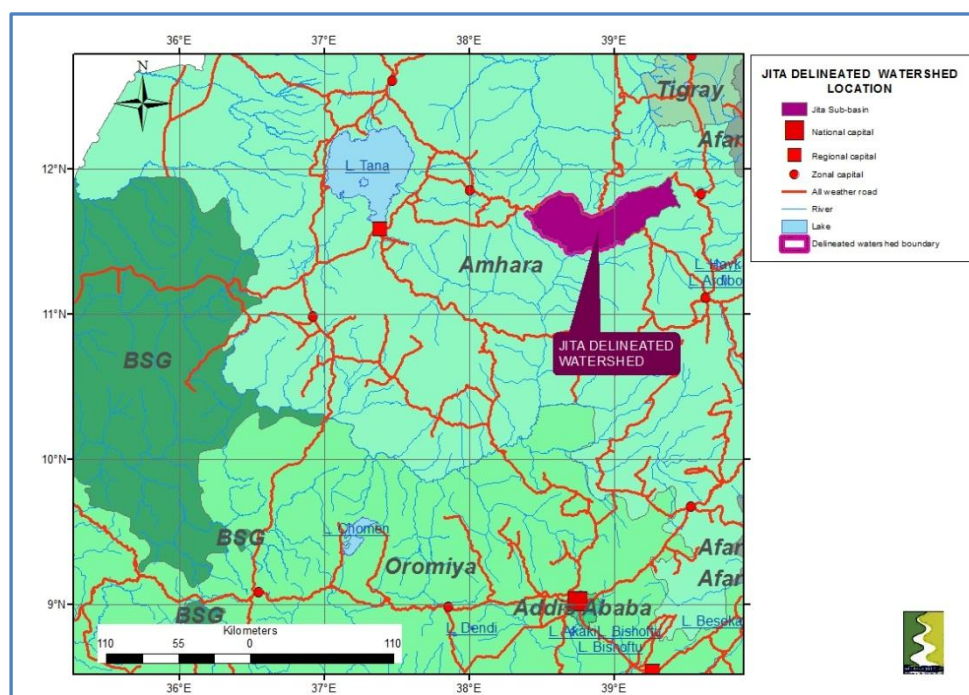
Experience in Ethiopia and elsewhere suggest a number of possibilities for small and medium sized urban centres (Barret et al. 2001, World Bank, 2004). These include:

- Increasing rural agricultural income by acting as demand and market nodes for agricultural produce from rural hinterlands.
- Reducing costs and improving access to a range of public and private services and goods from within and outside the immediate region by acting as a centre for production, processing and distribution of goods and services to rural hinterlands.
- Becoming centres for growth and consolidation of non-farm economic activities and employment for rural residents through the development of small and medium size enterprises or the relocation of branches of large private or public enterprises.
- Attracting rural migrants through the demand for non-farm labour.

PROFILE 4. INTEGRATED WATERSHED MANAGEMENT – ABBAY SUB-BASIN, JITA (UPPER BESHILLO) CATCHMENT, ETHIOPIA IN AN AREA OF LOW AGRICULTURAL POTENTIAL AND DEGRADING RESOURCE BASE

Location

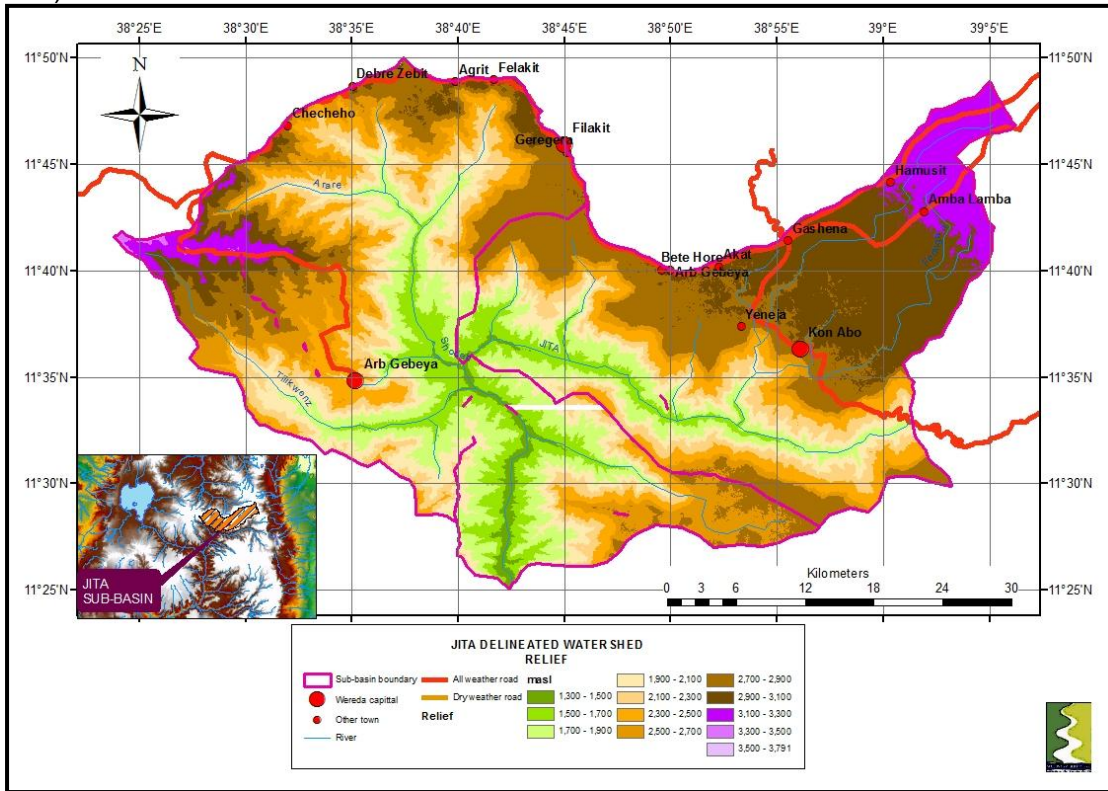
The Jita delineated Watershed is located in the southern part of the Abbay Sub-basin. The area of the Sub-basin is 2,915km². The relief comprises a broad deeply dissected plateau with a ridge of high ground along the eastern border of the sub-basin. The rivers are deeply incised to 1,300masl. Steep slopes characterize the incised valleys with steep slopes found along the high eastern ridge.



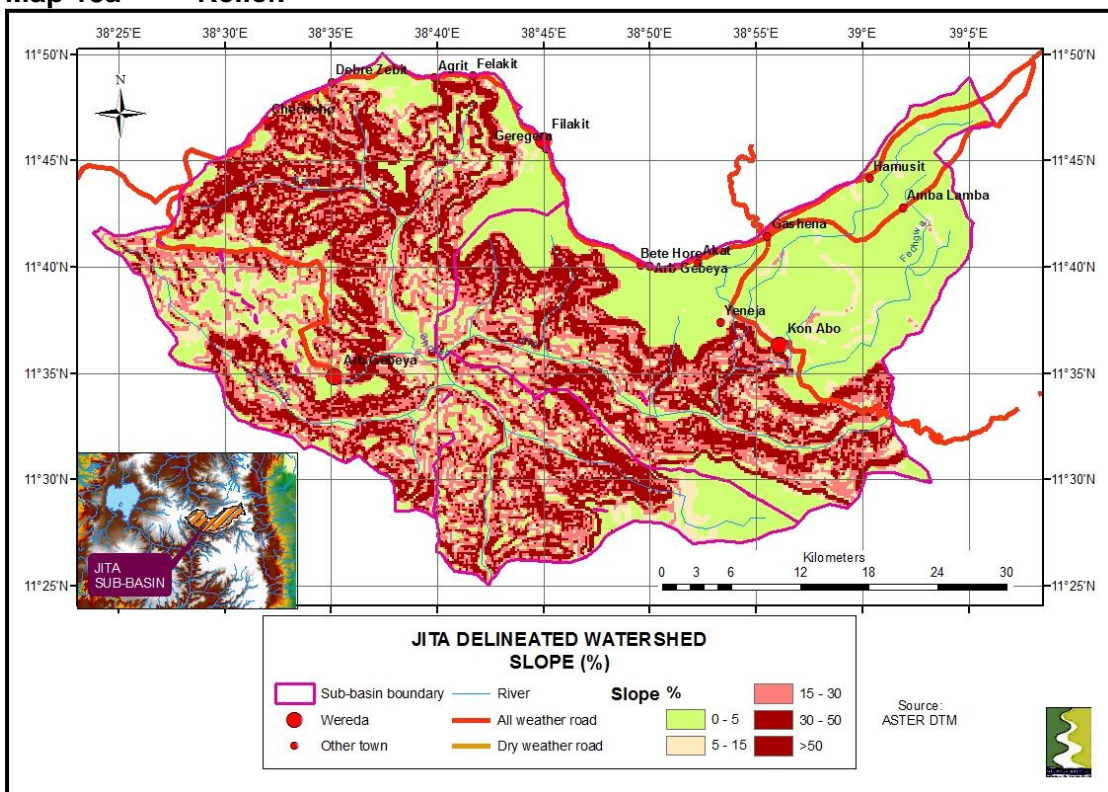
Map 12. Jita Delineated Watershed: Location

Summary Description of the Jema Delineated Watershed

The relief comprises a broad deeply dissected plateau with a ridge of high ground along the eastern and western borders of the sub-basin. The rivers are deeply incised to 1,300masl (Map 13a). Steep slopes characterize the incised valleys with steep slopes found along the high eastern ridge (Map 13b).



Map 13a Relief.



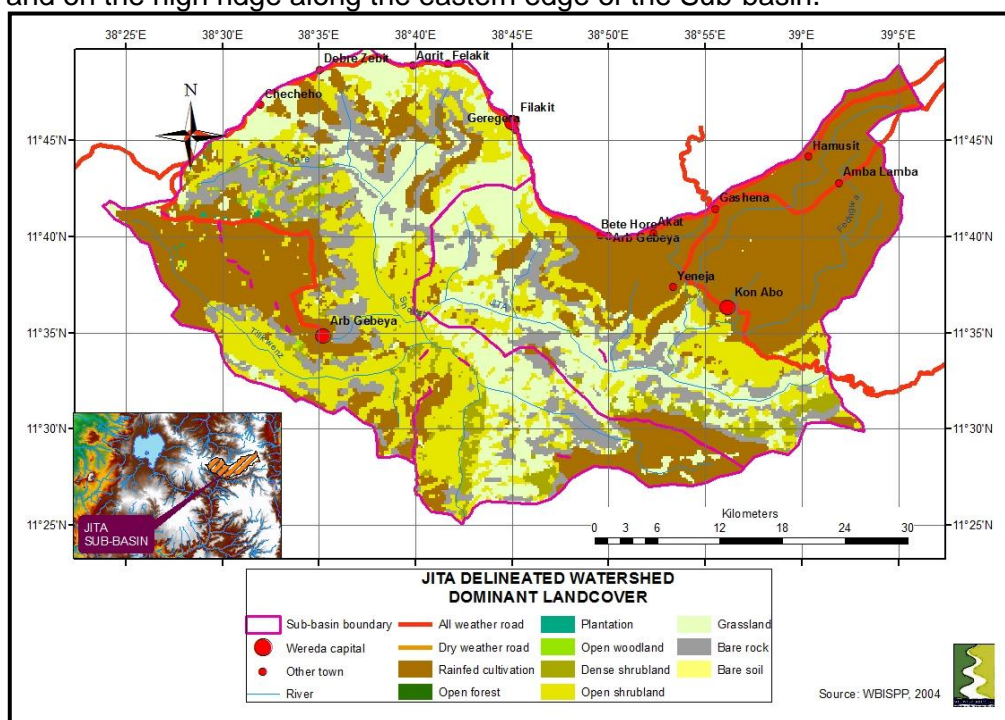
Map 13b. Slope (%)

The areas and percent of total area of the dominant landcover classes are shown in table 4 and their distribution in Map 14. The most widespread landcover is rainfed cultivation covering 53 percent of the Sub-basin with grassland, open shrubland and bare rock covering 18, 16 and 11 percent respectively.

Table 4. Jita Delineated Watershed: Dominant Landcover (km2)

Landcover	Area (km ²)	Area (%)
Rainfed cultivation	1,540	53%
Grassland	512	18%
Open shrubland	456	16%
Bare rock	328	11%
Dense shrubland	53	2%
TOTAL	2,889	

The rainfed cultivation is confined to the plateau areas with the grassland and woodland located in the gorges and on the high ridge along the eastern edge of the Sub-basin.



Map 14. Dominant Landcover

Reason for Selection

The Jita Catchment is located to the east of the Abbay River and just the southeast of Lake Tana and forms an upper tributary of the Beshlo River. The catchment is extremely dissected at together with the Jema catchment to the south makes a major contribution to the suspended sediment load of the Abbay River. The Jita Catchment is extremely degraded and is of low agro-ecological potential because of the low and variable rainfall. The incidence of poverty is very high. The catchment is very inaccessible with high transport costs due to the very dissected terrain.

The Watershed has a relatively low potential for agricultural development because of low and highly variable rainfall and are some of the main food deficit areas. The range of marketable agricultural production strategies are lower than the high potential areas. The Watershed is experiencing severe soil erosion and soil nutrient mining and declining soil fertility levels. With high population densities farm sizes are small.

A key strategy is the conservation of soil moisture to reduce risk of crop failure as well as to reduce the risk of using inorganic fertilizers. Soil and water conservation structures should be integrated with other improved crop and soil husbandry measures. Where market access is higher relatively higher urban market prices for cereals in these areas are likely to make fertilizer use profitable in years of average to good rainfall. Some form of crop insurance may be feasible in these areas. Urban centres in close proximity may provide opportunities for non-farm employment.

Where access is poor the opportunities for agricultural development for marketable produce in these areas are much more limited. The strategy for own-consumption agricultural production should be to ensure food security. Marketable agricultural products will be limited to high value, low volume and non-perishable products. These could include crops such as onions and peppers, small livestock such as sheep and goats, and honey production. In parts of Ethiopia improved goat production by women has proved very successful, particularly for women-headed households. The long-term Government strategy is to improve accessibility to markets through feeder road and farm to market road construction.

Objectives

The objective of this Project is to provide support to Regional Governments to arrest severe land degradation hotspots within areas of low agricultural potential in the Jita Watershed in the Abbay Sub-basin, strengthen household and community livelihood strategies and contribute to the alleviation of poverty.

Information Present

Information on the Abbay Basin is available in the WSM CRA Country Report on Ethiopia (Abbay Sub-basin), the Trans-boundary Report on the Abbay—Blue Nile Sub-basin, the Distribution Analysis Report (chapter on Abbay-Blue Nile Sub-Basin and the Ethiopian Ministry of Water Resources (MWR) Abbay Basin Master Plan.

Other Programmes

One key on-going project is the Productive Safety Net Programme (PSNP) and the Household Asset Building Programme (HABP) both part of the overall Food Security Programme.

Lessons Learnt

Lessons learnt over the past two decades clearly indicate the need for a participatory approach to watershed management, that interventions must be mutually reinforcing and closely integrated and that a wide range of supporting interventions are required that address the wider issues of reducing market transaction costs and increasing market integration, as well as improving access to social infrastructure (education and health), micro-credit and skills training, capacity building and support to micro, small and medium scale enterprises among others.

Stakeholders

Primary stakeholders include the following:

- Rural agricultural households residing within the Jita Watershed with land holdings for cropping and access to communal grazing and forested lands;
- Landless rural households residing within the Jita Watershed who have access to communal lands for collection of fuelwood, medicinal herbs and water.
- Staff of the Bureau of Agriculture and Rural Development who will receive technical and logistical support.

Secondary Project Stakeholders include:

- Operators of the Millennium dam who will benefit from reduced rates of sedimentation in the reservoir.

Technological Interventions by Development Domain

HIGHLAND: Medium Agricultural Potential (Medium moisture stress risk) Poor market Access:
Located above 1,600masl

(a) Overall Strategies: Low Market Access

The opportunities for marketable agricultural development in this Domain are relatively good with their good access to the Debre Birhan market. Use of external inputs may be privately unprofitable (to farmers) but may be economically cheaper than importing food into the area (Pender et al., 1999). Marketable agricultural products will be limited to high value, low volume and non-perishable products. These could include crops such as onions and peppers, small livestock such as sheep and goats, and honey production. In parts of Ethiopia improved goat production by women has proved very successful, particularly for women-headed households. The strategy for own-consumption agricultural production should be to ensure food security. The long-term Government strategy is to improve accessibility to markets through feeder road and farm to market road construction and market access will improve.

(b) On-farm Interventions

Improved Soil Husbandry: The use of manure and compost increases soil organic matter and nutrients and increases water holding capacity. This intervention requires sufficient quantities of manure and residues, and labour. These interventions need to integrate with improved animal husbandry interventions.

Chemical fertilizer: This will be confined to areas with good market access and to cash crops (teff, vegetables).

Improved tillage: Contour ploughing assists in reducing runoff and soil movement.

Stone terraces: These are more efficient in retain soil moisture than bunds or grass strips. In many parts of the two Development Domains surface stones are readily available. The high rate of adoption indicates that many farmers appreciate their use for soil and soil moisture conservation.

On-farm Forage Development: Backyard improved forage: forage grasses (e.g. including but not limited to *Pennisitum purpureum*, *Panicum maximum*), tree legumes (*Leucaena leucocephala*) and pigeon pea. The focus of the intervention is on improving small ruminant productivity.

On-farm Tree development: In areas with good market access trees for timber and fuelwood as

well as fruit trees (citrus, avocado and mango) would be promoted. In areas with poor market access on-farm tree production for timber will be for own consumption only. However, there is the potential for fruit trees as citrus, avacados and mangos will bear transport costs.

On-farm Water Harvesting: Rainfall is variable and there is potential for water harvesting interventions to provide domestic and livestock water supplies as well as backyard irrigated vegetables.

(c) Interventions on Communal Lands

Cut-off Drains: A pre-requisite for in-farm soil conservation measures is a cut-off drain above cultivated areas. Even by themselves they can reduce in-field run-off and soil movement.

Road and track drains: run-off from roads needs to be controlled with small check dams and safe outlets to streams.

Gully Stabilization: This requires the integrated stabilization of both the gully and its watershed area. This will require a combination of livestock exclusion (in both watershed area and gully), and vegetative and structural measures (check dams, etc) within the gully. This intervention can be integrated with a communal forage development programme.

Communal Forage Development: To be effective and sustainable this best undertaken at the sub-kebelle (tabia) level. This intervention usually requires some form of area closure with cut-and-carry, or controlled grazing or controlled hay production and harvesting. The site of the intervention can vary from steep and degraded hillsides, poorly drained valley bottoms, and stream edge buffers. A key object is to reduce livestock movement. The process of natural re-generation can be supplemented with over-sowing of herbaceous (*Pennisitum purpureum*, *Panicum maximum*) or tree legumes (*Leucaena leucocephala*) and pigeon pea but this increases costs. The intervention can also be integrated with communal tree production.

Small-scale Supplementary Irrigation: For high value non-perishable marketable crops (onions, garlic, peppers) using supplementary irrigation for maximum area (given good storability season price fluctuations are small).

(d) Other On-farm Strategies

Honey production: In densely populated areas where land is short honey production is not affected by land or cash constraints. Improved hive can substantially increase production.

(e) Other Strategic Interventions

Improving Rural and Urban Domestic (traditional/biomass) Energy Systems.

The focus here is on domestic biomass (or “traditional”) energy sources. “Modern” energy sources are considered only in respect of their role as substitutions for biomass sources.

A number of strategies are proposed. In summary these are:

g. Improved Mitads: The annual reduction in wood use for mitad baking is 20%.

h. Lakech Charcoal Stove: publicity campaigns by Regional Bureaus of Rural Energy to maintain the momentum of stove adoption.

- i. **Improved ceramic 'gounziye' Stove** with an annual fuelwood saving of 30%.

Improving Rural-urban socio-economic linkages in the context alternative livelihoods.

Experience in Ethiopia and elsewhere suggest a number of possibilities for small and medium sized urban centres (Barret et al. 2001, World Bank, 2004). These include:

- Increasing rural agricultural income by acting as demand and market nodes for agricultural produce from rural hinterlands.
- Reducing costs and improving access to a range of public and private services and goods from within and outside the immediate region by acting as a centre for production, processing and distribution of goods and services to rural hinterlands.
- Becoming centres for growth and consolidation of non-farm economic activities and employment for rural residents through the development of small and medium size enterprises or the relocation of branches of large private or public enterprises.
- Attracting rural migrants through the demand for non-farm labour.

6. RANKING AND PRIORITISING PROPOSED PROJECTS

6.1 Purpose of Ranking and Prioritising

The four Projects have already been screened and thus no one project is superior to any other. Thus, the purpose of prioritizing the projects is:

- To enable ENTRO to manage to the next stage of project design and preparation in a phased manner;
- This is because the Watershed Management Project funding sequencing necessitates this to be implemented over a three year period;
- It is possible that one or more donors may request ENTRO to provide details of potential projects that accord with their own specific set of selection criteria;
- To facilitate this process Projects have also been grouped into a number of broad thematic areas.

6.2 List of Criteria

6.2.1 Provisional List of Criteria for Project Selection

A provisional list of criteria was developed during the Inception Phase. Areas of severe resource degradation or "hot spots" had been identified in the Trans-boundary Analysis Watershed Management CRA and had been taken into consideration in the Project selection. This provisional list of criteria provided initial guidance on the type and level of information to be collected for the purpose of micro-catchment delineation.

Empirical work in Ethiopia indicates generally high levels of poverty in all rural areas and most particularly amongst rainfed agriculturalists in areas of variable rainfall. For this reason no specific group or geographic area was used as criteria, rather the level and degree of impact the proposed intervention had on the levels of household production, income and vulnerability was used.

The expectation of regional benefits such as the alleviation of downstream environmental, economic and/or social damages, were also seen as very important. Cooperative action in terms of watershed management is likely to be more forthcoming where benefits accrue to two or more riparians.

Where a Project accrued potential global benefits this was also seen as very important, particularly in terms of seeking and obtaining financing from one of the global financing mechanisms: e.g. the Global Environment Fund (GEF), Carbon Fund, etc.

Taking these as a starting point a provisional list of screening criteria for the nine projects under examination was developed.

1. **Local benefits** will exceed costs and contribute to:

- Increased household income and thus poverty reduction;
- Increased equitable access to resources by all members of the community;
- reduced vulnerability of local households to environmental, social and economic "shocks";
- enhanced integrity of natural resources and the environment that will support sustainable livelihoods of local inhabitants;
- the increased value of natural resources to local communities leading to an increased willingness to protect the sustainable supply of services and products from these resources.

2. **Down-stream Regional benefits** will exceed costs and contribute to:

- Reduction in environmental costs for down-stream users;
- Reduction in environmental costs for down-stream users;
- environmental, social and economic “shocks” that were previously caused by upstream environmental degradation.

3. **Global benefits** will exceed costs and contribute to:

- Enhanced integrity of the global environment that will contribute to sustainable livelihoods across the world.

4. **Threats to Biodiversity reduced:**

5. **Project involves close and active cooperation** of the local communities.

6. **Local communities are empowered and their natural resource management institutions are strengthened;**

7. **Local communities gain increased technical and financial capacity** to sustainably increase production, product quality and thus increase incomes.

8. **Access to product and market information by local communities** is increased thereby increasing value added and market price received.

6.2 Extended List of Criteria for Ranking and Prioritizing Proposed Projects

In developing an extended list of criteria for prioritizing the proposed projects reference has been made to the criteria developed for the Fast Track Projects in Ethiopia (King & Leul Kahsay Gezehegn, 2005) and Sudan (Bullock & Yagoub Abu Shora, 2005).

Given that the present study is one step in the Project cycle the Project Logical Framework (LF) has been used as the basic structure for ranking and prioritizing criteria. The levels of the LF are as follows:

- Project Goal (Strategy)/Project Objective
- Project deliverables: (Outcomes)
- Project Activities (Outputs)

In addition, the Project Assumptions/Risks that constitute the fourth column of Logical Framework are included.

The extended list of criteria incorporates (i) those from the initial list outlined in para.5.1 above, (ii) criteria proposed by various stakeholders during the field visits.

The proposed structure of the criteria is as follows:

- Relevant to Local, Regional /State, National and NBI-ENSAP policies and strategies.(Goal/Objectives)
- Problems related to identified environmental and natural resource hotspots addressed (Outcomes).

- Local, Downstream and Global Benefits Accrue. (Outputs)
- Risks to project outcomes and outputs can be mitigated.

The detailed criteria are listed below within the proposed structure outlined above.

1. *Relevant to Regional/State, National and NBI-ENSAP policies and strategies.*

- Relevant to policies/strategies of Region/State.
- Relevant to National Policies and Strategies.
- Relevant policies/strategies of NBI-ENSAP.
- Relates to other interventions/projects/programmes. (e.g. other ENSAP and JMP Projects).

2. *Problems related to identified environmental and natural resource hotspots addressed*

- Key stakeholders are correctly identified.
- Project correctly addresses Community needs underlying problems.
- New natural resources assets are created that contribute to more than one identified need (e.g. social needs/production needs).
- Project contributes to improved environment and/or reduced environmental degradation that will support sustainable livelihoods of local inhabitants;
- Threats to biodiversity (genetic, species and habitat) are reduced.

3. *Local, Downstream and Global Benefits Accrue*

3.1 Local benefits will exceed costs and contribute to:

- Increased household income and poverty reduced;
- Equitable access to resources by all members of the community increased;
- Vulnerability of local households to environmental, social and economic “shocks” reduced;
- Value of natural resources to local communities increased leading to an increased willingness to protect the sustainable supply of services and products from these resources

3.2 Down-stream Regional benefits will exceed costs and contribute to:

- Environmental costs for down-stream users reduced;
- Vulnerability of downstream households to environmental, social and economic “shocks” that were previously caused by upstream environmental degradation reduced;
- Regional/trans-boundary cooperation enhanced.

3.3 Global benefits will exceed costs and contribute to:

- Integrity of the global environment enhanced contributing to sustainable livelihoods across the world.

4. *Risks to project outcomes and outputs can be mitigated.*

6.3 Screening Methodology

6.3.1 Process

The process was as follows:

- A comparative assessment was undertaken of each project for each Sub Criterion and given a score from 1 to 5.
- The Sub criterion in each of the four Main Criteria were given a weighting factor (%) such that the Sub Criteria weighting factors for each Main Criteria added up to 100%.
- The individual scores (1 to 5) for each Sub-criterion was multiplied by the individual sub criteria weighting factor (%.)
- The weighted scores of each Sub Criteria were added up to obtain aggregate Main Criteria score for each Project.
- Each Main Criteria was assigned a weighting factor (%) such that the four weighting factors added upto 100%
- The aggregate Main Criteria scores were multiplied by Main Criteria Weighting Factors to obtain a Weighted Score for each Main Criteria for each Project.

The four weighted scores of the Main Criteria added up to obtain the **FINAL OVERALL WEIGHTED SCORE** for each Project.

6.3.2 Comparative Assessment of Projects by individual criteria

For each individual sub criterion a comparative assessment of each project was undertaken using information from documents, lessons learned during field visits and other information variously conveyed to the mission.

For each Project, every Sub Criteria was scored on the basis of a range from 1 to 5. This was achieved by first identifying the norm (score of 3) amongst the ten projects. Other Projects were then compared against the norm, ranking either higher or lower on the balance of evidence available (ANNEX 3).

6.3.3 Sub Criteria Assigned Weighting Factor

Each of the four Main criteria was enumerated separately. Individual Subsidiary criteria were assigned a weighting factor. Weighting factors of Sub Criteria for each of the Main criteria sum to 100 percent (Table 5).

Within Main Criteria 1 all weights are the same. Within Main Criteria 2 Sub- criteria 2.2 (Project correctly addresses Community priorities and underlying problems) and 2.5 (Project contributes to improved environment and/or reduced environmental degradation that will support sustainable livelihoods of local inhabitants) receive the highest weights, as it is considered that these are more important than the other criteria. In Main Criteria 3 with respect to 3.1 Local Benefits Sub Criteria 3.1.1 (Household Income Increased and poverty reduced) receives the highest weighting reflecting its considered importance over the other sub criteria. In Main Criteria 3.2 with respect to Downstream/Regional benefits Sub Criteria 3.2.1 (Environmental costs for down-stream users reduced) receives the highest weighting reflecting its considered importance over the other sub criteria.

Table 5. Sub Criteria Weighting Factors (%)

CRITERIA	WT
1. Accords with Regional/State, National and NBI-ENSAP policies and strategies.	
1.1 Relevant to policies/strategies of Region/State.	35%
1.2 Relevant to National Policies and Strategies.	35%
1.3 Relevant policies/strategies of NBI-ENSAP.	15%
1.4 Relates to other interventions/ projects/ programmes.(e.g. other ESNSAP and JMP Projects).	15%
TOTAL	100%
2. Problems related to identified environmental and natural resource hotspots are addressed (Objective).	
2.1 Key stakeholders are correctly identified.	15%
2.2 Project correctly addresses Community needs & underlying problems.	25%
2.3 New natural resources assets are created that contribute to more than one identified need (e.g. social needs/production needs).	20%
2.4 Project contributes to improved environment and/or reduced environmental degradation that will support sustainable livelihoods of local inhabitants;	25%
2.5 Threats to biodiversity (genetic, species and habitat) are reduced.	15%
TOTAL	100%
3. Accrues Local, Downstream and Global Benefits.	
3.1 Local benefits will exceed costs and contribute to:	
3.1.1 Household income increased and poverty reduced;	20%
3.1.2 Equitable access to resources by all members of the community increased;	12%
3.1.3 Vulnerability of local households to environmental, social and economic “shocks” reduced;	14%
3.1.4 Value of natural resources to local communities increased leading to an increased willingness to protect the sustainable supply of services and products from these resources.	12%
3.2 Down-stream Regional benefits will exceed costs and contribute to:	
3.2.1 Environmental costs for down-stream users reduced;	12%
3.2.2 Vulnerability of downstream households to environmental, social and economic “shocks” that were previously caused by upstream environmental degradation reduced;	10%
3.2.3 Regional/ trans-boundary cooperation enhanced	10%
3.3 Global benefits will exceed costs and contribute to:	
Integrity of the global environment enhanced contributing to sustainable livelihoods across the world.	10%
TOTAL	100%
4. Risks to project outcomes and outputs can be mitigated.	
TOTAL	100%

6.3.4 Applying Weighting Factors to the Four Main Criteria

The next step was to weight the four main criteria as in Table 6.

Table 6. Weighting Factors for main Criteria

MAIN CRITERIA	WT %
1. Accords with Regional/State, National and NBI-ENSAP policies and strategies.	20%
2. Problems related to identified environmental and natural resource hotspots addressed (Objective).	40%
3. Local, Downstream and Global Benefits accrue.	30%
4. Risks to project outcomes and outputs can be mitigated.	10%

Main Criteria 2 was considered the most important of the four and thus was accorded the highest weight. This was followed in tern by Main Criteria 3, then 1 and finally 4.

6.4 Results of Ranking and Prioritisation

The unweighted scores were assigned to each Sub Criteria for each Project (Table 7).

Each unweighted score was then multiplied by the relevant Sub Criteria weighting. The relevant resulting Weighted Scores of each Sub Criteria are shown below in Table 8. These were then aggregated by each of the four Main Criteria.

A summary of the Main Criteria Aggregate Scores from table 4 are shown in table 9.

Table 7. Unweighted Scoring Matrix for Sub Criteria

	1. Chemoga	2. Fincha'a	3. Jema	4. Jita	
1. Accords with Regional/State, National and NBI-ENSAP policies and strategies.					
Relevant to policies/strategies of Region/State.	3	3	3	3	
Relevant to National Policies and Strategies.	3	3	3	3	
	3	3	3	3	
Potential linkages to other interventions/ projects/ programmes.(e.g. other ESNSAP and JMP Projects).	3	3	3	3	
TOTAL	12	12	12	12	
2. Problems related to identified environmental and natural resource hotspots are addressed (Objective).					
Key stakeholders are correctly identified.	4	4	4	4	
Project correctly addresses Community needs & underlying problems.	4	4	4	4	
New natural resources assets are created that contribute to more than one identified need (e.g. social needs/production needs).	3	3	3	3	
Project contributes to improved environment and/or reduced environmental degradation that will support sustainable livelihoods of local inhabitants;	3	3	3	3	
Threats to biodiversity (genetic, species and habitat) are reduced.	3	3	3	3	
TOTAL	16	15	15	16	
3. Accrues Local, Downstream and Global Benefits.					
3.1 Local benefits will exceed costs and contribute to:					
Household income increased and poverty reduced;	3	3	4	4	
Equitable access to resources by all members of the community increased;	3	3	3	3	
Vulnerability of local households to environmental, social and economic "shocks" reduced;	3	3	4	4	
Value of natural resources to local communities increased leading to an increased willingness to protect the sustainable supply of services and products from these resources.	3	3	4	4	
3.2 Down-stream Regional benefits will exceed costs and contribute to:					
Environmental costs for down-stream users reduced;	4	4	4	4	
Vulnerability of downstream households to environmental, social and economic "shocks" that were previously caused by upstream environmental degradation reduced;	4	4	4	3	

EASTERN NILE TECHNICAL REGIONAL OFFICE

Regional/ trans-boundary cooperation enhanced	3	3	3	3	
3.3 Global benefits will exceed costs and contribute to:					
Integrity of the global environment enhanced contributing to sustainable livelihoods across the world.	3	3	3	3	
TOTAL	27	26	26	26	
4. Risks to project outcomes and outputs can be mitigated.					
	3	3	3	3	

Table 8. Weighted Sub Criteria Scores

	WT	1. Chemoga	2. Fincha'a	3. Jema	4. Jita
1. Accords with Regional/State, National and NBI-ENSAP policies and strategies.					
Relevant to policies/strategies of Region/State.	35%	1.05	1.05	1.05	1.05
Relevant to National Policies and Strategies.	35%	1.05	1.05	1.05	1.05
Relevant policies/strategies of NBI-ENSAP.	15%	0.45	0.45	0.45	0.45
Relates to other interventions/ projects/ programmes.(e.g. other ESNSAP and JMP Projects).	15%	0.45	0.45	0.45	0.45
TOTAL	100%	3.00	3.00	3.00	3.00
2. Problems related to identified environmental and natural resource hotspots are addressed (Objective).					
Key stakeholders are correctly identified.	15%	0.60	0.60	0.60	0.60
Project correctly addresses Community needs & underlying problems.	25%	1.00	1.00	1.00	1.00
New natural resources assets are created that contribute to more than one identified need (e.g. social needs/production needs).	20%	0.60	0.60	0.60	0.60
Project contributes to improved environment and/or reduced environmental degradation that will support sustainable livelihoods of local inhabitants;	25%	0.75	0.75	0.75	0.75
Threats to biodiversity (genetic, species and habitat) are reduced.	15%	0.45	0.45	0.45	0.45
TOTAL	100%	3.40	3.40	3.40	3.40
3. Accrues Local, Downstream and Global Benefits.					
3.1 Local benefits will exceed costs and contribute to:					
Household income increased and poverty reduced;	0.20	0.60	0.60	0.80	0.80
Equitable access to resources by all members of the community increased;	0.12	0.36	0.36	0.36	0.36
Vulnerability of local households to environmental, social and economic "shocks" reduced;	0.14	0.42	0.42	0.56	0.56

EASTERN NILE TECHNICAL REGIONAL OFFICE

Value of natural resources to local communities increased leading to an increased willingness to protect the sustainable supply of services and products from these resources.	0.12	0.36	0.36	0.48	0.48
3.2 Down-stream Regional benefits will exceed costs and contribute to:					
Environmental costs for down-stream users reduced;	12%	0.48	0.48	0.48	0.48
Vulnerability of downstream households to environmental, social and economic “shocks” that were previously caused by upstream environmental degradation reduced;	10%	0.40	0.40	0.40	0.30
Regional/ trans-boundary cooperation enhanced	10%	0.30	0.30	0.30	0.30
3.3 Global benefits will exceed costs and contribute to:					
Integrity of the global environment enhanced contributing to sustainable livelihoods across the world.	10%	0.30	0.30	0.30	0.30
TOTAL	100%	3.22	3.22	3.68	3.58
4. Risks to project outcomes and outputs can be mitigated.					
TOTAL	100%	3.00	3.00	3.00	3.00

Table 9. Aggregate Scores of Main Criteria from Table 8.

MAIN CRITERIA	1. Chemoga	2. Fincha'a	3. Jema	4. Jita
1. Accords with Regional/State, National and NBI-ENSAP policies and strategies.	3	3	3	3
2. Problems related to identified environmental and natural resource hotspots addressed (Objective).	3.4	3.4	3.4	3.4
3. Local, Downstream and Global Benefits accrue.	3.22	3.22	3.68	3.58
4. Risks to project outcomes and outputs can be mitigated.	3	3	3	3
TOTAL	13.06	12.71	12.58	12.81

The aggregate Main Criteria scores in table 8 were then multiplied using the Main Criteria weights (Table 6) above. The results are shown in table 10 below.

Table 10. Final Weighted Scores by Main Criteria and order of Project Priority

MAIN CRITERIA	WT	1. Chemoga	2. Fincha'a	3. Jema	4. Jita
1. Accords with Regional/State, National and NBI-ENSAP policies and strategies.	20%	0.6	0.6	0.6	0.6
2. Problems related to identified environmental and natural resource hotspots addressed (Objective).	40%	1.36	1.36	1.36	1.36
3. Local, Downstream and Global Benefits accrue.	30%	0.966	0.966	1.104	1.074
4. Risks to project outcomes and outputs can be mitigated.	10%	0.3	0.3	0.3	0.3
TOTAL		3.226	3.226	3.364	3.334
PRIORITY		2=	2=	1=	1=

It is possible that some donors may wish to use their own criteria for selecting projects for funding. These criteria might include a specific country or countries; a specific thematic area such as Integrated Watershed Management, Biodiversity Conservation or Livestock Production and Rangeland Improvement.

ANNEX 1. TERMS OF REFERENCE

1. Background:

The EN countries, comprising of Egypt, Ethiopia and Sudan are pursuing cooperative development at the sub-basin level through the investment oriented Eastern Nile Subsidiary Action Program (ENSAP). Towards this end, the EN countries have identified their first joint project, the Integrated Development of the Eastern Nile (IDEN), which consists of seven sub-projects addressing issues related to flood preparedness and early warning, power development and interconnection, irrigation and drainage, watershed management, multi-purpose water resources development, and modeling in the Eastern Nile. The Eastern Nile Technical Regional Office (ENTRO) is an institution established by the three EN countries to advance the implementation of ENSAP projects.

The Eastern Nile Watershed Project is one of the seven projects agreed under IDEN. Its immediate objective is to establish a sustainable framework for the management of selected watersheds in the sub-basin in order to improve the living conditions of the people, enhance agricultural productivity, protect the environment, and reduce sediment transport and siltation.

Towards meeting its objective, the Watershed project undertook two sets of activities in parallel between 2004 -2008: preparation of investment ready projects for national implementation (fast track projects) and a Regional Cooperative Assessment (CRA) study. Both sets of activity were successfully completed. Currently implementation of eight pilot projects is initiated at national level.

The Watershed Management Cooperative Regional Assessment (CRA) identified and prepared Project Profiles for a number of potential follow-up watershed management projects. With support from the NBI Institutional Strengthening Project (ISP), ENTRO has commissioned in 2010 a consultancy to delineate and prioritize the areas loosely defined in the Profiles. The focus of that consultancy was on areas outside the Abbay as activities under the Joint Multipurpose Identification Project (IMP ID) were expected to cover the Abbay. With changes in JMP ID plans, ENTRO now seeks, again under ISP, to initiate work on delineation and prioritization of watershed projects in the Abbay. This is envisaged to enhance the capacity of ENTRO for subsequent resource mobilization and the coordination of the eventual preparation of the prioritized projects, which will take place after this consultancy has concluded. In collaboration with the ENSAP teams, criteria for prioritizing the projects will be established. It is envisaged that in some cases projects may be integrated where synergy between the projects can be achieved.

2. Objectives of the assignment:

The objective of this assignment is to define watershed investment projects from the broadly identified hot spot areas in the Abbay sub-basin by the CRA study for watershed management for detailed project preparation (List of profiles of hot spot areas is attached herewith³).

3. Scope of the assignment

³ The CRA study for watershed management has prepared profiles for 13 hot spot areas. Out of these only four are included in the list. The remaining nine are outside the Abbay Sub-Basin and these are excluded from the list as they are already delineated and prioritize..

This consultancy aims at defining potential watershed projects for eventual preparation and investment through reviewing profiles of broadly identified hot spot areas, delineating each of the hot spot areas into micro-watersheds of manageable size, and prioritizing them on the basis of criteria to be developed in consultation with national counterparts. Each delineated area will be described in terms of socioeconomic and biophysical characteristics through document review and field assessment. Collecting available background information for each of the delineated sub-watersheds, reviewing, analyzing, assessing, and documenting related programs within the delineated sub-watersheds will be a key activity of this consultancy. The list of criteria developed and agreed will guide the collection and compilation of information (both secondary and primary data) that will later be used in the evaluation of micro-watersheds.

Stakeholders' participation and adoption of an integrated watershed management approach are imperative approaches in this assignment. The consultant is expected to work at all levels with government and non-government experts, who are knowledgeable about the areas under consideration as well as with the communities residing in these areas. In addition the consultant shall work very closely with the national coordinators for watershed and their team as well as with ENTRO in developing the list of criteria for prioritization.

At the end of the assignment the consultant will present the findings in a workshop for final review and approval.

4. Specific Tasks

The consultant shall review the information provided in the deliverables of the Cooperative Regional Assessment study which include:

- Transboundary analysis country reports for Egypt, Ethiopia, and Sudan
- Transboundary analysis for the Abbay-blue Nile; Takeze Atbara, Baro-Akobo-Sobat, and Main Nile sub-basins
- Distributive Analysis
- Watershed Management in the Eastern Nile Basin: Constraints and Challenges
- Project profiles

Making use of this information but not limited to it, the consultant shall carry the following tasks:

- Review the project profiles provided (list attached) and delineate each into micro-watersheds of manageable size (1,000 – 2000 km²)
- Develop list of criteria for ranking and prioritizing the micro-watersheds in consultation with key stakeholders.
- Through a process of stakeholders consultations (national watershed coordinators and working groups; ENTRO, the World Bank; potential donors and others as appropriate), finalize the list of criteria for ranking.
- Collect essential information for each micro-watershed through conducting a desk study of readily available information and collecting additional information through field visits and consultations with local population. The consultant shall collect the type and level of information required based on the list of criteria developed early on.
- Identify on-going investment projects within each of the delineated sub-watersheds, including water infrastructures,
- Identify key issues, challenges and potentials for each of the delineated watersheds that will form potential project components during the detailed project preparation
- Based on the review conducted, screen and rank all the micro-watersheds based on the agreed list of criteria.

5. Outputs

The outputs of the consultancy shall contain the information above, and be in the form of documents and maps. The consultant will provide the following:

- **An inception report:** within one week of commencement, the consultant will comment on the material and information on the project profiles provided by ENTRO, and present a work plan on how the consultants will carry out the work including logistical arrangement.
- **Draft final report:** Submit a draft final report of the consultancy which will include (i) a list of screening and ranking criteria, (ii) description of each micro-watershed (the description should as much as possible include ongoing investment projects as well as identification of development issues, including information emerging from each of the tasks listed in section 4, above, challenges and opportunities that will form potential project components during the detailed project preparation), (iii) screening and ranking matrix of the sub-watersheds with a clear justification of the evaluation of each sub-watershed against the criteria which is clearly referencing the information used to arrive to this assessment, and (iv) List of micro-watersheds in order of priority.
- **Workshop** is an important output of this consultancy. The consultant will present its findings to key stakeholders in a workshop.
- **Final report.** Submit a final report in which comment from workshop participants and other stakeholders is incorporated.

Additionally, a dataset should be delivered which contains all data collected during the consultancy, in a format that will be agreed with the client during contract negotiations. The format for GIS and RS data, the following file/document formats will be used:

- For georeferenced image or satellite - GeoTiff
- For raster files – ESRI grid format
- For vector data -ESRI Geodatabase or shapefile formats.
- Time series data – Excel

The outputs will be according to an agreed work plan. Consultant payment schedules will be linked to outputs. Comments on draft report will be consolidated by ENTRO and forwarded to the consultant. The consultant will revise the report accordingly and submit revised report within two weeks of receiving the consolidated comment.

6. Timeframe

The Consultancy is expected to take a maximum of three months. Out of this the consultant is expected to spend around one month in the field. The schedule of delivery is as follows:

- i) Within the first week of commencement (inception report)
 - ✓ A debriefing note that includes comment on the material and information on the project profiles provided by ENTRO.
 - ✓ A work plan on how the consultant will carry out the work including logistical arrangement.
- ii) Within one month of commencement
 - ✓ A list of delineated watersheds with a map
 - ✓ A list of criteria for screening and ranking
 - ✓ desk review and suggested sites for field visits (including outline of travel plans and logistics for field visits)

iii) Within two and half months of commencement

- ✓ A draft final report document which includes:
 - a description of each of the delineated micro-watersheds in terms of socio-economic and biophysical features
 - list of criteria for screening and ranking
 - The screening and ranking matrix of the projects and a clear written justification for the evaluation of each project against the criteria which is clearly referencing the information used to arrive at this assessment (for each project).
 - List of watersheds in priority order with a potential for detailed preparation of investment project

iv) Within three months of commencement

- ✓ Presentation of findings to a workshop
- ✓ Final report after incorporating comments from the workshop as well as written comments from ENTRO and other key stakeholders

7. Improvement of Terms of reference

The consultant may offer suggestions and improvements to the Terms of Reference where he/she considers it would result in better implementation of this assignment. Such suggestions if accepted will form part of the Terms of Reference of the assignment

8. Implementation arrangement

The task will be undertaken by an individual international consultant. The consultant shall work under the supervision of the Regional Watershed Project Coordinator. All deliverables described in this TOR will be addressed to the Regional Watershed Coordinator. In addition to the deliverables the consultant is expected to submit weekly progress reports to the project coordinator. The Watershed Project Coordinator's office is located within ENTRO's headquarter at Addis Ababa, Ethiopia. The coordinator will ensure that the performance of the work is in line with the terms of reference and related norms. ENTRO will be responsible for contract administration and serving as a link between the consultant and country offices. The national coordinators for watershed will facilitate meetings with concerned line ministries and field visits in their respective countries.

9. Required qualification

The required qualification to undertake the task is an MSc degree or above in natural resources management, watershed management, or related fields with more than 15 years of extensive experience in undertaking technical studies in watershed management, preparation and design of watershed projects of a similar scope, soil conservation and land use planning. Experience of work within the region and knowledge about the Eastern Nile Subsidiary Action Program and the Eastern Nile Watershed Project will be an advantage. In addition skills in GIS and Remote Sensing related to watershed application is required.

ANNEX: LIST OF PROJECT PROFILES OF HOT SPOT AREAS

PROJECT	CHALLENGES	DIRECT INTERVENTIONS	SUPPORTING INTERVENTIONS	DIRECT BENEFITS	SECONDARY BENEFITS	REGIONAL/GLOBAL BENEFITS
PROFILE 1. Integrated Watershed management: Abbay Sub-basin – Chemoga Watershed, Ethiopia	<ul style="list-style-type: none"> Severe land degradation in area of high agricultural potential Catchment major contributor of sediment to Abbay River High population densities land shortage livestock feed deficits 	<ul style="list-style-type: none"> SWC on cropland Area closure on Communal land Micro credit fertilizer & improved seed development On-farm forage development Dairy production Small-scale irrigation Crop diversification 	<ul style="list-style-type: none"> Feeder roads Improved market infrastructure Increased access to market information Capacity building for extension & research Increased access to micro credit Literacy & Skills training 	<ul style="list-style-type: none"> Arresting crop & communal land degradation Increased crop & livestock productivity Increased food security Increased farm incomes Reduced time for biofuel collection Increased access to technology & Information Wider range of livelihood strategies 	<ul style="list-style-type: none"> Improved nutrition & health Increased availability of wild plants Reduced vulnerability to climatic, economic & social shocks Improved access to off-farm employment Improved human and social capital assets 	<ul style="list-style-type: none"> Reduced sediment loads & downstream sedimentation Reduced loss of biodiversity (crop & wild plants) Increased sequestration of soil carbon
PROFILE 2. Integrated Watershed management: Abbay Sub-basin – Fincha'a Watershed, Ethiopia	<ul style="list-style-type: none"> Severe land degradation in area of high agricultural potential Sedimentation of Fincha'a Reservoir & Chomen Wetlands High population densities land shortage livestock feed deficits 	<ul style="list-style-type: none"> SWC on cropland Area closure on Communal land Micro credit fertilizer & improved seed development On-farm forage development Dairy production Small-scale irrigation Crop diversification 	<ul style="list-style-type: none"> Feeder roads Improved market infrastructure Increased access to market information Capacity building for extension & research Increased access to micro credit Literacy & Skills training 	<ul style="list-style-type: none"> Arresting crop & communal land degradation Increased crop & livestock productivity Increased food security Increased farm incomes Reduced time for biofuel collection Increased access to technology & Information Wider range of livelihood strategies 	<ul style="list-style-type: none"> Improved nutrition & health Increased availability of wild plants Reduced vulnerability to climatic, economic & social shocks Improved access to off-farm employment Improved human and social capital assets 	<ul style="list-style-type: none"> Reduced sediment loads & downstream sedimentation Arresting degradation of Chomen Wetlands Reduced loss of biodiversity (crop & wild plants, wild fauna and wetland habitat), Increased sequestration of soil carbon
PROFILE 3. Integrated Watershed management: Abbay Sub-basin – Upper	<ul style="list-style-type: none"> Severe land degradation in area of low agricultural 	<ul style="list-style-type: none"> SWC on cropland Area closure on Communal land 	<ul style="list-style-type: none"> Feeder roads Improved market infrastructure Increased access 	<ul style="list-style-type: none"> Arresting crop & communal land degradation Increased crop & 	<ul style="list-style-type: none"> Improved nutrition & health Increased availability of wild 	<ul style="list-style-type: none"> Reduced sediment loads & downstream sedimentation Reduced loss of

EASTERN NILE TECHNICAL REGIONAL OFFICE

<p>Beshilo Watershed, Ethiopia</p>	<p>potential but variable rainfall – high crop risk</p> <ul style="list-style-type: none"> • Poor road & market accessibility • High population densities • land shortage • livestock feed deficits 	<ul style="list-style-type: none"> • Micro credit fertilizer & improved seed development • On-farm forage development • Improved Small livestock production • Small-scale irrigation • Crop diversification 	<p>to market information</p> <ul style="list-style-type: none"> • Capacity building for extension & research • Increased access to micro credit • Literacy & Skills training 	<p>livestock productivity</p> <ul style="list-style-type: none"> • Increased food security • Increased farm incomes • Reduced time for biofuel collection • Increased access to technology & Information • Wider range of livelihood strategies 	<p>plants</p> <ul style="list-style-type: none"> • Reduced vulnerability to climatic, economic & social shocks • Improved access to off-farm employment • Improved human and social capital assets 	<p>biodiversity (crop & wild plants)</p> <ul style="list-style-type: none"> • Increased sequestration of soil carbon
<p>PROFILE 4. Integrated Watershed management: Abbay Sub-basin – Upper Jema Watershed, Ethiopia</p>	<p>Severe land degradation in area of low agricultural potential</p> <ul style="list-style-type: none"> • Low but variable rainfall – high crop risk • Poor road & market accessibility • High population densities • land shortage • livestock feed deficits 	<ul style="list-style-type: none"> • SWC on cropland • Area closure on Communal land • Micro credit fertilizer & improved seed development • On-farm forage development • Improved Small livestock production • Small-scale irrigation • Crop diversification 	<ul style="list-style-type: none"> • Feeder roads • Improved market infrastructure • Increased access to market information • Capacity building for extension & research • Increased access to micro credit • Literacy & Skills training 	<ul style="list-style-type: none"> • Arresting crop & communal land degradation • Increased crop & livestock productivity • Increased food security • Increased farm incomes • Reduced time for biofuel collection • Increased access to technology & Information • Wider range of livelihood strategies 	<ul style="list-style-type: none"> • Improved nutrition & health • Increased availability of wild plants • Reduced vulnerability to climatic, economic & social shocks • Improved access to off-farm employment • Improved human and social capital assets 	<ul style="list-style-type: none"> • Reduced sediment loads & downstream sedimentation • Reduced loss of biodiversity (crop & wild plants) • Increased sequestration of soil carbon