

ETHIOPIA

COUNTRY ENVIRONMENTAL PROFILE



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EXECUTIVE SUMMARY

Ethiopia is a **biodiversity hotspot** that occupies the major part of the Horn of Africa. The country belongs to a broader highland-lowland system where resources are not equally distributed but are dynamically interlinked. The country's population, predominantly rural (84 % rural, 16% urban) is currently experiencing sharp increases estimated at 2 million people / year.

STATE OF THE ENVIRONMENT

Environmental degradation in Ethiopia ranges from very severe in rural areas to severe in urban areas. **Soil erosion and degradation** remains one of the most critical and far ranging environmental issues affecting the country. As a result of **population increases, increased crop cultivation in marginal areas** and **increased livestock grazing pressure** have also contributed to increased deforestation and soil erosion in the central highlands. In the forested areas of the South and South West, **deforestation** is occurring at a sustained rate with major forestry threats including resettlement, commercial farming and fire. In the eastern and southern lowlands, commercial agricultural investments, rangeland enclosures, (re)-settlement schemes, charcoal production and the relentless expansion of very aggressive invasive alien species are having a profound and detrimental effect on the natural resources availability, the traditional rangeland management systems and institutions in place and ultimately the livestock based pastoralist livelihoods of the Afar, Somali and Boran people. In this respect, the **current agro-fuel investment scramble** taking place in many lowland areas does not bode well for the future and stability of pastoralist livelihoods in Ethiopia.

Other major ecosystems in Ethiopia (wetlands and afro-alpine areas) are also increasingly being threatened and degraded. Recognising that land tenure insecurity in Ethiopia was indirectly contributing to environmental degradation, the government has recently taken important measures to implement a land certification program in the 4 main regions aimed at increasing land tenure security. It is however too early to assess its potential impact on levels of productive investments and on environmental degradation.

Ethiopia is one of the **world biodiversity hotspots** but also one of the most degraded ones. The diversity of ecosystems and the geographically isolated highlands and arid lowlands to the east mean that Ethiopia harbours unique and diverse biological diversity. The biogeography of the country is characterized by these two dominant features. The Ethiopian flora is rich both in species number (between 6500 and 7000 species) as well as in endemics. Ethiopia also represents one of the eight centres in the world where crop plant diversity is strikingly high. As the centre of origin of *Coffea arabica*, Ethiopia is home to a unique pool of genetic diversity of this species, which is found mainly among stands of wild coffee in the rainforests of the West and South West. The increased clearing of coffee forests due to resettlement and commercial farming initiatives is resulting in the irreversible loss of unique and commercially valuable coffee genetic diversity. Overall, **invasive alien species** are posing an increasing threat to biodiversity and to the economic well-being of the population in Ethiopia, threatening agricultural land and protected areas, aggressively invading pastoral areas, destroying natural pasture, displacing native trees, forming impenetrable thickets, and reducing grazing potential. To counter these multiple biodiversity threats, several *in situ* and *ex situ* conservation activities have been successfully launched by the Institute of Biodiversity Conservation (**IBC**) in partnership with farming communities.

Air quality has sharply declined in Addis Abeba and other major towns as a consequence of the drastic increase in new and second hand vehicles. In terms of water drinking quality, fluoride is the major problem especially for the Rift valley. Ethiopia has one of the **lowest levels of sanitation coverage** in the world, estimated by the Ministry of Health at less than 30%. The country was also until very recently a **toxic hotspot** in terms of **obsolete pesticides** accumulation. However, the insufficiently controlled expansion of the flower and horticulture industries and the concurrent use of unauthorised pesticides and fungicides in the Rift valley and elsewhere in the country have brought the issue of pesticide regulations back onto the agenda.

ENVIRONMENTAL POLICY, LEGISLATION AND INSTITUTIONS

Despite significant achievements (formulation and approval of the Environmental Policy of Ethiopia (EPE), establishment of the Environmental Protection Authority (**EPA**)) and the overall influence that it has had in pushing forward critical issues related to environmental protection and sustainable development, the implementation of the Conservation Strategy of Ethiopia (CSE) and the promotion of various environment related policies have been characterised by significant gaps between policy and implementation and limited stakeholder participation, especially outside of the government. One of the notable exceptions to this trend has been the implementation of Access and Benefit Sharing¹ (ABS) of genetic resources related legislation with the result that amongst developing countries, Ethiopia is currently one of the leaders in the field of ABS, taking advantage of the outstanding expertise available in the EPA and IBC. However, the overall penetration of CSE activities and environmental policies into rural areas and into the thinking of the senior politicians has been limited.

The two most dynamic environmental institutions in Ethiopia are the EPA and the IBC. The EPA is involved with the development of environmental policy and legislation, standards setting for environmental media, monitoring pollution, establishing Environmental Impact Assessment (EIA), negotiating and signing ABS agreements on genetic resources and undertaking capacity development in relevant agencies to ensure the integration of environmental management in policy development and decision making. The IBC has power and duties related to the conservation, research and utilisation of biodiversity including maintaining and developing international relations with bilateral and multilateral bodies. On the basis of the existing legislation, The IBC has the responsibility and duty to implement international conventions, agreements and obligations on biodiversity to which Ethiopia is a party.

The recognition of environmental issues related to government sector policies and programs varies. At federal level, three sector agencies have established environmental units, but they are poorly staffed and have limited effectiveness. In other key agencies, much remains to be done in terms of integrating environmental concerns into their policies and programs. In rural areas, woreda offices have substantially increased resources and responsibilities in the present context of decentralization but these are exceptionally being allocated to environmental issues. The capacity to evaluate EIAs exists in Ethiopia but a coherent enforcement system is still lacking, particularly when foreign-led investments such as agro-fuel plantations are at stake.

¹ The Convention on Biological Diversity (CBD) introduced a system for the regulation of collection and other types of access to genetic resources. This system is known as the Access and Benefit-sharing (ABS) system. It involves the joint regulation of access to genetic resources and the sharing of benefits arising from their use by the researchers or companies from user countries and the representatives of the states, in which the genetic resources have been accessed. The Access and Benefit-sharing system is applicable similarly to the traditional knowledge (TK) of indigenous and local communities associated to genetic resources. In such cases, indigenous and local communities are to be involved in the process.

The **environmental civil society** in Ethiopia is currently underrepresented and **undervalued**. The few environmental Non Governmental Organisations (NGO) present in Ethiopia operate in a context characterised by aid and aid dependency. This constitutes a real challenge when it comes to the implementation of sustainable activities and methodologies, often involving maintenance and cost recovery systems. Moreover, in many communities of Ethiopia, there are local institutions for addressing various aspects of environmental management. This, to a large extent, reflects the **correlation between biological diversity and cultural diversity** which is found in biodiversity hotspots such as Ethiopia. Unfortunately, their potential for development and for addressing critical environmental / rural development / food security issues is not being sufficiently recognized.

ENVIRONMENT IN THE MAIN POLICIES AND SECTORS

Environmental considerations are included in several components of the Rural Development policy, although often more implicitly than explicitly and hence rather superficially. The Sustainable Development and Poverty Reduction Program (SDPRP) draws on the CSE and the EPE. Priority areas for action in environment and development are land degradation, the strengthening of regulatory and institutional capacity, and the enhancement and protection of biodiversity. Some important environmental issues, especially of a conservation nature, were included in the SDPRP as crosscutting issues, but they are not properly integrated or mainstreamed into any of the main chapters. In practice and over the last five years, there have been significant gaps between the SDPRP policy and implementation on the ground. Resettlement, which is covered under the food security heading, also includes references to the need for careful assessment of land resources and disease problems in the resettlement sites and also calls for communities to take responsibility for environmental protection and rehabilitation within resettlement areas. However, the mid-term and long term negative environmental impact of the resettlement and commercial farming schemes appear to have been underestimated while the short term direct benefits have been over-emphasised. In this respect, the SDPRP and current Plan for Accelerated and Sustained Development to End Poverty (PASDEP) insufficiently consider and address the issue of the revenues that could be obtained from a more systematic protection and sustainable valorisation of existing environmental resources (biodiversity, Non Timber Forest Products (NTFP), etc).

The emphasis of PASDEP is resolutely on accelerated agricultural and rural growth and the concurrent development of the private sector. Economic development is the priority whilst environmental concerns and issues of environmental sustainability are relegated into the background. There is little discrepancy between the policy and the implementation practice. The Ethiopian government is pursuing a policy of privatisation of its natural resources (forested areas, rangelands, minerals, spring waters, fossil fuel, game parks, etc). On some important environmental and rural development issues such as Integrated Pest Management (IPM), PASDEP represents a significant step backwards compared to the SDPRP. Moreover, recent and significant developments in the agro-fuel sector have highlighted the need for clarifications on a number of critical issues. Foremost is the fact that the current fast expansion of agro-fuel investments is taking place in an environment characterised by the absence of relevant policy and regulatory frameworks. The potential invasiveness of *Jatropha curcas* has not been assessed in the Ethiopian context. It is also unclear whether agro-fuel crops are just going to become another agricultural export commodity alongside coffee subject to the vagaries of the international market or whether the in-country bio-diesel refinery capacity is going to be upgraded to absorb local agro-fuel production, thereby contributing to reduce the fuel import bill.

The current water and sanitation policies and strategies are highly relevant and reflect best Ethiopian and international practice. However, implementation is lagging behind policy. Moreover, regulations and guidelines, although rapidly developing, are still missing in important areas.

ANALYSIS OF AID

In Ethiopia, most donors are active to some extent in the field of environment. The very active donors who have established environmental restoration, preservation and sustainable development as core development strategies include, amongst others, the Norwegian, Finnish and German cooperation agencies. The principles underlying the interventions of other donors are that environmental issues should be systematically mainstreamed in the various sectors of intervention (rural development, food security, transport, industry, trade, etc). Donor support and interventions related to the environment can be clustered around the following themes:

Forestry and Participatory Forestry Management (PFM)

Recognising that forest products and livelihoods were undervalued, that forestry and wetland ecosystems of the South West are complex and fragile and play key roles in wider sub-regional watersheds and ecosystems (Nile basin), several donor agencies (German, European Commission (EC), Norwegian, Dutch, Japanese, World Bank) have invested in Participatory Forestry Management approaches aimed at increasing the role and responsibilities of local communities in the management and conservation of their forests. All PFM activities have had noticeable and immediate impacts, including reduced illegal timber cutting, collecting and selling from urban centres, an overall reduced pressure from outsiders on forest resources, a reduced prevalence of conflicts between local communities and settlers, the maintenance of air and water quality and availability (springs, water table level) and the reduced prevalence of livestock pests and diseases commonly observed in deforested areas.

Biodiversity and NTFPs

A few donors are beginning to recognise the potential contribution of Ethiopian biodiversity to rural development. The EC, in partnership with the University of Huddersfield, is promoting NTFP research, development and marketing activities in the SNNPR. The German and Dutch Cooperation agencies have been actively supporting the strengthening of the IBC and initiatives aimed at building in-country ABS capacity. Very recently, French institutions and the EPA have formed partnerships to study the possibilities of establishing Geographical Indication systems to promote and add value to Ethiopian “produits de terroirs”. However, Ethiopia’s biodiversity development potential remains largely untapped compared to other biodiversity hotspots in the world.

Water, sanitation and irrigation

In the water and sanitation sector, there are no areas of support that can be described as saturated or over crowded. However, sanitation has generally been under-supported and it appears that there has been a tendency to channel more funds to the urban than to the rural sector. The needs are so great across a very wide area that all support finds relevant targets for its assistance. The development of small scale irrigation is being supported country wide by a variety of donors, including the EC, with, in most cases, a very insufficient focus on maintenance, sustainability and overall software aspects. The program currently funded by the Agence Francaise de Developpement (AFD) in the Amhara region is a notable exception to this trend.

Land issues (Certification, SWC, SLM)

Regarding the PSNP, and in the best of cases, the key assumption that public works at community level focused on natural resource management (SWC, water harvesting) will contribute to the restoration of the environment and therefore of the productive capacity of rural areas in the highly populated central and northern highlands is only partially true. Poor senses of ownership amongst farmers and poor maintenance remain the weak points of these public works initiatives. Other emerging donor initiatives related to land and the environment include support to the government-led land certification programme and the promotion of the Sustainable Land Management (SLM) approach. In an effort to address the land degradation issue, several donors are currently pooling their resources to promote the concept and implementation of SLM methodologies within the Ministry of Agriculture and Rural Development (MoARD). In its current design (strong focus on scaling up of de-contextualised “best” practices), it is yet unclear how this program will avoid the pitfalls of similar initiatives undertaken in Ethiopia over the last decades.

Climate change initiatives

Another recent donor initiative is focused on climate change mitigation. Presented as a potential innovative concept for Ethiopia, it currently fails to take a meaningful historical perspective, to disentangle the hyper-variability and erratic nature of the Ethiopian climate from local and global climate change and to look at local climatic interrelationships within Ethiopia. Lastly, it does not recognise that most food security / rural development interventions launched in Ethiopia over the last decades were already designed with the ultimate aim to mitigate the effects of the Ethiopian climate variability, long before the concept of climate change mitigation entered the rural development jargon.

CONCLUSION

The environmental well-being of Ethiopia is of regional importance. While natural resources are not distributed evenly between the highland and lowland areas, it is essential to bear in mind that they are dynamically interlinked. Thus, the environmental health of Ethiopia can affect the environmental well-being of several neighbouring countries including Kenya, Somalia, Sudan and even Egypt.

Throughout Ethiopia, complex and fragile ecosystem equilibriums and interdependencies are being increasingly disturbed while the ecosystems themselves are being degraded to an alarming extent. The altitudinal dimension of these interdependencies is still insufficiently recognised in development circles, particularly regarding pastoralist areas. Concurrently, the emergence of a “green” rush is becoming noticeable. Public / communally managed natural resources (springs, forests, grazing areas, parks, minerals, etc) are being increasingly privatised. In this respect and owing to its suddenness and scale, the recent surge in agro-fuel plantation investments requires close monitoring.

As far as the environment is concerned, the policy framework of the country is well established, covering all the relevant issues and sectors. Specific environment related policies exist, and most economic and sector development policies contain environmental provisions and regulations. However, there is a tendency for most government rural development policies and programs to be designed and implemented with an insufficient consideration of the comparative advantages prevailing in each area and with a systematic emphasis on crop production and agricultural livelihoods at the expense of forestry or livestock-based and pastoralist livelihoods. A higher degree of consideration and inclusion of pastoral and forestry livelihood processes should therefore go into future policy designs, with in the case of forested areas, a much stronger focus

on NTFPs. Despite claims in the SDPRP and PASDEP that all rural development interventions should take into account the specificities of each agro-ecosystem and area, in practice and despite claims to the contrary, this has rarely been the case, the blanket recommendation approach still being the preferred strategy of implementation. To date, this approach has precluded the consideration and understanding of the diversity and of the mosaic of physical and social environments that characterise the highlands of Ethiopia and has almost systematically by-passed the vast untapped biodiversity-related development potential of the country. This is again a reflection of the insufficient consideration of the natural comparative advantages that Ethiopia offers as a biodiversity hotspot.

From an environmental perspective, the Ethiopian institutional framework offers a mixed perspective. On the positive side, structures and institutions have been established at federal, regional and in some cases zonal and woreda level. On the negative side, the environmental management capacity of the country is persistently undermined by chronic capacity issues, serious turnover problems and financial constraints observed almost everywhere at woreda and even zonal level. In such conditions, the mainstreaming of the environment to as many line ministries as possible would appear to be a questionable strategic choice.

On the donor side, the dominant view is that environmental issues should be mainstreamed into the major economic sectors (rural development, transport, energy, etc). Such an approach fails to recognise and address the urgency of the environmental crisis currently unfolding in many parts of the country and the fact that short of immediate and direct interventions aimed at preserving / restoring the environment and fostering the sustainable use of environmental resources, there is a significant risk that food insecurity will spread to western resettlement areas currently categorised as food secure.

The information and the analysis of the data available no longer point out to the need for environmental mainstreaming but for the upgrading of the environment as a focal sector of intervention. In light of the strong rural development / food security bearing of the country, it would seem realistic to conceive of an environmental focal sector intimately intertwined with rural development initiatives. Tentatively, the environmental focal sector could be developed along the following lines:

Accompanying growth in the densely populated areas of the highlands by focussing on water harvesting and irrigation maintenance and “software” issues

Accompanying the (re)settlement process and optimising its development potential by strengthening PFM and Participatory Natural Resource Management development processes

Promoting the conservation, use and the national and international valorisation of Ethiopian biodiversity, including NTFPs, in all parts of the country

Supporting much needed environmental research to assess the impact of current pro-growth policies particularly in the emerging agro-fuel, floriculture and horticulture industries.

Selected quantitative environment-related indicators for Ethiopia

| | | |
|----------------------|-------------------|---|
| 0 | Number | Number of comprehensive studies conducted to assess the environmental and public health impact of the commercial floriculture and horticulture industry expansion in the central rift valley lake complex (Shalla, Abyata, Langan, Ziway). |
| 2 | Number | Number of ABS agreements signed by the government with foreign companies regarding the exploitation of Ethiopian genetic resources (teff and vernonia) (Feyissa 2006) |
| 5 | Number | Minimum number of very severe and countrywide drought events recorded in each century over the last 500 years (Pankhurst 1988) |
| 6.75 | Percentage | Upper bracket estimation of the annual agricultural GDP loss due to land degradation (Yesuf & al 2005) |
| 30 | Percentage | Upper estimation of the Ethiopian sanitation coverage (MoWR & al 2006) |
| 72 | Percentage | Percentage (8/11) of resettlement sites where serious conflicts over natural resources between local inhabitants and re-settlers have occurred recently (Forum For Social Studies 2006) |
| 10 000 | Number | Lower estimate of the number of Ethiopian accessions of wheat, barley and sorghum currently held in research centres outside of Ethiopia (Engels & al 1991) |
| 1 150 000 | Ha | Area already established and/or currently under negotiation for agro-fuel development in mainly lowland pastoralist areas of Ethiopia (SEEDLING 2007) |
| 3 000 000 | Tons | Annual unutilised sustainable bamboo production (FAO-INBAR 2005). |
| 53 800 000 | USD | Annual total net cost of deforestation in the Baro-Akobo basin (ENTRO 2007) |
| 160 000 000 | USD | Annual savings in the California barley industry resulting from the use of Ethiopian barley germplasm to breed resistance to dwarf yellow virus (WCMC 1992) |
| 1 450 000 000 | USD | Conservative estimate of the benefits that would result from an international coffee breeding and dissemination program over a 30 year period using the available diversity of Ethiopian germplasm (Hein & Gatzweiler 2006) |

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Table 2 - Deforestation rates 1990-2000

Table 3 - Summary of 2000 and 2005 data WBISPP report 2000

Table 4 - Deforestation rates 1990-2005

Table 5 - Summary of biodiversity threats and root cause analysis

Table 6 - Invasive Alien Species and their geographical distribution

Table 7 - National Parks and Wildlife Sanctuaries

LIST OF ACRONYMS

| | |
|-------|--|
| ABS | Access and Benefit Sharing |
| ADLI | Agricultural Development Led Industrialization |
| BMNP | Bale Mountains National Park |
| CBD | Convention on Biodiversity |
| CFW | Cash For Work |
| CSE | Conservation Strategy of Ethiopia |
| CSA | Central Statistical Authority |
| CWDCC | Coping with Drought and Climate Change |
| DA | Development Agent |
| DDT | DichloroDiphenylTrichloroethane |
| EA | Environmental Assessment |
| EBA | Endemic Bird Area |
| EC | European Commission |
| EFAP | Ethiopian Forestry Action Plan |
| EGS | Employment Generation Scheme |
| EHRS | Ethiopian Highlands Reclamation Study |
| EIA | Environmental Impact Assessment |
| EIS | Environmental Information Systems |
| EPA | Environmental Protection Authority |
| EPC | Environmental Protection Council |
| EPE | Environmental Policy of Ethiopia |
| EPDRF | Ethiopian People Democratic Revolutionary Forces |

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|--------|--|
| ESDM | Environment and Sustainable Dry Land Management |
| ESMF | Environmental and Social Management Framework |
| FFW | Food For Work |
| FRA | Forestry Resource Assessment |
| GEF | Global Environmental Fund |
| GTZ | Gesellschaft für Technische Zusammenarbeit |
| IAS | Invasive Alien Species |
| IBC | Institute of Biodiversity Conservation and Research |
| IDA | International Development Association |
| ILO | International Labour Organisation |
| IUCN | International Union for the Conservation of Nature and Natural resources |
| JICA | Japan International Cooperation Agency |
| MEDAC | Ministry of Economic Development and Cooperation |
| MoARD | Ministry of Agriculture and Rural Development |
| MoFED | Ministry of Finance and Economic Development |
| MoH | Ministry of Health |
| MONREP | Ministry of Natural Resources Development and Environmental Protection |
| MoWR | Ministry of Water Resources |
| NAPA | National Adaptation Plan of Action |
| NGO | Non Governmental Organisation |
| NBSAP | National Biodiversity Strategy and Action Plan |
| NFPA | National Forest Priority Areas |
| NEAP | National Environmental Action Plan |

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|----------|---|
| NRM | Natural Resource Management |
| NTFP | Non Timber Forest products |
| PAN | Pesticides Action Network |
| PASDEP | Plan for Accelerated and Sustained Development to End Poverty |
| PFM | Participatory Forest Management |
| PGRC/E | Plant Genetic Resources Centre/Ethiopia |
| PIM | Program Implementation Manuals |
| PSCAP | Public Service delivery and Capacity-building Program |
| PSNP | Productive Safety Net Programme |
| PW | Public Works |
| RCS | Regional Conservation Strategies |
| REA | Regional Environmental Agency |
| SDPRP | Sustainable Development and Poverty Reduction Program |
| SEG | Safe Environmental Group |
| SIDA | Swedish International Development Agency |
| SMNP-IDP | Simen Mountains National Park Integrated Development Project |
| SNNPR | Southern Nations Nationalities and Peoples Region |
| SWC | Soil and Water Conservation |
| UNDP | United Nations Development Program |
| WBISPP | Woody Biomass Inventory Strategic planning |
| WHO | World Health Organisation |
| WSG | Woreda Support Group |
| WWF | World Wildlife Fund |

1-BACKGROUND

The size of Ethiopia is roughly of 1,130,000 km². The country, which occupies the major part of the Horn of Africa, has a population estimated at 73 million inhabitants as of mid-2005 and is one of the major biodiversity hotspots in the world. The varied relief (massive highlands with high and rugged mountains, flat topped plateaux and deep gorges), divided by the Great Rift Valley, and surrounded by lowlands and semi-deserts, determines a variety of climates, soils, vegetations and settlement patterns. Altitudes range from 126 m below sea level (Kobat Sink, Afar Depression) to 4620 m at Ras Dejen. Agro-ecological and altitude zones range from the cool zone above 2,400 m to the lowland hot zone (which includes both tropical and arid zones) below 1,500 m. The Great Rift Valley separates the north-western and south-eastern highlands.

The climate of Ethiopia ranges from equatorial desert to hot and cool steppe. The south-western part is the wettest of the country with an average annual rainfall exceeding 2200 mm for instance in Ilubabor Province. Rainfall amounts decrease in all directions as one moves from the south-western highlands, averaging less than 200 mm in the Danakil Depression, the lower Awash River Basin and in Eastern Ogaden.

The geography of Ethiopia is dominated by highland mesic plateaus surrounded, particularly to the east, by arid and semi-arid lowlands. These geographical features have profound influences on the ecological processes, ecosystems and biodiversity of the region and country.

The highlands of Ethiopia attract large amounts of orographic rainfall (Gamachu 1977). As a consequence, the highlands are not only prime areas for rain-fed agriculture, but they are also the watershed for the surrounding lowlands. There are seven major river basins: Webe Shebelle, Awash, Omo, Juba (Genale, Web, Welmel) and Blue Nile (Takeze, Baro-Akobo and Abbai) in the highlands of Ethiopia that provide water for the people, livestock, wildlife and riparian vegetation in the lowlands. This is the highland-lowland system where resources are not equally distributed but are dynamically interlinked. Thus, the people, livestock, wildlife and riparian vegetation in the lowlands (not only within Ethiopia but extending to all the surrounding arid lowland countries) are dependent on the good management and protection of the watersheds in the highlands.

In terms of administration, Ethiopia is divided into nine states on the basis of ethnical criteria, namely Afar, Amhara, Benilshangul-Gumuz, Gambela, Harari, Oromia, Somali, Southern Nations, Nationalities, and Peoples Region (SNNPR) and Tigray. Although Oromo, Amhara and Tigrayans account for three-fourths of the Ethiopian population, the people of Ethiopia are much more diverse than the number of states suggests. Most of the population (75 – 80%) works in agriculture, which is mainly of a subsistence nature, although a large part of the country's exports are provided by the small cash-crop sector.

Owing to its geographical and historical characteristics, the country remains one of the ultimate rural areas in the world. In 2005, urban population was estimated at 16 % of the total population.

Ethiopia is currently experiencing sharp population increases (population growth rate estimated at 2 million people / year) which in turn are significantly impacting on the sustainability of livelihoods throughout the country, both in urban and rural areas. This is having profound consequences on the evolution of the state of the environment. Concurrently, government and most donors alike continue to focus their efforts and investments on essentially productive and economic growth activities.

2-THE STATE OF THE ENVIRONMENT

2.1-Mineral resources and geology

Ethiopia has significant deposits of gold, silver and tantalite. Other metal deposits include iron ore, manganese, nickel and platinum (Yager 2003). Small deposits of uranium have recently been discovered in the Bale mountains.

The country also produces a number of industrial minerals such as brick clay, diatomite, feldspar, gemstones such as opals, granite, gypsum, kaolin, limestone, pumice, sand, scoria, soda ash, talc and salt.

Salt deposits in the Afar Region are significant and fuel domestic as well as regional salt markets in the Horn of Africa. Rock salt is produced by artisan miners while salt is also produced from brine lakes in the areas of Afdera, Assal and Badda. Ponds at Emi and Krime also produce salt in the SNNPR.

Other industrial mineral deposits in the country include apatite, bentonite, dolomite, potash, quartz and sulphur (Yager 2003).

However, production of several mineral commodities faces several constraints, including insufficient infrastructures, unpredictable world market conditions and limited domestic demand.

Gas reserves have been confirmed in the Ogaden basin region (Caleb and Hilala gas fields) but remain to date unexploited. Recent oil drillings in the Gambella region have so far been negative. Drillings will resume after the 2006 rainy season. Exploration for oil has recently begun in the Awash basin.

Ethiopia remains totally dependent upon imports to meet its demand for petroleum.

In terms of geological risks, Ethiopia is at the epicentre of the geologically active Great Rift Valley and is susceptible to earthquakes of moderate to high intensity and volcanic eruptions as evidenced recently during the eruption of the Ertale volcano in the Afar Region.

2.2-Land

Soil erosion and degradation remains one of the most critical and far ranging environmental issues affecting the country. Despite repeated soil and water conservation campaigns spread throughout most mountainous parts of the country and implemented in each Farmers' Association, very significant volumes of productive soil are lost every year to water erosion and wind erosion. According to the various studies undertaken to evaluate these losses, estimates vary between several tons/ha/year (WBISPP) to 100 tons / ha / year (EHRS). The large discrepancies observed between both studies would tend to suggest that figures produced by the latter are somewhat overestimated.

Two significant factors have contributed and continue to contribute to compound this worrying trend.

First is the fact that the public works implemented over the last two decades (since the fall of the Derg roughly) in their various forms (SWC, agro-forestry, etc) and for a number of reasons (political control dimension, lack of government staff capacity, poor design, tenure problems) fail to raise senses of ownership among farmers. Maintenance is consequently the main weak point of such schemes. Farmers in most parts of the country do not undertake maintenance by themselves as they feel that the activities are not their responsibility and as in any case future maintenance is conditioned by the availability and access to future cash or food disbursements. Worse, in marginal areas barely suitable for agriculture (in several lowland areas in particular), SWC tends to stand for Stone and Water Conservation and illustrates the crop and agriculture bias predominant in this country. The safety net programme in this respect perpetuates these trends. There is currently nothing to suggest that natural resource management activities undertaken under the umbrella of the safety net activities differ in any way from the previously labelled EGS, CFW or FFW activities. The title may have changed but the modus operandi, the methodology and implementation of natural resources management based public works remain similar. Of concern is the continued discrepancy between the theory of safety nets / public works / poverty graduation and the actual implementation of NRM activities by MoARD and kebele administrations. PW on NRM provide patches to the environment on a yearly basis but fail to raise senses of ownership and therefore maintenance.

The Konso case illustrates quite well this phenomenon. Isolated from government public works schemes and activities until very recently, the SWC activities of the Konso people remain a model not only technically but also in terms of sense of ownership and maintenance.

The second factor relates to the pronounced population increases and land pressures observed during the last fifteen years. Repeated deliveries of food aid or cash in various forms have resulted not only in the maintenance of the affected populations (the traditional life saving argument) but also in an increase of the number of productive farmers and therefore a decrease of the average acreage of each household. This in turn has forced numerous farmers to search for new fields for cultivation. The resulting

encroachment of cultivated land onto semi-marginal to marginal areas (steep slopes, rocky/stony areas) has become systematic in most parts of the highlands, thereby further amplifying the soil erosion phenomenon. It is estimated for instance that cultivated land in grain crops alone, which represents the bulk of crop production, has increased dramatically from 6.96 million ha in 1994 to 10.24 million ha in 2005 (CSA bulletin). At country level, overall cattle and small ruminant populations have simultaneously increased between 1994 and 2005 from 29.4 million to 38.5 million and from 19.2 million to 26.6 million respectively (FAOStat). While it is difficult to interpret these figures for highland mountainous areas alone, it is very likely that livestock grazing and pressure on the natural resources has increased despite an overall destitution trend spread amongst all categories of farmers in some parts of the highlands (Devereux & al 2004), thereby further contributing to overgrazing in most areas including marginal areas. The combination of increased crop cultivation with increased livestock grazing pressure in turn has also contributed to increased soil erosion. Overall knock-on effects of various forms of erosion are particularly visible in riverine areas with important uprooting and deforestation of river vegetation as a consequence of high velocity run-offs and flash floods.

Losses of arable land due to increased urbanisation / industrialisation are tangible throughout the country, particularly on the Addis Ababa - Awassa, Addis Ababa - Debre Berhan and Addis Ababa - Wolisso axes, but remain to be quantified.

The other important dimension of land in Ethiopia relates to the security of its tenure for farmers.

Until the recent implementation of the Land Certification scheme in the four major regions, the land policy in Ethiopia was based on the government's position that land is both a factor of production contributing to growth and an essential element in providing for the welfare of the population. The policy was essentially the same as that during the Derg regime, which is that land is state property and farmers have use rights over the plots they farm. Land cannot be sold, exchanged or mortgaged. The government anticipated that moving beyond providing security of access to full ownership was likely to cause large numbers of destitute farmers, who would have no option but to sell their land in order to survive, to sell, heavily mortgage or otherwise transfer their rights to other people and thereby become landless. It was thought that this would lead to a concentration of rural land ownership in the hands of the urban elites, to massive rural-urban migrations, landlessness and widespread poverty.

However, gradually recognising that the issue of tenure insecurity was tangible and serious amongst Ethiopian farmers (fear of redistribution) and potentially hampering investments, maintenance and productivity improvements in rural areas, the government decided to embark on a large land certification campaign in the four main regions of Tigray, Amhara, Oromyia and SNNPR. The federal Land Administration and Land Use Proclamation No. 456/2005 provides among others that farmers have a perpetual use right on their agricultural holdings, and that this right will be strengthened by issuing certificates and keeping registers (Deininger & al 2006).

Unlike similar initiatives in other countries, the implementation of this scheme has caught on in Ethiopia and, as of early 2006, data had been collected on about six million households, of which about half had actually received their ‘first phase’ certificates (Deininger & al 2006). This initial phase is weak on the description of the land plots, which neither include a map, nor any kind of spatial reference (save a list of neighbouring landholders), and only give a roughly measured or estimated indication of the acreage.

According to one recent study carried out taking into account the four main regions of Ethiopia, land right certification has reduced conflict, helped to empower women, and improved governance at the local level (Deininger & al 2006). Another specific study focused on the land certification process in Tigray alone reveals that the land registration and certification process has contributed positively to tenure security in Tigray. 84% of the households interviewed stated that they perceived the risk of being evicted from their land to have been reduced because of the certification while 78% of the households stated that they thought that land certificates increased the probability of getting compensation in case of land takings (Holden 2006). Other major findings were that there is limited knowledge of the land law in rural Tigray and that land registration and certification may have contributed to improve the efficiency of the land rental market (Ibid 2006). However, it was noted that the number of land disputes handled by woreda courts has increased in recent years which is in direct contrast with the findings of Deininger & al 2006 (see above).

In the SNNPR, where the certification process began after the other regions, the issue of the certification of communal forest areas has not yet been addressed. In addition, there is evidence that the anticipation of the implementation of the scheme led many farmers to clear out as much communal forest areas in order to have them registered as private agricultural land under the new proclamation. As a result, several small forest clearing “rushes” were observed in several parts of Bench Maji and Kefa zones (McKEE 2005b). This rush is now believed to be over.

These partial and preliminary findings point out to the need to continue to closely monitor the impact of the land certification exercise in the four regions. Investment and productivity-impacts may take longer to materialize (Deininger & al 2006). In particular, the extent to which the land certification exercise will ultimately contribute to raise the level of investment by farmers in SWC measures and translate into improved senses of ownership and increased maintenance of SWC works should be carefully monitored and analysed.

2.3-Water and sanitation

2.3.1-Quality of drinking water

Ethiopia accepts the international water quality standards of the World Health Organisation (WHO).

A detailed water quality study (Melaku & Leta 2006) established that faecal contamination in collected and stored household drinking water was detected in over 40% of stored water samples, although only 3% of these scores were at a level which would present a risk to human health (Ibid). Although it was not statistically significant, the study identifies a certain degree of concentration difference in faecal coliforms between the sources and point-of-use. Disinfection and supervision of water sources should also be undertaken on regular basis which is unfortunately not a practice for many “protected” water systems in Ethiopia (MWR & al 2006).

Recently the Ministry of Health and other stakeholders conducted a rapid assessment on drinking water quality (WHO & al 2006) that established the following main findings:

- Arsenic is not problematic except for the Rift Valley
- Fluoride is a major problem especially for the Rift valley
- Nitrate concentration complies with WHO and national standards
- The level of protection is low from risks such as: cracks in the pre-filters; existence of a sewer or latrine within 30m of a water tap; animal proximity; water storage practice in the household and, sources of pollution in the proximity.

2.3.2-Safe disposal of human excreta

Ethiopia has one of the lowest levels of sanitation coverage in the world, estimated by the Ministry of Health at less than 30%. In the last two years, there has been a general shift in approach with regards to addressing sanitation and hygiene challenges in Ethiopia. From subsidising communal latrine construction, more recent efforts have moved towards intensive hygiene promotion and community mobilisation. Practical successes of this approach have been observed in some woredas of Southern Nations and Nationalities Peoples Republic (SNNPR), Amhara, Tigray and Benishangul Gumuz (MoWR & al 2006).

With the vision of replicating and scaling up these experiences the Sanitation Protocol clearly spells out that public funds are to be redirected to finance public health workers costs, software activities, the construction of institutional latrines (schools, health centres, market places, other community sites) with up to 95% subsidy. The household is expected to take full responsibility for investing and constructing a latrine with hand washing facility. The training and deployment of some 7000 health workers at kebele level demonstrates the commitment of MOH to the new approaches (Ibid 2006).

2.3.3-Water and sanitation availability

An initial evaluation of the water and sanitation sector performance was carried out based on available data², using the indicators shown in Table 1.

² There is very little agreement on present coverage estimates with differing figures from differing reports depending on the definitions used to denote coverage and non functionality etc. The figures used in this

Based on best estimates, the water and sanitation sector has shown a very remarkable increase in coverage in rural water supply and sanitation during the last year. This is largely a result of the combination of:

- The application of appropriate low cost technology e.g. in sanitation in the SNNPRS,
- Initiatives taken by the local private sector to manufacture low cost water lifting devices and,
- Political leadership from the Federal, Regional and Woreda governments (MoWR & al 2006). These developments have been made possible by, and have also contributed to, a growing collaboration between government, civil society and the private sector.

Table 1- Key sector performance indicators

| Indicator | | 2000 | 2005/6 estimate | Progress 2004/5- 6 |
|---|-------|--------------------|------------------------|---------------------------|
| 1 Access to improved water supply ⁽¹⁾ | Rural | 23% | 44 % | 11% |
| | Urban | 74% | 80% | 6% |
| | Total | Data not available | 42% | Data not available |
| 2 Proportion of functional water systems | | | 70% | |
| 3 Average unit cost of new water supply systems | Rural | | ? Birr/p | |
| | Urban | | ? Birr/p | |
| 4 Access to improved sanitation | Rural | | 17.5% | |
| | Urban | | 57% | |
| | Total | | 28% | |

Source: MoWR & al 2006

2.4-Ethiopia, a toxic hotspot

2.4.1-Obsolete pesticides

A report issued in 1999 indicated that at least 1500 tonnes of obsolete pesticides were spread in 402 stores at 256 sites in the country (PAN UK 1999). This figure excluded massive but unquantifiable amounts of soil soaked in pesticides which have leaked from their containers, thousands of sprayers for which no spare parts could be obtained and contaminated building materials, pallets, shipping containers, etc.

report are those used for the PASDEP/UAP and which are now considered the official WSS&H sector statistics.

Most of the pesticides were donated by aid agencies to help the Ethiopian people to protect their crops or combat disease (anti-malaria campaigns). However, lack of coordination between donors and discrepancies between the real and estimated needs frequently resulted in the supply of the wrong chemicals or in quantities far beyond local needs or in units which were too large for Ethiopian farmers to use (Ibid). In other cases, over-enthusiastic central purchasing, for example for the state farms, resulted in massive oversupply of pesticides which could not be used before they lost their efficacy or leaked away.

Other causes of obsolescence included the absence of labels as many of the pesticides supplied never had labels other than the name of the product and its manufacturer. Occasionally, products are supplied without enough information about their intended use. For instance, several barrels of pesticides labelled prominently as gift from the EC to the people of Ethiopia, tell users only that the product is called Vincit. No such product is listed in any of the recognised reference manuals and one can only guess what its intended use is (PAN UK 1999).

To reduce the threat of obsolete pesticides in Ethiopia, a large obsolete pesticide disposal programme led by the FAO and jointly funded by Italy, USA, Japan, the Netherlands and Sweden was implemented between 2001 and 2004 culminating in the incineration in Finland of 1500 tonnes of obsolete pesticides by a hazardous waste management company. The country is currently engaged in the second phase of a project to dispose of 1,100 tonnes of publicly held obsolete pesticides located in 705 sites spread across the country. Ethiopia is well advanced with its disposal activities in Phase II, using the principles of FAO's Environmental Management Toolkit, which provides a process for prioritizing sites and regions (MoARD 2006). The project falls under the Umbrella of the Africa Stockpiles Programme.

However, as pesticides donations to Ethiopia have not ceased and as the discrepancies between the estimated and real needs remain a chronic problem, there is still a strong need to address the issue of obsolete pesticides in the country. Moreover, given the wide range of pesticides used in the emerging floriculture and horticulture industry, the human health and environmental problems reported in other countries with established flower industries and the biodiversity value of the rift valley lakes, utmost priority should be given to effective pesticide management in Ethiopia. Recent studies show that respectively, 18 of the 96 insecticides and nematicides, and 19 of the 105 fungicides imported by the flower farms were not registered in the MPS-code 2006 list. These are likely to be underestimates as the lack of a coordinated system makes it very probable that the list did not capture all the chemicals pesticides imported. The importation of large quantities of pesticides and the bypassing of the registration system of the MoARD present a high risk for future accumulation of obsolete pesticides (Abate and Tameneh 2006). It also puts workers and nearby populations at risk of exposure to unregistered pesticides (Ibid 2006).

2.4.2-DDT

In 2002, the Safe Environment Group (SEG) undertook a study of DDT usage in Ethiopia in collaboration with the Environmental Protection Authority (EPA) to identify sources of DDT and the quantities used, to examine the safety of handling and to investigate the potential health and environmental impacts (PAN-UK 2003).

Between 1997 and 2002, the Federal malaria control programme imported or purchased 2701 tonnes of insecticides and distributed 2418 tonnes to regions and other institutions. Five regions and one city administrative council covered in the study used a total of 1888 tonnes of insecticides over this period, of which DDT accounted for 90% by weight (PAN-UK 2003).

WHO and Federal health officials believe that DDT diversions from the malaria programme were negligible. Other officials at regional level, however, recounted serious losses including organised theft (Ibid).

Another major finding of a first DDT study initiated by SEG was the issue of misuse of DDT by farmers, who used it for treating crops as well as for home remedies for household and storage pests. Farmers recounted several cases of acute and fatal poisonings of family members who had applied mixtures of concentrated DDT, often with malathion, to combat head lice or even attempt to cure open wounds (SEG 2001). Other studies have highlighted similar misuse of DDT in other parts of the northern highlands (McKEE 2005).

2.5-Air

Air quality has sharply declined in Addis Abeba as a consequence of the drastic increase in vehicles particularly second hand vehicles (estimated influx 10000 vehicles / year). Air quality in other urban centres and in the rural mountain areas remains good as the incidence of industrial activities and releases is low.

2.5.1-The Ethiopian climate and current debates on climate change

In Ethiopia, the climate is mainly controlled by the seasonal migration of the Inter-Tropical Convergence Zone (ITCZ) and associated atmospheric circulations, as well as by the complex topography of the country. It has a very diversified climate, ranging from semi-arid desert type in the lowlands to humid and warm (temperate) type in the southwest. Different parts of the country experience different rainfall distribution and temperature at different times of the year. Mean annual temperature ranges from 10°C in the mountains of the north western and south eastern highlands to 35°C in the North Eastern lowlands (GEF-UNDP 2006). Mean annual rainfall distribution ranges from about 2000 mm in the south-west, gradually decreasing to less than 200 mm in the south-east and 100mm in the north-east of the country. Temporal distribution of the rain brings

three distinct seasons: the Bega (dry season, from October to January); the Belg (small rainy season, from February to May); and the Meher (long rainy season from June to September) (Ibid 2006).

Climate change vulnerability analyses undertaken for Ethiopia have suggested that climate change over the coming decades presents a serious threat to various economic and social sectors (natural resources basis, particularly biodiversity, ecosystems, water, agricultural and human health) as the frequency and intensity of drought is likely to increase (EPA 1997). Development and Humanitarian actors heavily involved in the food aid and relief-to-development business have argued that the frequency and intensity of droughts had been increasing over the last decade (GEF-UNDP 2006) and that it has been largely responsible for the deteriorating food security of the country (Ibid 2006).

While there is no doubt that extreme weather events generate great sufferings in Ethiopia and contribute to food insecurity, a few critical points are worth bearing in mind:

- The current debate on climate change and mitigation has so far failed to take a meaningful historical perspective by ignoring the fact that the highlands of Ethiopia have been subject to high degrees of climate variability and extreme weather events for several centuries if not millennia. Detailed royal chronicles and accounts of foreign travellers in Abyssinia have eloquently underlined the severity and regularity of drought events in the past (See the narrative of Fransisco Alvares in the 16th century (Beckingham and Huntingford 1961), and for an exhaustive historical overview on the subject of drought and famines Pankhurst 1988). According to these accounts, large scale drought events (characterised by the succession of more than three years of consecutive droughts over extended geographical areas) resulting in massive deaths of people and livestock and of displacements of people tend to occur on average three to five times in any given century.
- These historical accounts have also indirectly referred to another fundamental characteristic of the weather in most parts of Ethiopia, that is, not only its variation through time (in a given year or from one year to another) but also its geographical variation from one valley or micro-climate to another at a fixed point in time. This dimension is virtually absent from the current debate on climate change. This micro-variability explains why there are numerous famine pockets even in bumper harvest years and why many pockets in the highlands remain unaffected by severe drought or other adverse climatic events.
- Moreover, the near-obsessive focus on catastrophic and negative scenario events that characterises the humanitarian debate in Ethiopia has led many to bypass the positive aspects of Ethiopian climate variability. For example, few experts will have noticed that Wag Hamra, currently classified as one of the most drought prone areas of the country, has

experienced high and well distributed levels of rainfall for the last two consecutive years for the first time in half a century, going back to Imperial times.

Overall, there have been no comprehensive attempts to try and disentangle the inherent and chronic spatial and temporal micro-variability and erratic nature of the Ethiopian climate from the impact of both local and global climate change. The current debate on climate change is too much focused on the presumed impact of global climate change and insufficiently addresses the local climatic interrelationships that prevail in Ethiopia. In particular, very little attention is given to the regulatory influence of the South-West forested areas on both the local climate and on climate stability in the Northern highlands (Wood 2007). Moisture from evapotranspiration contributes to rainfall up-wind and so impacts on rainfall in the Northern highlands (Ibid).

2.6-Shrinking forests

2.6.1-The highland “desert”

Population increases and the subsequent encroachment of agriculture onto marginal areas have concurrently and significantly further reduced the already dwindling forest and woodland resources of the highlands. Natural vegetation is now almost exclusively limited to church compounds, remnants of hedges, very steep and inaccessible areas, the very highlands (above 3000 metres), the lowland savannah woodlands of the major watersheds (Abbay, Tekkezze, etc) and the riverine vegetation of streams and small rivers. Agriculture on steep slopes and poorly maintained SWC works further contributes to increased run-offs, uprooting and degradation of the riverine vegetation. Government enclosures initiated more than five years ago can be seen as a partial success in the sense that enclosed areas have indeed witnessed average to high levels of regeneration. On the other hand the very top-down and authoritarian nature of the enclosure management systems put in place have done little to restore senses of ownership and conservation among neighbouring villages communities. Consequently and despite the fear of punitive measures, enclosures are regularly exploited for charcoal and timber production purposes. Charcoal production is on the rise everywhere in the country to satisfy the growing demand of a blooming urban population.

Moreover, it should be noted that in many areas the natural resource management and enclosure activities have collided with the new land demarcation process initiated at kebele level, resulting in the allocation to individuals and farming of agricultural plots inside the previously enclosed areas.

Reforestation through mass agro-forestry in previous EGS or under the current safety net program activities has remained one of the weak points of most SWC, EGS works initiated by the government over the past decade. While the ESMF adequately highlights

the weaknesses of past agro-forestry initiatives (see Box 2), there is nothing to suggest that the current safety net programme is going to bring any major changes to the agro-forestry/enclosure problems outlined above.

Box 2

“Examples of negative impacts of such projects on the natural resource base could include, for example:

-A reforestation project employing exotic or inappropriate species, proves to be damaging to, for example, soil stability, other flora, or livestock;”

ESMF Implementation strategy 2005

For reasons similar to the ones mentioned above, senses of ownership on agro-forestry activities are extremely low. During public works, farmers are regularly seen transporting seedlings over large distances (sometimes more than 10 km) to replant them in sites (public areas, schools, selected reforestation sites) not chosen by them but by government staff. The absence of sense of ownership of the activity results in hasty and poor transplantation practices and catastrophic survival rates (as low as 10 % in many instances). Even more worrying is the fact that the same fruitless exercise is repeated every year.

The choice of species for agro-forestry and reforestation is also questionable. To date, the emphasis of government nurseries in the highlands remains on the production of “multipurpose”, “fast growing” and “high value” exogenous species believed to have a very high potential for dissemination in Ethiopia on the basis of their high degree of success in other drought prone countries (India, Israel, etc) and on the basis of the successful adaptation trials carried out in Ethiopian research stations.

This approach, which is an offshoot and synthesis of the “transfer of technology” and “dissemination of best practice” models, fails to consider the complexity of local knowledge beliefs and practices related to trees and plants in the highlands and in particular, pays insufficient attention to the following basic but crucial technical, social and cultural factors, some of which are specific to the Ethiopian context (McKee 2006):

- Due to the absence of the most basic cost recovery system for the seedlings, farmers feel no responsibility or obligation to look properly after the seedlings, both during transplantation and afterwards. This results in poor survival rates.
- The dissemination of best practice approach (or best tree/plant species) fails to address the issue of the cultural context in which the best practice has been identified. A de-contextualised technique, use or knowledge about a given plant species becomes largely irrelevant when applied in a different cultural context.

- Exogenous species are more likely to meet with some degree of success if they are already related to Ethiopian species (for example Ethiopian Juniper versus imported fast growing Cupressus species).
- This problem is further compounded by the implementation of blanket agro-forestry approaches, whereby a “success” from one area or another country is taken and disseminated as a blueprint for vast unrelated areas, both physically and culturally. This, in turn, often leads to insufficient consideration of the agro-ecology (altitude preference, tolerance to drought and frost, water requirements) of the tree species introduced and results in very low survival rates (observed to be inferior to 10 % in some areas of the highlands). It is for example still common to see hundreds of thousands of eucalyptus seedlings being repeatedly planted towards mid-lowland areas where it is obvious that moisture stress conditions and very low water table levels will result in very low survival rates of the seedlings and ultimately in the death of the remaining ones.
- In many parts of the country, the mountainous highlands present very high degrees of localised altitude variation and very erratic landscapes. This in turn affects the distribution of plants and the knowledge that farmers have of these plants. Farmers mainly use species with which they are familiar, that are culturally acceptable in terms of local beliefs and uses and that grow within the immediate vicinity of their household (McKee 2005). Furthermore, significant cultural and altitude biases exist mainly from highlanders towards midland and lowland species (the reverse is true but to a lesser extent (Ibid 2005)). The overall result is a mosaic of small and localised patterns of conservative knowledge. Such a conservative and contrasted knowledge environment makes the introduction of exogenous species even more risky.
- Spanning the entire altitude range, the highlands of Ethiopia are endowed with a tremendous wealth of local, multipurpose, well adapted and known species, reflecting the ancient presence of man in these areas. To date, local knowledge, traditions and preference of agro-forestry appear to have been partially or totally ignored in agro-forestry development activities. The absence of consideration of local plant knowledge and of the specific plant cultures found at specific altitudes have led to surreal situations whereby agro-forestry efforts can be based on a “tree” approach when the culture of the inhabitants is largely grass-based.
- It is again important to emphasise the fact that there is in Ethiopia, as in other biodiversity hotspots, a significant correlation between biological diversity (i.e. the number of species including endemics) and the cultural diversity found, including specific ethno-botanical knowledge.
- The methodology employed by government and most foreign institutions for reforestation campaigns precludes the consideration and inclusion of much needed ethno-botanical knowledge, particularly related to plant propagation. It is a well known fact that certain categories of traditional healers (*debteras* and

galitchas) have extensive and detailed knowledge of plant propagation techniques for local species. This potential for agro-forestry development remains largely untapped.

The catchment treatment activities based on an integrated watershed approach as recommended in the Safety net PIM and the ESMF are therefore rarely a success, not because of the integration approach which is sound but because of an over-reliance on blanket recommendations at the expense of critically needed but undervalued local species, knowledge and practice.

On the whole, cases of successful agro-forestry activities, i.e. cases where farmers replicate and disseminate selected plant species by themselves are very rare. Since the introduction of eucalyptus at the turn of the previous century, one can only mention the successful introduction of Agave americana during the 80s with its fast dissemination in Amhara and Tigray and more recently the spread of potatoes. The most common outcome of past agro-forestry campaigns are physically isolated, and culturally misunderstood and untouched (by both humans and livestock) stands of a long list of so-called foreign miracle trees such as Melia, Neem, Moringa, Grevillia, Tree Lucerne, Kondo berbere, Elephant grass, etc.

2.6.2-Deforestation rates

While deforestation is undoubtedly known to occur in the remaining forested areas of the country, rates of deforestation have been more difficult to estimate.

According to data provided by Earthtrends in 2003, Ethiopia had lost 400000 ha of forest between 1990 and 2000 (see Table 2) corresponding to a deforestation rate of 40000 ha / year.

On the other hand, the Ethiopian Forestry Action Plan (EFAP 1994) concluded that deforestation rate in Ethiopia was between 150000 and 200000 ha per year.

Another MoA study indicated an annual deforestation rate of 163600 ha between the 1970s and 1986/90 (Reusing 1998).

Table 2: Deforestation rates 1990-2000

| | 1000 hectares | Change in forest area 1990-2000 |
|--------------------------|---------------|---------------------------------|
| Total forest area 2000 | 4593 | - 8 % |
| Natural forest area 2000 | 4377 | - 9 % |
| Plantation area 2000 | 216 | 1 % |
| Total dryland area 2000 | 65309 | |

Forest area =4%

Source: Earthtrends 2003

For the period 2000-2005 alone, estimates and extrapolations from the data of the WISSPP report (WBISPP 2005, see Table 3 and ANNEX 2 for details) indicate rates of deforestation of 146 000 ha / year.

Table 3-Summary of 2000 and 2005 data WBISPP report 2000

| National Categories 2000 2005 | Area in hectares | |
|----------------------------------|------------------|-------------|
| | 2000 | 2005 |
| Forest | 3 651 935 | 3 337 988 |
| High woodland area | 10 049 079 | 9 632 616 |
| Plantations | 509 422 | 509 422 |
| Low woodland + Shrubland | 46 297 530 | 46 297 530 |
| Other land | 53 169 093 | 53 899 503 |
| Inland Water | 828 277 | 828 277 |
| Total | 114 505 336 | 114 505 336 |

Source (WBISPP 2000)

Some of the figures outlined in Table 3 should be taken with caution (plantations, low woodland) as evidence on the ground suggests an increase in commercial farming/ plantation activities as well as substantial woodland clearings between 2000 and 2005.

A recent FAO study, after recalibrating and reclassifying the WBISPP data (see Table 4) indicated deforestation rates of 140 000 ha / year over the 1990-2005 period.

Table 4-Deforestation rates 1990-2005

| FRA categories | 2005 Area (1000 hectares) | 2000 | 2005 |
|---------------------|---------------------------|--------|--------|
| Forest | 15114 | 13705 | 13000 |
| Other wooded land | 44650 | 44650 | 44650 |
| Other land | 49868 | 51277 | 51981 |
| Inland water bodies | 799 | 799 | 799 |
| TOTAL | 110430 | 110430 | 110430 |

Source FRA FAO 2005

A study undertaken as part of the Nile basin Initiative reports that the total net costs of deforestation of high forest and woodland in the Baro-Akobo Sub-basin amount to ETB

482.9 million/yr (US\$ 53.8 million/yr). This amount is forecasted to rise to ETB 12,072 million/yr (US\$ 1,345 million/yr) in 25 years time.

| VALUE | Cost (ETB million/yr) | Cost (US \$ million/yr) |
|---------------------------------------|-----------------------|-------------------------|
| A. Direct use value | 455.9 | 50.6 |
| B. Indirect use Values | 104.6 | 11.8 |
| Less value of agricultural production | 77.2 | 8.4 |
| TOTAL NET COSTS | 482.9 | 53.8 |

Source ENTRO 2007 (See Annex 13 for the details of the calculation)

2.6.3-Forestry threats

2.6.3.1-Resettlement

Due to the underestimation of their impact on local populations, the implementation of past and recent resettlement programs and the resulting switch from free and unlimited access to land, water, grazing and forest resources to a restricted access regime have introduced drastic changes in forested areas including:

- A direct competition for water, grazing, timber and non-timber forestry resources (bee hive trees, spices, wild coffee, etc) derived from the sudden confrontation between the essentially agriculture-based livelihoods of the settlers and the forestry/agro-pastoralist livelihoods and culture of the local inhabitants.
- Cultural clashes stemming from the opposition of radically different natural resources resource management systems (local management versus total resource extraction)
- An immediate and sustained increase in tension between different categories of users, resulting periodically in serious civil unrest and armed conflict (Tepi, Gida Kiremu, Bale). A recent study in 11 resettlement sites has reported the occurrence of conflict of natural resource use in eight sites out of the 11, resulting in incidents leading to death in two sites. Fear of future conflicts with local pastoralist people is a serious concern, notably in SNNPR sites (Forum for Social Studies 2006).
- The introduction of charcoal production activities by settlers as an easy and fast cash earning option.
- An overall increase in the rate of depletion of forest resources resulting in further tensions and conflicts over the remaining resources. The current Land Proclamation Act which was approved two years ago and is being implemented in the SNNPR had the unwanted side effect of contributing to a forest clearing rush in the South West. In certain areas, farmers cleared as much prime forest land as they could in anticipation of its registration as private land.

- A drastic degradation of the environmental conditions resulting from the forest depletion (modification of hydrological balances, decrease in water availability (springs, level of water tables), increased prevalence of livestock pests and diseases, etc).
- A serious and increasing threat to the unique Ethiopian biodiversity in general and to the unique and vast genetic pool of wild coffee in particular.

2.6.3.2-Commercial farming

Concurrently, mid-scale to large scale (thousands of hectares) commercial agricultural investments in the forested areas has increased during the last five years. Significant tracks of prime rainforest have been cleared to give way to cash crop plantations of tea, coffee, rubber and *endod* (*Phytolacca dodecandra*). Several clear trends have emerged from this process:

- Little thought and attention has been given to the existing traditional forestry user rights prevailing in the forest areas (for example the *kobo* system among the Sheko people in the SNNPR).
- As in the case of resettlement programmes, it was hastily assumed that forested areas are unoccupied and unused. This poor preparation and planning has generated serious tensions during the clearing of the forested areas, resulting in the sporadic eruption of armed and lethal conflict on several occasions in the South West (Tepi, Masha).
- The cheap labour force recruited by investors from other parts of the country to carry out plantation work is also indirectly fuelling existing tensions between local communities and commercial farms as labourers have little consideration for forestry livelihoods and indiscriminately cut timber, produce cheap and easy charcoal and clear forests for their own direct benefit, mirroring the practices of settlers.

Overall, the forecasting and the analysis (economic, social, cultural) of the potential impact of the programmes (resettlement, commercial investment) on the livelihoods of the local indigenous populations already present in the targeted areas have been insufficient. This appears to be a serious shortcoming of the implementation of the SDPRP resettlement and commercial farming programmes. The mid-term and long term negative impact of the schemes have been underestimated while the short term direct benefits (reduced pressure in the overpopulated highlands, increased food security for settlers in newly colonised areas, increased export revenues derived from commercial exploitation, etc) have been over-emphasised. In this respect, the SDPRP and current PASDEP plan insufficiently considers and addresses the issue of the revenues that could

be obtained from a more systematic protection and valorisation of existing forest resources, most notably wild coffee (see biodiversity section).

Deforestation is further compounded by the regional and Zonal MoARD policy to promote production shade-intolerant spice species such as ginger (*Zingiber officinale*) or *erd* (*Curcuma longa*) rather than pushing for an expansion of shade-tolerant species such as Ethiopian and Indian cardamom and wild pepper (*Piper longum*), which would contribute to strengthen existing forest Non Timber Forest Products (NTFP) based livelihoods while facilitating forest regeneration in certain forest buffer areas.

2.6.3.3-Fire

Large fires started at the end of January 2000 and raged for about three months. They were the result of human interference exacerbated by a prolonged dry spell and severe drought. Usually, Ethiopian fire cycles centre primarily on lowland or midland areas. However, unlike in the past, the 2000 fires were concentrated in the highlands and high forests. Among the places where forest fires broke out in 2000 were Bale, Borana, Jimma, Ilubabor, East Wellega, East and West Hararghe and Arsi Zones of Oromia Region, Benishangul Gumuz and Gambella Region and SNNPR zones. It is estimated that over 100,000 ha was affected in Bale and Borana zones alone (George and Mutch, 2001). The forest fires that broke out in 2000 were also different from previous fires in their scale and in the type of land that they affected.

The fires also affected many of the National Priority Forest Areas (NFPAs), designated by the Ethiopian government as especially important to Ethiopia's national economy and environment. Secondary succession has begun, but this succession is primarily composed of tree species with less commercial value and bushy species different from the original ones.

2.7-Other important ecosystems of Ethiopia

2.7.1-Wetlands

Wetland resources in Ethiopia are not fully documented. However, it is known that they represent a significant micro-environment in many parts of the country. Including swamps, marshes, shallow lakes, margins of the Rift valley and lakes, floodplains of major rivers (Baro-Akobo, Omo and Awash) and swamp forests, the total area of wetlands in Ethiopia may exceed 2 % of the country (or 22500 km²). In the wetter parts of the country such as Illubabor, this may reach 5% of the zone (800 km²). The major wetland areas of the country are summarised in ANNEX 3.

According to the FAO land use map of the country made in 1984, two types of wetlands dominate in Ethiopia:

- Swamps – which are permanently flooded areas with herbaceous vegetation (usually greater than one meter in depth) , and
- Marshes - which are also permanently flooded areas with herbaceous vegetation (usually less than one meter).

These two wetland types cover an estimated 1803 km² (0.16%) of the country's surface. In addition there are other important types of wetland areas throughout the country that were not addressed by the FAO land use, such as the floodplains of major rivers (e.g. the Baro-Akobo and the Awash), the Rift Valley lakes, human made lakes (e.g. Koka dam and others), and swamp forests.

Wetlands are currently threatened throughout Ethiopia. Threats include:

- Draining for agriculture use

Successive drainage of wetlands for food production has been undertaken for decades in the South-Western part of the country, especially in Eastern and Western Wollega, Illubabor and Jimma Zones (Bognetteau & al 2003).

Draining of wetlands for agricultural purpose is a century old practice in some parts of the country, mainly in Southwest Ethiopia. However, improper draining mechanisms, double cropping, growing of perennial crops such as sugar cane within wetlands ecosystem have become major threats for the survival of wetlands. Long term draining interferes with the ecological recovery of the wetland system and will fasten its drying up.

- Grazing

Throughout Ethiopia, past and present wetlands areas have been and still are important sites for livestock grazing. Specifically, wetlands are often a last destination for pastoralists during the dry season in most parts of the country. However, livestock population increases, fodder shortages and the simultaneous expansion of agricultural activities have contributed to exacerbating the grazing pressure on wetlands. The pressure from grazing has resulted in changes of the wetland characteristics. In some cases, wetlands have been transformed into rough grazing land. Over grazing in wetlands can become a threat when for instance year round grazing excludes ecological recovery period of the wetland. Compaction of the wetland by livestock is also known to have a significant impact on the infiltration capacity of the soil hence affecting the hydrological system and balance of the wetland itself (Hailu 2004). Loss of biodiversity is another negative impact of overgrazing.

- Over exploitation of wetland resources

Wetlands in Ethiopia are important sources of water, food and raw materials (fish, reeds, water, medicinal plants, papyrus, etc) that sustain the livelihoods of significant populations. Over-exploitation or harvest of these resources is now a major threat in

several wetland areas of Ethiopia (Hailu 2004). In this regard, a good example of over-exploitation is the fishery resource from Lake Tana in the Amhara Regional State. Reports on catch size from the lake are indicating a steady decline over the last ten years (Ibid). This is associated mainly with the indiscriminate harvesting of the resources from the lake and the degradation of wetlands on the edges of the lake, known to play a significant role in the breeding of the fishery resources.

Excessive exploitation of resources can also lead in some cases to a direct collapse of the wetland itself. A good example for this scenario is the collapse of Lake Alemaya in Eastern Ethiopia due to the combined impacts of human use. An excessive water withdrawal by the neighbouring communities was believed to be a major cause for the collapse of the lake (Brook 2004).

- **Deforestation, siltation, soil erosion and land degradation**

Deforestation and losses of vegetation within a wetland catchment area is the starting cause for an accumulation of silt within the wetland ecosystem. The accumulation of silt within the wetland usually leads to a complete change in the ecosystem, resulting in biodiversity alteration, in decreases in the water holding capacity of the wetland and in the worst case in the collapse of the wetland itself (Hailu 2004).

In several parts of Ethiopia, many wetlands have already disappeared due to siltation. Although the collapse of Lake Alemaya is mainly associated with an excessive water extraction by the local population, siltation has also played its part in the loss of the lake.

- **Urbanization, settlement, pollution from urban centres and industrialization**

Due to the abundance of natural resources in wetlands, many urban centres in Ethiopia are located near or in their vicinity (Bahir Dar, Awassa, Alemaya, Debrezeit, etc). However, through time and population increases, these urban centres or settlements have become an important source of pollution and are threatening the stability of these ecosystems.

Other major threats include the introduction of perennial crops into wetland ecosystems, the planting of high water demanding plants into the wetland ecosystem, the spread of invasive plants species within wetland areas and government policies that encourage the draining of wetlands to meet the countries food shortages.

2.7.1.1-Overall impact of threats on wetlands

Insufficient attention is paid to the fact that wetlands are part of extensive socio-economic and environmental systems. For instance, the characteristics of a wetland, especially its hydrological regime, can affect the ecology and therefore the agriculture in the areas surrounding it through the local groundwater table it supports. This can also affect local springs and domestic water supply.

In summary, the impacts from the current threats on wetlands resources in general have the following negative outcomes:

- Decline and eventually total loss of food production,
- Loss of resources that will be collected from the wetlands,
- Lowering ground water table and drying up of water springs,
- Change in water quantity and quality,
- Change in the ecosystem as a whole,
- Loss of biodiversity, and
- Loss of dry season grazing site, etc.

The threat from over use and unwise management of these resources might cause a significant damage to the wetlands themselves and to the ecology of their environs and might reach a larger area. Furthermore, the loss of wetlands and their resource will also directly affect those who are directly and indirectly dependent on them for their livelihood.

Wetlands are a very important aspect of the environmental resource base of Ethiopia. As part of complex environmental and socio-economic systems, linked through the hydrological system to upstream catchments and downstream areas, they produce a range of ecological and socio-economic benefits in their natural state which contribute to the well-being of rural communities and the environmental security of the country. However, wetlands are often seen as wastelands that have no value and are best converted by drainage to allow agriculture or grazing. Such conversion may create some new benefits in the short run - increased food production and grazing, but will generally cause the loss of many other benefits in the long run. Indeed in the end the net result of converting wetlands can be serious environmental degradation and loss of benefits to the community. The economic analysis of this process shows that wetlands are most valuable when used in a way that maintains their natural functions and to do that conversion must be limited (Abbott & al 2001).

2.7.2-Afro-alpine ecosystems

The unique afro-alpine ecosystems of the Simien mountains, Bale, Abuna Yosef, Abway Gara, Mount Guna, Menz, etc together with their endemic fauna (important endangered flagship species such as the red wolf, the Walya Ibex, the mountain Nyala etc) and flora are increasingly coming under the pressure of unregulated human activities (land “hunger”, expansion of grazing areas, encroachment of agriculture). In the Bale area, the problems of population pressure have been compounded by the influx of farmers from the recent resettlement programme, exacerbating the potential for conflict over natural resources and for a further deterioration of the afro-alpine habitats.

2.7.3-Pastoral rangelands

In the predominantly pastoralist lowland areas of Afar, Somali and Boran, migration or movement of livestock is largely a function of the spatial and temporal distribution of rainfall and the resulting availability of grazing and water. Traditional livestock production systems based on a high degree of mobility are still predominant, with herd concentration-deconcentration and transhumance between dry season and wet season grazing areas being standard strategies.

In pastoralist areas, the seasonal migrations of people and livestock have a very strong altitudinal dimension. This dimension is critical as pastoralist people regularly interact with sedentary and agro-pastoralist people living at higher altitudes. In many cases, the seasonal co-existence of people with different livelihoods over prolonged period of times has resulted in the development and institutionalisation of mutually benefiting interrelationships and traditional agreements concerning access to natural resources, water, temporary livestock lending, etc. Such agreements can be found within exclusively pastoralist areas but are also known to exist between pastoral and agro-pastoral or even sedentary agricultural communities and to involve movements of livestock and people between different and seemingly unrelated altitudinal and agro-ecological zones. The traditional *gereb* system that involves Afar pastoralists and sedentary Tigrayan highlanders is just but one example of such mutually beneficial relationships (Tewodros 1995).

Within the broader context of its food security policy, the Federal government has specifically addressed pastoral development in several key documents, including the Rural Development Policies and Strategies and the Statement on Pastoral Development Policy. All documents uphold as the major long-term objective of government policy the phased voluntary sedentarisation of pastoralist populations along the banks of the major rivers as the main direction of transforming pastoral societies into agro-pastoral systems, “from mobility to sedentary life, from rural to small pastoral towns and urbanisation.” (Statement on Pastoral Development Policy)

Overall and as a direct result of government policy implementation, the traditional pastoral production systems of Ethiopia have come under increasing external pressures over the last decades. Specifically, game park creation (Awash), commercial agricultural investments, rangeland enclosures both for cropping and for private grazing (mainly in the Somali region) and (re)-settlement schemes orchestrated by the government on the fertile floodplains and grassland banks of the Awash and Wab Shebelle rivers have had and are having a profound effect on the natural resources availability, the traditional rangeland management systems and institutions in place and ultimately the livestock based pastoralist livelihoods of the Afar, Somali and Boran people. By extracting key dry season grazing areas and access to the water points during critical periods of the dry season, such rural development programs are having profound and disturbing knock-on effects on the water and rangeland management strategies of pastoralists. As a consequence of those changes, it is also very likely that readjustments are being made in terms of strategy, partnerships, alliances, group dynamics, etc. Their impact on pastoralist livelihoods in terms of potential conflicts, modified rangeland and water availability migration routes, herd dynamics, etc remains to be fully understood.

The increased maintenance and provision in recent years of water sources by government, NGOs and private actors, have also contributed to re-shaping the internal dynamics of pastoralist production systems. On one hand, the restoration of traditional pastoralist water harvesting and storage structures (*birka*, *haffir* dams, etc) has been a positive trend that has somehow contributed to maintaining the cohesion of communities and traditional institutions. On the other hand, the idealistic emphasis on communally managed structures and insufficient emphasis on privately managed structures has led to poor maintenance performance and therefore reduced water availability in the mid run. Above all, the insufficient and in most cases absence of analysis of the potential impact of new water points on existing pastoral dynamics (social and physical) has contributed to increasing rather than decreasing tensions, the intensity and scale of overgrazing around water points, disturbances and in the end conflicts over natural resources.

Concurrently, the relentless expansion of very aggressive invasive alien species such as *Prosopis juliflora* and *Parthenium hysterophorus* in agro-pastoral and pastoral areas (Afar, Awash, Raya, Dire Dawa, Shinile, Fik, etc) has also led to a decrease in the volume of palatable biomass available to livestock in a normal year and to a noticeable decline of the diversity of plant species (fodder species particularly) available in the rangelands, as both invasive species tend to replace indigenous species.

Unregulated and intensive charcoal production as an alternative source of income has also been on the increase during the past five years, fuelling local and international markets in the Arabian Peninsula. This has directly affected the vegetation of the rangelands as pastoralists tend to rely on the use of indigenous species, thought to produce a better quality and therefore more marketable charcoal than exogenous or invasive species such as *Prosopis juliflora* for instance.

The impact of these man-made external interventions and changes has been compounded in the past decade by the sustained recurrence of crisis episodes caused by drought. Seen through the lens of natural resources, the overall deterioration of pastoralist livelihoods can be measured in terms of:

- The alarming rate of degradation of the natural resource base, both quantitatively (overgrazing, shrinking of rangelands and decrease in the availability of biomass) and qualitatively (sharp decrease in plant species diversity in the rangelands),
- The simultaneous deterioration of various traditional systems aimed at managing resources, conflicts and social issues, and ultimately,
- The increased prevalence of conflicts over natural resources. Competition over natural resources is believed to have exacerbated seasonal tensions between pastoralists, agro-pastoralists and sedentary farmers in several areas of the country (Awash, Afar, Bale, Boran).

It is against this growing imbalance in pastoral systems and dynamics that recent developments in the agro-fuel industry ought to be reviewed. The majority of the 1.15 million hectares

currently being allocated or about to be allocated (SEEDLING 2007) for commercial agro-fuel investments are located in the periphery lowland areas of the country, considered more suitable for *Jatropha curcas* and other agro-fuel plantations. Implicitly, extracting about a million hectares from pastoralist / agro-pastoralist areas and systems is likely to have a profound environmental, economical and social impact on pastoralist groups. On the whole, the sheer scale of the planned agro-fuel investments gives serious causes for concern as they have the potential to exacerbate existing conflicts over natural resources in many different lowland areas of the country.

2.8-Ethiopian biodiversity: threats and potential

2.8.1-Biodiversity status

Ethiopia is one of the world biodiversity hotspots and one of the Vavilov centres of agrobiodiversity.

The country contains five recognized biomes: Sudanian, Congo-Guinean, Sahel arid zone, Somali-Maasai, and the Afrotropical and montane. These can be further subdivided into ten ecosystems:

- Afroalpine and sub-alpine,
- Dry evergreen montane forest and grassland,
- Moist evergreen montane forest,
- Moist evergreen lowland forest,
- Congo-Guinean forest,
- Acacia woodland and thickets,
- Acacia-Commiphora woodland,
- Combretum-Terminalia woodland/savannah,
- Lakes, wetlands & river systems, and
- Arid ecosystems

WWF recognizes 12 eco-regions (11 plus the Rift Valley Lakes, whereas an updated Pichi-Sermolli analysis indicates that there are 20 vegetation types (See ANNEX 4).

This diversity of ecosystems and the geographically isolated highlands and arid lowlands to the east mean that Ethiopia harbours unique and diverse biological diversity. The biogeography of the country is characterized by these two dominant features (GEF 2006). First, the ancient, arid areas of the Horn of Africa, with its three centres of endemism, including the Ogaden, fall within Ethiopia (Kingdon 1990). The arid nature of the Horn means that species abundance is relatively low, but its age (>100 million years) means that endemism is exceptionally high. The highland plateaux are the second biogeographical feature. Although the highlands are relatively young in evolutionary terms, highland isolation has resulted in significant endemism. Overall, therefore, while the arid Horn and young highlands are relatively impoverished in species number, the levels of endemism are high (Ibid).

Other scholars, however, contend that the Ethiopian flora is rich both in species number (between 6500 and 7000 species) as well as in endemics (Gebre Egziabher 1991). Ethiopia is part of the Afro-montane floristic region, adjoins both the Sudanian floristic region and the Somalia-Masai floristic region in the South east. Consequently, the Ethiopian flora presents high levels of affinities with Arabian flora and most African flora save Equatorial Africa (Ibid).

Ethiopia has over 6,000 species of vascular plant (with 625 endemic and 669 near-endemic species, and one endemic plant genus), 860 avian species (16 endemic species and two endemic genera), 279 species of mammal (35 endemic species and six endemic genera) (GEF 2006).

There are a number of charismatic flagship species, most notably the gelada (an endemic genus and the world's only grazing primate), the mountain nyala (an Afrotropical tragelaphine antelope endemic to the Afroalpine ecosystem), the Ethiopian wolf (a palaeartic descent from a wolf-like ancestor that crossed into the Ethiopian highlands just over 100,000 years ago), the walia ibex (another palaeartic species confined to areas in the Simien Mountains) and the giant lobelia.

The large mammal populations cannot be compared with the wildlife spectacles of Kenya or Tanzania. However, there are remnant populations of elephant (an estimated 850, including 150 of *Loxodonta africana orleansi*), lions (an estimated 1,000) and large ungulates. Spotted hyaenas are abundant; indeed, they flourish and are largely tolerated in Ethiopia. There is at least one and a possible further two isolated populations of black rhino (GEF 2006).

The country spans two hotspot areas: the Horn of Africa and the Ethiopian Highlands (Williams et al., 2005) (which is included in the Eastern Afrotropical Hotspot). The areas included in the Hotspots covers the majority of the country, including the entire eastern area of Ethiopia below 1,100m a.s.l and all highland areas above 1,100m a.s.l.

2.8.1.1-Highland biodiversity

The Ethiopian Highlands have an estimated 5,200 vascular plant species in an estimated 1,563 genera and 185 families. Of these, 555 species (10.7% of the total) are endemics, with some groups, the majority of them associated with the open grasslands, dry woodlands and heaths, being very diverse.

Endemism among vertebrates, particularly at the generic level, is relatively high in this region, especially when one considers mammals. Thirty-one of the 193 mammal species in the Highlands are endemic to the area. Remarkably, there are six endemic genera of mammals, and four are monotypic (three rodent genera, *Megadendromus*, *Muriculus*, *Nilopegamys*, and one primate genus, *Theropithecus*).

An estimated 680 species of bird are found in the Highlands and of these. Most of the bird species that are endemic to the highlands are distributed widely, but five are restricted to tiny pocket areas in the southern highlands. The latter region is considered an Endemic Bird Area (EBA) in the analysis of Stattersfield et al. (1998), as is the Central Ethiopian Highlands, with four species confined to it. There are four endemic genera,

three of which are widespread (*Cyanochen*, *Rougetius*, *Parophasma*) and one of which has a localised distribution in the south of the area (*Zavattariornis*).

The amphibian fauna includes six endemic genera (*Sylvacaecilia*, *Altiphrynoides*, *Spinophrynoides*, *Balebreviceps*, *Ericabatrachus* and *Paracassina*) and a high level of endemism at the species level (30 species, of a total of 71).

Only 64 fish species occur in Lake Tana and the other rivers draining the Ethiopian Highlands. Lake Tana is the source of the Blue Nile and, with a surface area of over 3,000km², is the most prominent freshwater feature of the Ethiopian Highlands. Nearly a quarter of fish are endemic to Lake Tana, including a loach, *Nemacheilus abyssinicus* and 14 large cyprinids barbs. *Barbus megastoma* is one of the largest of a number of important food fishes and it can grow to more than 80cm, which is unusually large for this genus (Nagelkerke & Sibbing 1998).

The number of species in all taxa has been steadily rising over the past 20 years, meaning that the totals given here are provisional. The Ethiopian Highlands is an area where little systematic collecting has been done, and many areas, particularly the forests of the southwest (where expeditions to date have been limited in duration and poorly equipped), are largely unexplored. The final total of both recorded species and endemics will almost certainly turn out to be much greater. In addition, the recognition of the endemic fauna and flora of Ethiopia requires adequate knowledge of areas of similar ecology and history (e.g., the Ruwenzori Mountains in the Albertine Rift) to be certain that presumptive Ethiopian endemics are absent elsewhere (Yalden et al., 1996).

2.8.1.2-Biodiversity of the Horn

Rough estimates indicate that there are about 5,000 species of vascular plants in the Horn of Africa (including areas outside Ethiopia), and of these about 2,750 are endemic. Many of the species in the arid Horn have very restricted areas of distribution. There are nearly 60 endemic genera of vascular plants in the arid Horn (of a total of about 970). Of the 170 families in the region, two are endemic, *Barbeyaceae* and *Dirachmaceae*.

A total of 190 mammals in 121 genera are known from the arid Horn and of these 20 are endemic, the most notable ones being a number of antelopes, such as Beira (*Dorcatragus megalotis*), Dibatag (*Ammodorcas clarkei*), Speke's gazelle (*Gazella spekei*), Silver dikdik (*Madoqua piacentinii*), and Salt's dikdik (*Madoqua saltiana*). In addition, there is an endemic subspecies of the Somali wild ass (*E. a. somalicus*). There are five endemic mammal genera in the Horn, all of them monotypic, including the aforementioned Beira and dibatag, and three small mammal genera (*Microdillus*, *Amodillus* and *Pectinator*). The arid Horn has been identified as an important area for rodent conservation (Amori & Gippoliti, 2001).

There are 802 species of birds recorded from the arid Horn and 31 of these are endemic. One Endemic Bird Area (EBAs) falls within the hotspot in Ethiopia: the Juba and Webe Shabelle valleys (with four species).

There are some 240 reptile species in 82 genera recorded from the Horn, and at least 54 are endemic. Amphibians are poorly represented in the arid Horn, with only 20 species

recorded, at least seven of which are endemic. It is roughly estimated that there are around 100 species of freshwater fish in about 48 genera and 30 families in the arid Horn, and of these 10 are endemic.

2.8.1.3-Crop diversity

Based on the concept of gene centres, developed by Vavilov in the 1920s, Ethiopia represents one of the eight centres in the world where crop plant diversity is strikingly high and where some of the crops actually became domesticated (Engels & Hawkes 1991). The highly rugged and dissected highlands of Ethiopia include natural barriers formed by mountain ranges and ravines where crop plants have evolved in isolation and present an extremely wide range of agro-ecological conditions. Diversity is also believed to be due to its geographical position at the crossroads between the Near-Eastern center of diversity on the one hand and the Indian centre on the other. It has also benefited from its connections with the mountain chain and rift valley following southwards in East Africa, and its connections with West Africa via the Sudan and Sahel regions (Engels & Hawkes 1991). Moreover, the ancient and diverse cultural history and presence of its people have ensured that artificial selection within the landrace populations has been ongoing for several thousand years. Ethiopia is known to be a primary centre of diversity and the probable centre of origin and the area of domestication for a number of crops (coffee, teff, nug, safflower, ensete, chat, Ethiopian cardamom, etc) and a secondary centre of diversity for crops whose wild relatives are not found in Ethiopia such as barley, tetraploid wheats, lentils, faba beans, etc (Engels & Hawkes 1991). Sorghum, with its tremendous diversity in Ethiopia, remains an enigma. Whilst several authorities such as Vavilov believe that Ethiopia may be the centre of origin of sorghum, others such as Harlan have expressed doubts on this issue (Ibid).

2.8.2-Biodiversity threats

The Ethiopian biodiversity is being increasingly threatened and reduced, making Ethiopia one of the most degraded biodiversity hotspots in the world (Lightbourne 2006). Threats are multiple and interconnected (see Table 5 for a summary).

This trend has been amplified in the past five years by population increases and the subsequent encroachment of agriculture onto marginal areas in the North and Central highlands, by the surge in resettlement and commercial farming initiatives in sparsely populated of the West and South West and by the spread into rangeland areas of extremely aggressive invasive alien species.

The case of coffee is a potent illustration of the multiple biodiversity threats in Ethiopia. As the centre of origin of *Coffea arabica*, Ethiopia is home to a unique pool of genetic diversity of this species, which is found mainly among stands of wild coffee in the rainforests of the West and South West and to a lesser extent in forests around Bale and Borena.

This diversity has come under serious threat in the last five years as a direct consequence of the resettlement and commercial farming initiatives promoted by the government. The increased clearing of coffee forest in the South and South West has resulted and is resulting in the irreversible loss of unique and commercially valuable coffee genetic diversity.

Table 5 Summary of biodiversity threats and root cause analysis

| Summary of Threats | Summary of Root-Causes | Summary of Barriers |
|---|--|--|
| Unsustainable use of natural Resources | Increasing demand for natural Resources | Inadequate institutional capacity in terms of manpower, funding or strategies |
| Overgrazing/browsing by large livestock population | Overdependence on natural resources, few alternatives | Biodiversity sector is marginalized from development process. No inter-sector coordination mechanism |
| Conversion of Natural Habitat | No regulatory ability, open-access | Policy disconnect, no planning or strategies for implementation of policy |
| Protected area system is not fully representative of all ecosystems, gaps | Poor agriculture planning, no inter-sector coordination, policy not harmonized, little political will No incentives | Top-down state-centric input, little partnership, little involvement of communities |
| | No stakeholder participation | |
| | Wildlife damage crops, no rewards | |

Source GEF 2006

Invasive alien species (IAS):

Invasive species have been identified by the Environmental Policy of Ethiopia (EPE) and the Biodiversity Strategy and Action Plan (NBSAP) as posing a major threat to biodiversity and economic well-being of the population. However, little attempt has been made to assess the status of IAS. Those species known to be threats are those that are already widespread. Prosopis juliflora was intentionally introduced as an agro-forestry species in the Awash basin, but now threatens agricultural land and protected areas in the Awash National Park and beyond. It is aggressively invading pastoral areas in the Middle and Upper Awash Valley and Eastern Harerge, destroying natural pasture, displacing native trees, forming impenetrable thickets, and reducing grazing potential. Parthenium

hysterophorus was introduced accidentally through aid shipments and is spreading rapidly in many rangeland areas of Afar and Somali, causing up to 90% reduction in forage production. It is also believed to have reached the Boran lowlands. Its impact in natural habitats has not been assessed, but it clearly poses a major threat to the biodiversity and grazing potential of these areas. Eichhornia crassipes is present in Ethiopia and is a most serious threat in the White Nile watershed and the Awash River system, with the usual impacts on ecosystem function and human activities.

Attempts to combat the threat of invasive species in Ethiopia have followed the usual piecemeal approach. They have not been coordinated across sectors, and have focused mainly on attempting to address the major invaders. The emphasis is on tackling problems that threaten agriculture and human activity, there being insufficient resources, capacity or information available to address the threats to natural ecosystems and biodiversity.

Table 6 – Invasive Alien Species and their geographical distribution

| Species | Regional distribution |
|----------------------------------|--|
| <u>Eichhornia crassipes</u> | Oromiya, Southern Nations Nationalities and Peoples, Gambella |
| <u>Lantana camara</u> | Oromiya, Somali |
| <u>Parthenium hysterophorous</u> | Oromiya, Somali, Afar, Tigray, Amhara, Nations Nationalities and Peoples |
| <u>Prosopis juliflora</u> | Oromiya, Tigray, Amhara, Somali, Afar |
| <u>Striga spp</u> | Oromiya, Tigray, Amhara |

2.8.3- The potential for development of Non Timber Forest Products (NTFP)

A marketing study conducted in 2004 in the South Western part of the country in Bench Maji, Kaffa and Sheka zone revealed that 90% of the households were engaged in the harvesting and production of NTFPs including forest wild and semi-wild coffee, forest honey, wild forest spices (Ethiopian cardamom, long pepper and turmeric) and bamboo (Tola & Wirtu 2004). The study also highlighted that fact that a majority of farming communities across the study areas were largely dependent on the forest resources. For instance, it was reported that on average, about 73% of the sample household's annual income was generated from NTFP sales during the 2003 crop year (Ibid 2004).

At a national level, over 12 million tons of bamboo (dry weight) are available from the unmanaged natural bamboo forests of Ethiopia and can provide about 3 million tons annually on a sustainable basis (FAO-INBAR 2005).

The untapped potential of other major NTFPs in the southwestern forests of Ethiopia (forest honey, Ethiopian cardamom, long pepper) although not quantified, is believed to be very important (Tolu & Wirtu 2004).

2.8.4-Biodiversity, genetic resources and bio-piracy

The study of the issues of agro-forestry / horticulture / forestry and biodiversity in Ethiopia is complex. In particular, one of the most potent paradoxes in the country is that the government, relayed by foreign humanitarian and development agencies, is busy introducing and promoting exogenous species (trees, vegetables, improved crops and livestock) on the basis of the alleged backward nature of Ethiopian rural populations and livelihoods while foreign / private commercial and research companies and institutions are frantically trying to access Ethiopian (agro)-biodiversity, traditional knowledge and genetic resources for technology, plant breeding and commercial development purposes outside of the country.

While no formal study has been carried out on the subject, it is more than likely that bio-piracy of Ethiopian traditional knowledge and genetic resources has not faltered in recent years. In fact, given the increasing number of connections, research projects and partnerships established between foreign universities and Ethiopian research institutions (universities and research centres), it is reasonable to assume that institutionalised bio-piracy has continued unabated over the past decade. It is an open secret that Ethiopian students travelling abroad to study biology related subjects (agronomy, biotechnology, genetics, etc) are requested to bring “samples” of the species that will form the basis of their research. In this respect, Ethiopia is no exception to a trend underlined by Darell Posey (Plenderleith 2004) more than a decade ago: University / research linkages have become preferential information and resource transfer highways from developing countries to the Western world.

The debate surrounding the need to protect Ethiopia’s unique coffee diversity has taken an unexpected turn with the recent discovery among old Ethiopian Coffea arabica collections taken by the FAO out of country in the 1960s of naturally occurring stands of low caffeine plants (Silvarolla & al 2004). This discovery and its financial implications for the European and American coffee industry in general and for the decaffeinated coffee market in particular are potentially very important, given the current high agro-processing costs of decaffeination. A naturally occurring stand of low caffeine coffee, if confirmed, can be immediately translated into an increase in the quality of marketed low caffeine coffee and increased profit margins resulting from the improved quality and reduction of agro-processing costs.

2.8.5- The value of genetic diversity and Access and Benefit Sharing agreements (ABS)

The economic value of genetic diversity is widely recognised but to date, there have been relatively few experiences with the actual valuation of genetic resources (Hein & Gatzweiler 2006) and even fewer focussing on Ethiopian biodiversity. So far, two evaluation exercises have been carried out, one concerning the Ethiopian genetic

diversity of barley and the other focussing on the genetic diversity of Coffea arabica found in Ethiopia.

Ethiopian genetic diversity of Coffea arabica

A recent study (Hein & Gatzweiler 2006) provides an estimate of the economic value of Ethiopian coffee genetic resources based on an estimate of the potential benefits that could be derived from them through the breeding of enhanced coffee cultivars for resistance to CBD, rust and nematodes, low caffeine contents and productivity enhancement. In terms of cost-reduction, the study examines the potential benefits of breeding resistance for three major coffee pests and diseases, as well as of breeding a low caffeine coffee cultivar. Pest and disease resistant cultivars yield economic benefits because they reduce yield losses and pesticide costs of coffee growers world-wide. With respect to the breeding of low caffeine coffee, the considered economic benefits relate to the avoided costs of decaffeinating. In terms of productivity enhancement, the study considers the breeding of high yielding varieties (Hein & Gatzweiler 2006).

Using very conservative price estimates, assumptions and forecasts, the study reaches the conclusion that the Net Present Value of Ethiopian coffee genetic resources could be as high as USD 1.45 billion over a 30 year period (15 years for a breeding programme and 15 years for a gradual diffusion/dissemination programme) with a 10% discount rate. The study however fails to observe that coffee breeding programs are already making extensive use of Ethiopian coffee accessions legally or illegally exported from the country since the 1960s.

Ethiopian genetic diversity of wheat, barley and sorghum

Ethiopian agro-biodiversity in cereals has and is still making very significant contributions to plant breeding programmes worldwide.

The recognition of the international value of Ethiopian wheat began with collections undertaken by Vavilov in the 1920s. Used widely by breeders in the Soviet Union, it is believed that much of the material was subsequently made available to breeders in Germany and other European countries (Hawkes & Worede 1991). At least 1800 wheat accessions retrieved from genebanks in the USA, Germany and Italy are currently being stored at CYMMIT. In the early 90s, six Ethiopian durum wheats were known to be used in CYMMIT breeding programmes (Ibid 1991). Over 400 wheat accessions, mainly tetraploid, collected in the 70s are currently stored in the germplasm institute in Bari (Ibid 1991).

The evaluation of Ethiopian barleys shows characters such as resistance to barley yellow dwarf virus, powdery mildew, net blotch and loose smut as well as high protein quality, high tillering quality, tolerance to marginal soil conditions and vigorous seedling establishment. More than 1/3 of total barley collections available world wide, totalling nearly 4500 accessions, originated in Ethiopia, ICARDA alone possesses nearly 2500 accessions.

American plant breeders made extensive use of Ethiopian barley accessions and of their resistance to the dwarf yellow virus to produce new varieties for the North American barley sector. For California alone, the loss reductions and the corresponding savings resulting from dissemination of the improved varieties have been estimated at USD 160 million / year (WCMC 1992). Over a 20 year period, this amounts to USD 3.2 billion.

Very recently, Ethiopian barley germplasm has been found to be of critical significance to the North American barley sector following the rapid spread of the barley stripe rust (BSR).

“Once stripe rust entered the U.S. it was evident that most available commercial cultivars were highly susceptible. Thus, a major effort to identify germplasm with resistance was begun....Many sources of resistance were identified. **Germplasm from Ethiopia was particularly useful.**” Source: Jackson 2003 (emphasis added).

4500 accessions of Ethiopian sorghum stored in ICRISAT have largely contributed to several successful West African sorghum development programmes. ICRISAT further holds 300 accessions of Ethiopian millets, 900 accessions of Ethiopian chickpea while 375 accessions of Ethiopian lentils are held in ICARDA (Ibid 1991).

From a global plant breeding perspective, Evenson and Gollin (1997) estimated that adding 1,000 catalogued accessions to rice collections would generate a net present value of \$325 million at a 10 percent discount rate (based on the assumption that these 1,000 new accessions would lead to 5.8 added released varieties that would generate a \$145 million income stream with a delay of 10 years).

If we apply a similar type of reasoning to three major crops like wheat, barley and sorghum and to the thousands of Ethiopian accessions that have been used in successful and at times critical breeding programmes undertaken worldwide over the past decades, the economic value of Ethiopian germplasm as well as its contribution to world food security and supply become quite simply staggering, with income streams in excess of USD 1 billion / year.

Amongst developing countries, Ethiopia is one of the pioneers in the field of Access and Benefit Sharing (ABS) of genetic resources and traditional knowledge, taking advantage of the outstanding expertise available in the IBC and EPA. To date, two pilot agreements on ABS have been signed between the Ethiopian government and commercial companies based in the UK and the Netherlands regarding the commercial exploitation of teff (Eragrostis teff, see copy of agreement in ANNEX 11) and Vernonia galamensis, a lowland plant whose oily extracts contain high concentrations of epoxy. More recently (January 2006), the government has moved a step further by issuing a Parliament Proclamation on ABS (See Annex 12).

2.8.6-Biodiversity and conservation efforts

The first conservation of natural resources started in 1969 with the establishment of two parks, the Simien and the Awash National Parks. In subsequent years, the Bale Mountains National Park was founded (1970), and other national parks, game reserves, wildlife sanctuaries and controlled hunting areas were established (see Table 7). However, the latter ones remained without legal protection. None of the conservation areas were established for the protection of plant biodiversity, though two of them, the Simien and Bale Mountains National Parks are also serving that purpose. Both Mountains are the most important centres of plant biodiversity in Ethiopia (Williams & al. 2005).

All parks, controlled hunting areas and wildlife reserve areas (see ANNEX 5 for details) are under severe threat, due to various reasons. While population growth, livestock grazing and the expansion of arable land are often cited as the main causes for the deteriorating conditions of the national parks, it is also clear that there is insufficient financial and political commitment from the government.

The case of the Bale Mountains National Park (BMNP) is particularly telling in this respect. The park, located east of the Great Rift Valley System was established in 1970, and is one of the non-gazetted parks. It is the largest alpine area in Africa and encompasses various ecosystems, from Combretum-Terminalia woodlands at the lower altitudes to Afroalpine moorlands in the higher altitudes. Moist montane forests are found on the southern side of the mountain, beginning at 1500 m and extending to 3250 m a.s.l. This moist montane forest, known as Haremma Forest is famous for its high level of endemic plants, e.g. *Maytenus harennensis* and *Solanecio harennensis* and for the diversity of wild coffee that it harbours. The forest currently faces destruction from settlement, agricultural expansion grazing/browsing and fire.

The central plateau, which lies between 3800 and 4377 m a.s.l. has also been under pressure from grazing. The expansion of grazing land from the lower lying forests and ericaceous scrub to the moorland is a recent phenomenon. Overall, free grazing is occurring in most parts of the Park, resulting not only in the direct destruction of vegetation but also indirectly in the spreading of rabies by domestic dogs to the Ethiopian red wolf.

The National Forest Priority Areas (NFPAs) are also severely affected by the increased pressure of human activities. A study undertaken by the EPA three years ago concluded that 60% of the total surface of the 58 NFPAs was degraded and that almost 30% of the same total surface area was severely degraded (see ANNEX 6 for details).

Table 7 - National Parks and Wildlife Sanctuaries

| Name | Area (Km ²) | Year Established | Ecosystem Category | No. of Species | | Major species conserved |
|----------|-------------------------|------------------|--------------------------|----------------|------|-------------------------|
| | | | | Mamm | Bird | |
| Abijata- | 800 | 1970 | <i>Acacia-Commiphora</i> | 37 | 370 | Great White Pelicans, |

| | | | | | | |
|--------------------------|-------------|--|---|----|-----|---|
| Shalla Lakes N/P | | | woodland, | | | Flamingoes, Egyptian geese, Storks, Eagles, herons, |
| Awash N/P | 756 | Established In 1966 gazetted in 1969 | Acacia-Commiphora woodland & Evergreen scrub | 76 | 451 | Beisa Oryx, Soemmering's gazelle, Swayne's Hartebeest & Ostrich |
| Bale Mountains N/P | 2400 | 1980 | Afroalpine & sub- afroalpine, Dry evergreen montane forest & Evergreen scrub | 67 | 262 | Mountain Nyala, Ethiopian Wolf, Menelik's Bushbuck & Giant Mole Rat. |
| Gambella N/P | 5061 | 1973 | Combretum- Terminalia woodland & savanna, Lowland evergreen and Moist evergreen montane forests, | 43 | 327 | White-eared kob, Nile lechwe, Roan antelope, Elephant, Buffalo, Lelwel Hartebeest |
| Mago N/P | 2162 | 1978 | Desert & semi- desert scrubland, Acacia- Commiphora woodland & Combretum- Terminalia woodland and savanna | 81 | 237 | Elephant, Buffalo, Grant's gazelle, Greater and Lesser kudus |
| Omo N/P | 4068 | 1966 | Desert & semi- desert scrubland, Acacia- Commiphora woodland & Combretum- Terminalia woodland and savanna | 69 | 300 | Eland, Buffalo, Zebra, Waterbuck, Greater and Lesser kudus, Oryx, Grant's gazelle and Topi |
| Simien Mts. N/P | 225 4731 | Est. in 1966, gaz. in 1969 | Sub-afroalpine & Dry montane forest | 33 | 125 | Walia Ibex, Ethiopian wolf & Gelada baboon |
| Yangudi- Rassa N/P | | 1976 | Desert & semi- desert scrubland, Acacia- <u>Commiphora</u> | 36 | 230 | African wild ass & Soemmering gazelle |

| | | | woodland | | | |
|--|------|------|--|----|-----|--|
| Babile Elephant Sanctuary | 6982 | 1970 | Desert & semi-desert scrubland, Acacia-Commiphora woodland & Evergreen scrub | 22 | 106 | African Elephant |
| Nech Sar National Park | 514 | 1967 | Lakes, rift valley escarpment, groundwater forest, hot springs, grasslands | 37 | 188 | Swayne's hartebeest, plains zebra, greater kudu, crocodile, hippo, African wild dog. |
| Senkelle Swayne's Hartebeest Sanctuary | 54 | 1971 | Acacia-Commiphora woodland & Evergreen scrub | 13 | 91 | Swayne's Hartebeest, Oribi |
| Yabello Sanctuary | 2500 | 1985 | Desert and semi-desert scrubland & Evergreen scrub | 43 | 280 | Abyssinian Bush Crow |

Source GEF 2006

3 - ENVIRONMENTAL POLICY LEGISLATION AND INSTITUTIONS

3.1-Environmental policies and legislation 3.1.1-The Conservation Strategy

of Ethiopia

In the early 1990s, the Ethiopian government made progress in laying the foundations for addressing environmental problems. One major initiative for introducing environment into the national policy arena was the Conservation Strategy of Ethiopia (CSE) process, which started in 1989 and went on for 13 years, culminating in a five-volume report.

The CSE process comprised three phases. Phase 1 (1989–90) focused on identifying key environmental issues and developing a framework and process for the CSE. Phase 2 (1990–94) focused on developing an environmental policy, an institutional framework and an investment program. Phase 3 was devoted to the preparation of Regional Conservation Strategies (RCSs) in all regions. The CSE was first hosted in the Planning Ministry where it was perceived as one of a number of overarching policy frameworks to which all sector policy would refer. It was subsequently transferred to the short-lived Ministry of Natural Resource Development and Environmental Protection until it finally came under the umbrella of the newly established federal Environmental Protection Authority.

It has been argued that during the course of its elaboration and formulation, the CSE gradually became a sector rather than a cross-sector policy in many respects and that it increasingly faced the challenge of making itself relevant to and valued by the other sectors (MoARD & al 2004).

Despite significant achievements (formulation and approval of the Environmental Policy of Ethiopia, establishment of the Environmental Protection Authority) and the overall influence that it has had in pushing forward critical issues related to environmental protection and sustainable development, the following shortcomings have been noted (CSE evaluation 2001, SIDA 2003, MoARD & al 2004):

- Significant gaps between policy and implementation
- Very limited stakeholder participation, especially outside of the government.
- Environmental mainstreaming remains a challenge, as few of the sectors have developed policies that integrate environmental considerations.
- The penetration of CSE activities into rural areas and into the thinking of the senior politicians has been limited.
- The inability to reach and influence administrative levels beyond the regional level.

3.1.2-Environment in the Constitution

The CSE was one of the driving forces that led to the inclusion of several references to the environment in the 1995 Constitution of the transitional government (MoARD & al 2004). For example, Article 44 guarantees the right to live in a “clean and healthy environment,” and Article 92 requires that the design and implementation of programmes and projects of development shall not damage or destroy the environment. Although the Constitution shows a major commitment to environmental issues, it concentrates more on the obligations of citizens to conserve and protect natural resources than on their right to utilize the resources in a sustainable manner for development and poverty reduction. This emphasis reflects the conservation-based approach to the environment that was dominant in government circles in the early 1990s.

3.1.3-The Environmental Policy of Ethiopia

The Environmental Policy of Ethiopia (EPE) was prepared at federal level. It summarizes the CSE in a policy document format that was approved by the Council of Ministers in 1997. Consisting mainly of guiding principles and of a short compendium of sector and cross-sector policies for sustainable environmental management, the EPE still constitutes Ethiopia’s official environmental policy. At the federal level, the CSE and the EPE

stimulated environmental thinking in various governmental agencies. Consequently, in several agencies, specific institutions or policies have been set up to address the environmental dimensions raised in the EPE. Some examples are the formulation of a Water Resources Management Policy, a Biodiversity Strategy, and a draft Land Administration and Land Use Policy, as well as the establishment of environmental units in the agencies responsible for roads, power, and water.

3.1.4-Recent Developments in the Regulatory Framework for Environmental Management

In 2002, three new environmental proclamations were approved. The legislation operationalised the objectives and the broad framework for environmental management stated in the EPE.

Establishment of Environmental Protection Organs (Proclamation 295/2002) clarifies the institutional mandate and responsibilities of the EPA and aims to integrate environmental considerations into the policies and decision-making of sector agencies through such means as the establishment of environmental units in these agencies at the federal level and the creation of independent environmental agencies at the regional level.

Environmental Impact Assessment (Proclamation 299/2002) specifies the projects and activities that will require environmental impact assessment. The EIA must be prepared by the proponent of the project, following the format specified in the legislation. The EPA will then review the EIA study, approve the project (with or without conditions), or reject it.

EIA is supported by guidelines reflecting international good practice and broadly compatible with the World Bank's EA safeguard policy. However, the EIA legislation is relatively new, and EIA is not yet widely employed in Ethiopia beyond the realm of internationally-financed projects. Thus the system cannot yet be said to be particularly effective. Comparatively speaking, few EIA reports have been submitted, and several of those that have been scrutinized by EPA have been found to be of mediocre quality. Yet the new EIA legislation does not only require rectification of this situation. It requires application of EIA at all levels, and sets high standards, including mandatory public consultation within a very rapid EIA review and decision process, monitoring of the implementation of mitigating measures, and the application of EIA to public instruments. The result has been a call for capacity building and increased competence in EIA at federal, regional, woreda and community levels in Ethiopia. EPA responded by launching a capacity building program to commence the task of widespread dissemination of EIA requirements and knowledge, including opening dialogues on the subject with the REAs, civil society and the private sector. Draft resettlement guidelines recommending community land management in newly settled sites have been published.

In spite of significant improvements, much remains to be done in the field of EIA, particularly in terms of enforcement of existing regulations. The recent foreign-led agro-

fuel investment expansion has strongly highlighted the deficiencies of the EIA enforcement process in Ethiopia. To date, only a small minority of foreign agro-fuel investors have actually submitted EIAs for review to the EPA. There are fears that the absence of EIA that resulted in the recent clearing of forest and to the “accidental” encroachment of an agro-fuel plantation into the Babile elephant and lion sanctuary (Tadesse 2007) could lead to similar unfavourable development and investment scenarios in other parts of the country.

Environmental Pollution Control (Proclamation 300/2002) addresses the management of hazardous waste, the establishment of environmental standards for various environmental media (air, water, and soil), and the monitoring of pollution. The problem of improper handling of hazardous substances is increasingly important—for example, with respect to pest management and industrial development.

Overall, this legislation was a significant step in that it provided a legal basis for implementation by the EPA of its mandate, for the mainstreaming of environment through the formation of Environmental Units in federal agencies, and for the establishment of environmental authorities in all regions.

3.2-Key environmental institutions

3.2.1-Government institutions

3.2.1.1-The Environmental Protection Authority

In 1992, a year after the coming to power of the EPDRF government, the government established a Ministry of Natural Resources Development and Environmental Protection (MONREP). This recognition of the importance of environment was partly stimulated by the United Nations Conference on Environment and Development in Rio that year, but also by the new government’s recognition of the importance of natural resource management for the country’s development, as was also underlined by the Agricultural Development Led Industrialization policy, which has guided the government’s approach to national development. The new government also continued the CSE process but moved it from the Ministry of Economic Development and Cooperation (MEDAC) to MONREP. In 1995, however, MONREP was dissolved and natural resources were returned to the Ministry of Agriculture, and a new ministry was created for water resources. The Environmental Protection Authority was created to take on MONREP’s remaining functions. As an independent authority, placed outside the main ministerial structures and reporting directly to the prime minister, the EPA represented a response to the recommendations in the CSE that because of the crosscutting nature of environmental issues, a specific champion of environmental concerns was needed that was outside any of the existing line ministries.

Since 2002, the new environmental legislation (see above) has given the EPA powers to fulfil its role, support all federal agencies in establishing environmental units and develop

skills in strategic environmental analysis of policies and public instruments. EPA is involved with the development of environmental policy and legislation, standards setting for environmental media, monitoring pollution, establishing Environmental Impact Assessment (EIA), Environmental Information Systems (EIS), negotiating and signing Access and Benefit Sharing (ABS) agreements on genetic resources and undertaking capacity development in relevant agencies to ensure the integration of environmental management in policy development and decision making.

3.2.1.2-The Environmental Protection Council

In addition to the EPA, under Proclamation 9/1995, an Environmental Protection Council (EPC) was established, with representatives from the federal ministries, to supervise the EPA's work. With its procedures not fully developed, the EPC was somewhat inactive in its early years. Under the recent environmental legislation (discussed below) and the new strategies of the EPA, the EPC is expected to be more active in the future, particularly in the fields of cross-sector coordination on environmental issues at the ministerial level and facilitating the integration of environmental concerns into key development policies such as the SDRP, the NCBP and PSCAP.

3.2.1.3-The IBC

Recognising the importance of conserving plant genetic resources and in order to avert the danger of genetic erosion, the Plant Genetic Resources Centre/Ethiopia (PGRC/E) was established in 1976 to collect, conserve, evaluate, document and promote the utilisation of crop plant germplasm occurring in Ethiopia. The gene-bank, since its establishment, has mounted a series of plant exploration and collection expeditions to collect and conserve the diversity in crop plants occurring in Ethiopia. In general, currently ca 60,000 accessions of some 104 plant species have been obtained through collection, repatriation and donation. A significant portion of the material has been evaluated for various characteristics. The material collected over the years is being conserved using appropriate conservation techniques and practices taking into account the storage behaviour, the type and the nature of the stored species. The bulk of the collected material is principally cereals and pulses.

In light of the importance of conservation and sustainable utilisation of biological resources, given the gaps that were apparent in the national conservation efforts and building on the strengths and achievements of the Plant Genetic Resources Centre, the Ethiopian government took measures to legally establish the Institute of Biodiversity Conservation and Research (IBC) in 1998 with the following expanded objectives and mandates. The general objective of the Institute is to undertake conservation, study, research and promote the development and sustainable utilisation of the country's biodiversity. As of June 1998, the mandate of the Institute has been expanded to cater not only for plant genetic resources but also for animal and microbial genetic resources. Ecosystem management is also recognised as one of the areas to be given top priority.

Apart from its more visible *ex situ* conservation activities, the institute has also successfully expanded and implemented numerous *in situ* conservation programs in partnership with rural communities.

Overall, the IBC has power and duties related to the conservation, research and utilisation of biodiversity including maintaining and developing international relations with bilateral and multilateral bodies. On the basis of the existing legislation, The IBC has the responsibility and duty to implement international conventions, agreements and obligations on biodiversity to which Ethiopia is a party. These currently include the CBD, the FAO multilateral agreement and the Carthagena protocol. The IBC is one of two key focal institutions in Ethiopia (along with the EPA) with the responsibility to implement international conventions related to Access and Benefit Sharing of genetic resources and traditional knowledge. To date, the Ethiopian government has already signed two ABS agreements with firms based respectively in the UK and in the Netherlands regarding the exploitation of various landraces of Eragrostis teff and Vernonia galamensis var. galamensis.

Other agricultural research centres spread throughout the country occasionally expand their collections of genetic resource for specific crops or species, essentially for breeding programmes. This may create disturbances with the IBC as the methodologies used by the IBC and other research institutions differ in their focus. The IBC aims to capture the largest representative sample of variability whereas research centres are more intent on capturing specific traits desirable for breeding purposes.

3.2.2-Issues of government institutional capacity

3.2.2.1-Federal and regional level

The recognition of environmental issues related to sector policies and programs varies. Most federal agencies have some environmental responsibilities or involvement, although their capacity to fulfil these responsibilities is often limited. Three sector agencies have established environmental units, but are poorly staffed and have limited effectiveness. In other key agencies, much remains to be done in terms of integrating environmental concerns into their policies and programs.

At federal level, the main public sector capacity for water and sanitation is located in the MOWR, MOH and MOE. The MOWR has 350 professional staff involved in water supply and sanitation (MWR & al 2006). The MOH, through its environmental health division, has 3 to 4 full time professional staff dedicated to sanitation and hygiene promotion and many more that are involved in overall preventative health care. Ethiopia's nine regions each have water, education and health bureaus. Woreda Support Groups (WSG) will be recruited from the local private sector to assist a number of woreda in the implementation of rural water supply and sanitation (Ibid).

At the regional level, there is a diversity of experience (MoARD & al 2004). Some regions are actively developing capacity to address environmental issues, as in Addis Ababa, or to address land administration within an enlarged regional environmental protection agency (REA), as in Amhara and SNNPR. Only six out of the eleven regions have REAs, while others have environmental focal points. Some lack approved conservation strategies and guidance on how they are to operate, especially in mainstreaming and integrating environmental issues. Most regions lack approved conservation strategies to guide their environmental management, and where such strategies exist, they are limited in practical utility. Moreover, regional government structures are characterised by chronic institutional instability (structural changes, transfers of authority, conflicts of interest between sector agencies, etc). In 2004, REAs had less than half their proposed staff in place (Ibid).

Moreover, it was found that there is little capacity for EIAs in sector offices such as health and water, and there is little follow up by these offices after the approval of projects.

Shortage / turnover of skilled staff and funding for staff and operations, especially for support by the REAs to the woredas, are issues of major concern. To highlight the acuteness of the problem, it is fitting to describe the case of the coffee *in situ* conservation activities. Until 2004, coffee forest *in situ* conservation activities were part of the mandate of the IBC. Overnight these responsibilities were transferred to the Oromyia and SNNPR. Due to chronic capacity problems at Regional, Zonal and woreda level, those activities, critical for the conservation of *Coffea arabica* genetic diversity, have come to a complete halt, whilst simultaneously resettlement activities and private forest investments are increasing and encroaching on several wild coffee diversity hotspots.

3.2.2.2-Government decentralization, empowerment and the environment: the woreda experience

In 2002 the government introduced a second phase of decentralization, making the woredas the centre of socioeconomic development with the aim of empowering local (woreda) administrations, bringing the government closer to the people, and enabling it to be more responsive to local needs.

The woredas now have economic autonomy and receive direct block grants from the regional level. They will be the base unit for representation in the federal and regional assemblies, making them a suitable point of merger between political empowerment and economic development at the grassroots level. Each woreda now has an elected council, from which are elected a woreda administrator and deputy who exercise overall leadership. The administrator chairs the woreda cabinet, which consists of the heads of the various government departments found at this level. These are now political appointees. The cabinet decides on the budget allocations to the various departments from the block grant.

With the empowerment of the woredas, the role of federal and regional agencies is also likely to change. Originally, decentralization meant that implementation was the responsibility of the regional bureaus. As a result of this second phase of decentralization, the regional levels now focus mainly on policy and on supervisory activities. Resources and responsibilities for service delivery and project implementation have been moved to the woreda offices. In practice, however, both woreda and regional policies are still guided by federal sector policies and by cross-sector strategies and programs such as the EPE. The federal authorities also retain an active role with respect to trans-regional issues such as river basin management, multiregional forests, and trunk roads (MoARD & al 2004).

Besides improving service delivery, it was believed that ongoing decentralization had the potential:

- To deepen democracy and improve accountability, with local issues reflected in voting decisions in the council elections.
- To decrease the distance between the formulation and implementation of plans and programs.

Key issues for consideration at the woreda level in relation to environmental management include the following:

- While woreda offices have substantially increased resources and responsibilities in the present context of decentralization, these are exceptionally being allocated to environmental issues. In short, financial and human capacity at woreda level is insufficient to ensure the implementation of meaningful environment-related activities and projects. Even within the regular structure of the Ministry of Agriculture, budgets for natural resource related activities are also insufficient. This is true in both rural areas where key environmental issues such as soil erosion, land use, problems of water quality and quantity are linked with food security and sustainable livelihoods and in urban municipalities where environmental health concerns stem from water pollution and waste issues associated with agro and other industries and small urban centres.
- Woreda expert and DA turnover is exceedingly high throughout the country and even more so in remote to very remote areas. Estimated vacancy rate at the woreda level is 55% overall and 70 % in certain sectors (MoARD & al 2004). The situation is particularly acute in the water sector. In many woredas of the country, there are no water experts.
- Regional governments still make critical environmental decisions with no prior consultations of the woredas, particularly when it comes to the allocation of land for private commercial development purposes. This situation is especially telling in the Oromyia and SNNPR Regions.

- There are no specifically environmental institutions at the woreda level or programs for institutional development for addressing environmental issues at this level. Responsibility for environment rests with various sector offices such as agriculture. In some woredas such as in Dire Dawa, environmental coordinating committees were established but have become moribund due to lack of financial resources.
- With few exceptions, in regions that have REAs, there is little or no working relationship between the REAs and woreda offices with respect to environmental management.
- Implementation responsibilities with respect to environmental policies and regulations between the REAs and woreda level are unclear. In some municipalities, for example, pollution remains uncontrolled because of lack of relevant regulations, lack of clarity on jurisdiction (e.g. polluting factories fall under federal jurisdiction);

3.2.3-Civil society, NGOs

Private individuals, communities and, to a lesser degree, companies play a significant role in the management of the Ethiopian environment. As the country democratizes, the role of civil society in environmental debates is likely to increase. Many observers agree that civil society in Ethiopia is maturing, demonstrated by its expanded reach into different areas of the country, increased capacity in service delivery, and emergence in areas of policy dialogue and monitoring (MWR & al 2006). The number of NGOs in Ethiopia has increased in recent years, with an estimate of 900 international and local NGOs operating in the country in 2004. Some improvements related to civil society operations in Ethiopia include a dramatically simpler and shorter registration process for NGOs (administered by the Ministry of Justice), and greater willingness to collaborate with civil society in some regions of the country.

A 1991-1994 report indicated that there were 64 NGOs active in the water and sanitation sector. Of NGO investment during this period 69% was expended on rural water supply and only 4% on sanitation (Ibid). There are thousands of community structures currently managing water and sanitation supply schemes up and down the country. Many of the smaller structures were – and continue to be - set up when schemes are first implemented and focus predominantly on water management rather than sanitation or hygiene issues. There is also little follow up support by those involved in the implementation or, despite good intentions, by woreda level water desks that are over-stretched trying to increase coverage and have little time for existing schemes. There are very few, if any user associations linking together either rural or urban community managed water and sanitation schemes.

While major government policy and planning documents such as the PASDEP make little reference to civil society as a sector, but instead include a few piecemeal references to the

work of individual NGOs, other policy documents such as the water sector policy documents refer to the role of NGOs as important development partners (MWR & al 2006).

Depending on their geographical location and the nature of their livelihoods, the concerns and aspirations of farmers and communities in Ethiopia are highly variable. It could indeed be argued that the care and attention given by farmers to their environment is higher in areas located on the periphery of the country (forested areas, lowland areas) whereas farmers with crop-based livelihoods essentially found in the central and northern highlands are less environmentally sensitive. This is certainly illustrated by the numerous clashes that have characterised the confrontation between highlanders and forest dwellers in most resettlement sites. While the former are systematically intent on clearing forest areas or turning pastures and swamps into cultivated areas, the latter are usually aware of the added values associated with the conservation of forest areas (forestry based livelihoods, maintenance of rainfall patterns and temperature, availability of water sources, reduced prevalence of disease, etc).

In many communities of Ethiopia, there are local institutions for addressing various aspects of environmental management. The *Gaada* traditional authority amongst the Borena people, the *Kobo* traditional forest management rights in the SNNPR, the *Gereb* herding and grazing arrangements between the Afar pastoralists and the Tigrayan farmers or the traditional grassland management systems found in Menz and among the Agaw people in the Amhara Region are the most publicised examples of such powerful and enduring institutions. This, to a large extent reflects the correlation between biological diversity and cultural diversity which is found in biodiversity hotspots such as Ethiopia. Unfortunately, their potential for development and for addressing critical environmental issues is not being sufficiently recognized. The commonly held view amongst government employees and many NGO staff is that such forms of traditional knowledge / institutions are backward and represent a leap in the past. There are today however enough successful case studies and projects based on the revitalisation and strengthening of such traditional institutions to suggest that they represent a real development potential.

Both local and international NGOs have developed valuable experience with respect to environmental management, stemming from their work with local communities and institutions. Some NGOs have established links with regional and woreda government and have developed approaches that are being scaled up by regional authorities. However, these NGOs still represent a minority when compared with the broad group of mainstream humanitarian NGOs. For most environmental NGOs, operating in a context characterised by aid dependency remains a real challenge when it comes to the implementation of sustainable activities and methodologies, often involving maintenance and cost recovery systems.

3.2.4-Private sector

Generally speaking, private sector institutions have limited environmental awareness. Much remains to be done with respect to getting investors and companies to see the long term value of environmental management.

In the water and sanitation sector, the private sector is emerging after the end of the command economy in 1991 but continues to face legal and institutional constraints especially when it comes to operating water supplies which are largely considered as state monopolies by many decision makers. This bias against the private sector is partly historical but also arises from a perception that as the private sector is profit oriented it can not serve the poor effectively. Private – Public partnerships which could secure the interests of the poor have not yet taken root and effective regulation which would safeguard consumers is not yet in place (MoWR 2006). Better use of the private sector could lead to effective use of its access to technology, managerial expertise, attention to operation and maintenance; more effective provision of spare parts as well as, making use of the private sector's marketing orientation. Ultimately the private sector could be a source of sector funding, although this should not be overestimated in the short term.

Capacity in the private sector reflects the historical level of demand. Very few of the more than 300 registered contractors in Ethiopia work in water supply. Specialist drilling companies, and suppliers and manufacturers are limited (Ibid). Only a handful of private firms are involved in vacuum cleaning septic tanks or solid waste collection in major towns. Private maintenance and management operators are not yet involved in providing water and sanitation services in the country. There is little familiarity with the market for spare parts and very few private sector concerns are involved in this market.

4- ENVIRONMENT IN THE MAIN POLICIES AND SECTORS

4.1-Agricultural Development Led Industrialization and the Rural Development Strategy

ADLI's core tenet is that increased agricultural productivity is seen as the main engine of both agricultural and industrial growth. Through the use of Green Revolution technologies, the low productivity of traditional Ethiopian farming systems is to be substantially improved. A key element of ADLI that was incorporated into the national extension policy is the Sasakawa Global 2000 agricultural extension program—a collaborative NGO initiative by the Sasakawa Africa Association and the Global 2000 Program of the Carter Center that, among other things, makes improved-variety seed packages, fertilizers and pesticides available to farmers. A credit program was linked to the extension package. Since then, parts of the country have experienced some bumper harvests, but others have suffered from drought and crop failure.

Farmers have also come to realize that when they can no longer afford chemical fertilizer, their yields will fall dramatically. The sustainability of the fertilizer package approach has been questioned from both the economic and environmental perspectives, and the

impact of improved-variety seeds on the genetic diversity of local crop varieties has also been criticized. The returns to investment are clearly insufficient for the development of a sustainable cash economy, particularly when bumper harvests cause market prices to drop dramatically. A national fertilizer development project is geared toward liberalizing fertilizer markets, but so far, little research has gone into the effects of fertilizer runoff on the environment and environmental health, or on the long-term sustainability of fertilizer use.

A complementary component, which was scaled up dramatically in 2003, is water-harvesting. An earlier drive to construct medium-size dams seems to have been abandoned, in part because of the problem of siltation due to lack of catchment treatment, but also because malaria became endemic in the irrigated areas (MoARD & al 2004).

Overall, this activity has achieved mixed results despite a huge potential for rural development and food security improvement in the drought prone areas of Tigray and Amhara. When searching for explanations for this lack of success, the following points can be brought forward.

- The government has combined a transfer of technology with a blanket recommendation approach (water harvesting for crop and vegetable production only, regardless of the topography and livelihoods of the nearby communities) and in doing so has paid insufficient attention to a number of important issues, including the existence of traditional water harvesting structures and technologies inside the country (sometimes inside the targeted communities themselves) and the fact that the most urgent water needs in many parts of the highlands were not necessarily crop-related but human or livestock related (in some areas, a 20 litres jerry can of water for human consumption is sold for ETB 5 during the dry season).
- The importance of focusing as much as possible on local materials. The government has chosen instead an expensive model requiring the purchase of expensive plastic sheeting. This has made the scheme un-replicable by farmers for obvious financial reasons.
- The hastiness of implementation of the activity and the lack of training of staff at kebele level.

Almost three years after the onset of this program, very few water harvesting structures have fulfilled their potential. In fact, the combination of the above mentioned factors has resulted in painful situations whereby newly constructed ponds did not fill up with water because they had been dug uphill or were constructed alongside existing traditional water harvesting structures thereby highlighting the inadequateness of the newly constructed structures.

Although some minor piloting has been carried out and some site specifications have been drawn up to reduce the problem, the environmental impact of constructing a large

number of water-harvesting points (about 30,000 in one year in Amhara alone) has not been assessed.

The original ADLI document does not reflect environmental issues and was not reviewed by the EPA. Questions are now being asked about the dominance in it of what has been called the “Green Revolution narrative,” given the problematic food security situation, and there is a discussion concerning the feasibility of the current approach and the need for possible alternatives. A search has begun for more environmentally sustainable schemes that will have a more direct impact on food security and economic development, as well as reducing vulnerability.

ADLI is reflected in the Rural Development Strategy (2001) which continues to stress the role of increased agricultural production as the basis for the country’s development. The strategy is driven by the search for food security and rural employment opportunities. It has eight building blocks:

- Technology generation and dissemination
- Food security, including resettlement and water harvesting
- Agricultural extension and vocational training
- Agricultural marketing, of both inputs and outputs
- Rural finance
- Cooperative development
- Rural transport
- Rural land administration and management.

Environmental considerations are included in several of these elements, although often more implicitly than explicitly and hence rather superficially. Explicit consideration is, however, given to the need to sustain production through use of appropriate technologies, development of extension and training that is sensitive to agro-ecological zones, and sustainable land management and land use.

Resettlement, which is covered under the food security heading, also includes references to the need for careful assessment of land resources and disease problems in the resettlement sites and also calls for communities to take responsibility for environmental protection and rehabilitation within resettlement areas.

4.2-Capacity Building

While acknowledging the gains in macroeconomic performance during the 1990s, the Ethiopian government identified constraints in human and institutional capacity, economic management, and governance as core problems that hamper the achievement of sustainable growth and poverty reduction. Accordingly, a National Capacity Building Plan was developed that includes a consolidated strategic public service delivery and capacity-building program (PSCAP) which is funded by the World Bank and other donors. A key element of PSCAP is to empower marginalized groups and enhance

popular participation in development by decentralizing public services and providing people with access to productive assets. Although environmental management is not listed as one of the PSCAP's pillars and is not explicitly emphasized in the National Capacity Building Plan, its positive linkages with sustainable and enhanced development, livelihoods, food security, and poverty reduction make its inclusion imperative, especially in the decentralized service delivery component, which addresses capacity building at the regional and woreda levels.

4.3-The Sustainable Development and Poverty Reduction Program

The SDPRP (2002) is Ethiopia's version of a poverty reduction strategy paper (PRSP). It provides overall guidance for the country's development and a framework within which donor support can be coordinated. The first round of deliberations on the paper resulted in the Interim Poverty Reduction Strategy Paper (I-PRSP), which has as its main objective the reduction of poverty by 10 percent by 2004/05, from the 1999/2000 level of 44 percent. As was noted in several critiques, the I-PRSP did not take environmental issues into account in defining alternative poverty reduction strategies. The final SDPRP document, which articulates the overarching objective of reducing poverty by enhancing rapid economic growth, draws on the CSE and the EPE. Priority areas for action in environment and development are land degradation, the strengthening of regulatory and institutional capacity, and the enhancement and protection of biodiversity. Some important environmental issues, especially of a conservation nature, are now included in the SDPRP as crosscutting issues, but they are not properly integrated or mainstreamed into any of the main chapters. The only exceptions are under land use and agricultural development. There is no wider consideration of environmental management and its potential contributions to development.

The SDPRP focused on the following building blocks:

- Agricultural Development Led Industrialization (ADLI)
- Reform of the civil service and the justice system
- Decentralization and empowerment
- Capacity building in the public and private sectors.

These building blocks are central instruments for practically addressing cross-cutting environmental issues, thereby improving environmental management and strengthening policies contributing to sustainable development and poverty reduction. The manner in which environment is conceptualized in these reform processes is critical and should take the concept of environmental management beyond the conservation-based approach to include its contributions to accelerated economic growth, improved livelihoods, and better living conditions.

Many of the specific and cross-cutting environmental plans and targets outlined in the SDPRP appear to have been accomplished;

- a set of guidelines have been produced (EIA have been produced for agriculture, industry mining and roads), social impact assessment and resettlement, pesticide, fertiliser and industrial audit guidelines
- All regions have environmental protection units and several have produced regional environmental laws.
- Some environmental units have been established in some line ministries.

However, beyond the institutional level, a closer review of environmental issues reveals the following:

- In theory, the rural development and food security policies articulated in the SDPRP are all geared towards the maintenance, restoration and enhancement of the natural resource base of the country. For instance, the Program Implementation Manuals (PIM) of both the Safety Nets and the Resettlement Programs contain detailed guidelines as to how environmental and natural resources related activities should be selected, planned and implemented.
- In practice and over the last five years, there have been significant gaps between the policies and implementation on the ground. More specifically, the translation of these policies into a wide range of programs (rural development, safety net program, resettlement, development of commercial farming, etc) implemented by government agencies, NGOs and private actors have significantly affected the natural resource base of the country in different ways, not always consistent with the established guidelines.
- Foremost is the fact that the implementation of these programs has resulted in serious livelihood disturbances, shifts and interactions which, in turn, have profoundly affected access, use and control over natural resources.
- Foremost is the fact that the public works organised by this government over the last two decades (since approximately the fall of the *derg*) in their various forms and for a number of reasons (inheritance of the feudal system, political control dimension, design issues, tenure problems) fail to raise senses of ownership among farmers. Maintenance is consequently the main weak point of such schemes.

The weak points of past Public Works and SWC activities are clearly outlined in both the PSNP PIM and in the Environmental and Social Management Framework (ESMF) implementation strategy (see box 1).

Box 1: The Importance of Environmental and Social Sustainability

“It is acknowledged that many, or most, of the PW are intended to rehabilitate or enhance the natural resource base. However, this good intention is no guarantee that the PW will actually have a beneficial effect on the environment, or even that it will be environmentally or socially sustainable. Experience has shown that:

- A large proportion of mass-mobilisation efforts in environmental rehabilitation in Ethiopia have failed or have been abandoned, as a result of which the environment has returned to its degraded state;
- Some projects designed to protect or enhance the natural resource base have ended up doing the opposite;
- To attain their objective, projects should not be planned and designed as ‘stand alone’ activities, but should be developed considering the entire watershed, as part of an integrated catchment management plan.

What could make PW unsustainable, or negatively impact the environment? Unsustainability can occur, for example, through a lack of ownership by the community, incompatibility between the project and the prevailing, or optimum, land-use pattern, a failure to tap local knowledge in project design, or a failure to maintain the project given the perception that it benefits only a certain section of the community.”(ESMF Implementation strategy 2005)

However, neither the PIM nor the ESMF contain any form of recommendation to address this critical issue of maintenance and sense of ownership. In this respect, the safety net programme perpetuates this trend.

The current safety net program may differ from past EGS / SWC in its theoretical outline and in its emphasis on a graduation out of poverty but proposed safety net activities do little to increase or restore already poor senses of ownership in SWC schemes among farmers.

4.3.1-Irrigated perimeters

As part of the SDPRP, the last five years have witnessed sustained government investment and attention in the development of medium sized and small irrigated perimeters throughout the highlands. The result is an impressive network of irrigated perimeters in most parts of Tigray, Amhara and Oromya Regional states (13000 according to the PASDEP document). NGOs and donors have further contributed to the strengthening of this important rural development and food security component.

At this stage and with a view of ensuring the sustainability of existing and future irrigation schemes in the highlands, the following issues and lessons gathered during the

monitoring of NGO implemented irrigation schemes ought to be given urgent attention (McKee 2006):

- The maintenance capacity of government at woreda, Zonal and Regional level is very insufficient in light of the multitude of small perimeters being completed. This is not an urgent issue now but is likely to become one in the coming decade as perimeters begin to deteriorate and as newly formed maintenance systems at community level are non-existent (resulting from poor implementation practices, usually NGO driven), degraded (see point below) or embryonic (as part of cooperative systems).
- Much more care should be given when rehabilitating existing traditional schemes. The current trend is to abandon existing and sustainable indigenous management and maintenance systems and to replace them with newly formed structures and institutions, mainly cooperatives. The net result is a technical improvement of the irrigation structures and a complete loss in terms of maintenance operations and therefore sustainability.
- Despite the hailing throughout the highlands of important concepts such as holistic or integrated watershed approaches, there is still a critical implementation gap when it comes to integrating upstream and downstream water users in the establishment and management of irrigated perimeters.

4.3.2-Resettlement and commercial farming

During the last five years, agricultural commercial investments and resettlement have been two of the major intervention strategies pursued by the government in the less densely populated areas towards the West, South and South West of the country. Regional authorities in Oromyia and the SNNPR, have granted a multitude of authorisations to exploit prime wetland / virgin rainforest areas to establish cash crop plantations. Concurrently, the government has launched its vast program of resettling highland farmers on a voluntary basis to the same areas, believed to contain considerable amounts of underutilised land.

According to the SDPRP document (p. 58), the following issues had to be considered prior to the establishment of any program in these areas:

- Assessing the physical and climatic endowments of the lands and the operating constraints thereof:
- Putting in place the necessary infrastructure facilities
- Availing adequate basic health delivery system

The Programme Implementation Manual for resettlements states that:

“In each resettlement site, plans and mechanisms for preserving natural resources must be implemented. Forest and wildlife resources are to be protected, and settlers should be provided with education and advice as to how to obtain the necessary materials for constructing their houses without depleting forest land.”

In light of the experience of the past five years and of the numerous problematic areas that have arisen in these areas with “substantial uncultivated land”, it is an understatement to say that the human factor was critically absent from the planning of rural development activities in these “largely unoccupied” areas of the countries.

Recent case studies have highlighted an overestimation of the availability of underutilised land and the fact that:

“In most cases, the land selected (for resettlement) was either used by local groups as fallow areas, for grazing and forest resources, or by earlier settlers or self-organised settlers. In other cases settlements have been established at the expense of rapidly dwindling forest reserves, which are often used by local communities for coffee and honey production.” (Forum for Social Studies, 2006).

Overall, the insufficient consideration / planning / forecasting and analysis (economic, social, cultural) of the potential impact of the programmes (resettlement, commercial investment) on the livelihoods of the local indigenous populations already present in the targeted areas appears to be a serious shortcoming of the implementation of the SDPRP. The mid-term and long term negative environmental impact of the schemes appear to have been underestimated while the short term direct benefits (reduced pressure in the overpopulated highlands, increased food security for settlers in newly colonised areas, increased export revenues derived from commercial exploitation, etc) have been over-emphasised. In this respect, the SDPRP and current PASDEP plan insufficiently consider and address the issue of the revenues that could be obtained from a more systematic protection and sustainable valorisation of existing environmental resources.

4.4-PASDEP

In theory and as far as environmental issues are concerned, the PASDEP policy is presented as building on the structure and strengths of the SDPRP. As such, the environmental targets of PASDEP are:

- a) Improved rural environment for gender equity and sustainable livelihoods;
- b) Waste management and Pollution reduction; and,
- c) Accelerated Environmentally Sustainable Socio-economic Development that ensures gender equity.

Regarding urban areas, there is no doubt that the focus of PASDEP on pollution and solid waste management is adequate and reflects the rising importance of urban growth and pollution issues in Ethiopia.

As far as the rural sector is concerned, the signals are not entirely clear. On one hand, the government's continued strategic focus on natural resource conservation and management (PASDEP: 85-87) is a positive signal. Moreover, the commitment to boost the environmental planning and implementation capacity of 125 woredas to address household biomass consumption, food, feed and energy should also be welcome.

On the other hand, there are indications that the integration of the agricultural growth strategy with the environmentally sound development vision for Ethiopia requires further fine-tuning. For instance:

- It is unclear how the implementation of government enforced enclosure activities outlined in the agricultural strategy can be reconciled with the strategic goal (A) of ensuring community led environmental protection
- Integrated Pest Management (IPM) was a solid implementation pillar of the agricultural component of the SDPRP. It is no longer reflected in the PASDEP document where the main emphasis is on pest control through the use of chemical pesticides only.
- It is unclear how the proposed expansion of the flower and horticulture industry will ultimately contribute to the prevention of environmental pollution (goal E), given the flower industry's heavy reliance on chemical fertilisers, pesticides and herbicides.

Overall, one of the marked difference between PASDEP and the SDPRP comes from the gradual relegation of rural development environmental issues to a secondary level, the emphasis of the policy document being resolutely on accelerated agricultural and rural growth and the concurrent development of the private sector. This is also largely reflected in the mineral exploration and development and hydro-power development components of PASDEP. Economic growth and development emerge as *the* priorities whilst environmental concerns and issues of environmental sustainability are relegated into the background.

From the economic growth perspective, there is little discrepancy between the policy and the implementation practice. The Ethiopian government is actively pursuing a policy of privatisation of its natural resources (minerals, spring waters, fossil fuel, game parks, rangelands, forests, tourism development, etc) with limited considerations for the environmental impacts of these initiatives. For instance:

- Large chunks of prime virgin forest areas (including wild coffee genetic diversity hotspots) are being cleared by private investors for coffee, tea and rubber

plantations in the South west, generating conflicts, modifications of local and wider hydrological balances, etc.

Supported by fiscal and investment incentives, the flower industry is spreading at an uncontrolled rate with unregulated uses of fertilisers, herbicides and pesticides, raising the unsavoury prospect of the contamination of ground and surface water and the accumulation of obsolete pesticides around several densely populated areas (Zeway, Debre-Zeit,, etc)

Very large wetland areas (Baro) and riverine grazing areas (Awash) are converted into commercial farming with no considerations for local rangeland dynamics, ground and surface water quality and dynamics.

Moreover, the recent and significant expansion³ of sugarcane and other agro-fuel commercial farming investments in many lowland parts of the country raises a number of questions related to the rural development strategies outlined in the PASDEP document. The following points are unclear:

- From a rural development perspective, PASDEP is presented as being a balancing act between the improvement of pro-poor subsistence farming and the shift to commercialisation of agriculture. The privatisation and extraction of several hundreds of thousand of lowland rangeland areas appears however to be heavily inclined towards the latter whilst having the potential to seriously affect the pastoral rangeland dynamics of several key pastoralist groups (Afar, Borena, etc) in what are already tense and potential conflict areas due to the scarcity of pasture. Moreover, the available information on on-going agro-fuel investments indicates that investors are not planning their investments on marginal low yielding areas but rather on high yielding favourable lands therefore directly competing with future food security initiatives and overall agricultural and livestock developments.
- The current fast expansion of agro-fuel investments is taking place in an environment characterised by the absence of relevant policy and regulatory frameworks. Investors appear to be free to identify and propose investment plots to the government and to make preparations for their investment with little government supervision and control. This was highlighted recently when an agro-fuel company “mistakenly” started clearing several hundreds of hectares inside a protected wildlife sanctuary in East Hararghe, ORS. Moreover, as *Jatropha* is likely to be the preferred choice of species for agro-fuel plantations in Ethiopia, it is worrying to observe that the potential invasiveness of this species has not been assessed in the Ethiopian context. The fact that the species is planted as a hedge species around Arba Minch does not imply that it will adapt and remain stable in other ecosystems of the country where it is not known to grow. *Jatropha curcas* is

³ 1.15 million ha are currently being cleared or under negotiation for *Jatropha curcas* , *Ricinus communis* and other agro-fuel plantations (SEEDLING 2007).

known to be toxic to mammals, is proving to have invasive tendencies if not managed correctly and should be researched further (IUCN 2007). Moreover, the government of Western Australia has recently banned the species for agro-fuel development due to its tendency to become invasive (Smith 2006).

The expansion of sugar cane plantations and the production of bio-ethanol are highlighted in PASDEP. However prospects for in-country bio-diesel production are unclear. Data available from a few investors suggest that at best, Jatropha curcas and Ricinus communis oil will be extracted in-country to be subsequently exported to European markets where current bio-diesel refinery capacity is being significantly upgraded. There are, in short, no tangible indications that the current agro-fuel scramble taking place in Ethiopia is going to contribute in any way to reducing the country's fuel import bill. It rather seems that agro-fuel crops are just going to become another agricultural export commodity subject to the vagaries of the international market.

4.5-Water and sanitation policies

The major policies and reforms of the water sector relate to the overall processes of:

- Decentralisation,
- Separation of regulation and service delivery and
- Overall civil service reform.

The water policy (1999) and strategy (2001), regulations and tariff proclamations as well as the health policy⁴ (1993), environmental health proclamations and bylaws and the sanitation strategy (2004) are key features of the sector.

All stakeholders agree on the fact that the main direction of decentralisation and the separation of regulation and service delivery are well conceived (MoWR & al 2006). The new sanitation strategy focuses public sector subsidies on promotion and public facilities rather than subsidising at household level.

Water supply policies follow best international practice. The same holds true for the sanitation sub-sector where the national strategy seeks to promote preventative and low cost approaches. The National Hygiene and Sanitation Protocol will empower local authority health, water and education desks to undertake health and sanitation programs in a consistent, integrated and co-ordinated manner. It is part of an overall effort of the government to mainstream hygiene and sanitation in key development programs and ultimately lever funding through a national hygiene and sanitation programme (MoH 2005).

⁴ Sanitation and hygiene do not have a separate policy statement but are included in the overall health policy. There is no water law as such, instead legal aspects are covered by proclamations especially 197/2000; 82/2003 and regulations such as 115/2005 (MWR & al 2006)

As mentioned above, there is a broad consensus in the sector that the current water and sanitation policies and strategies are highly relevant and reflect best Ethiopian and international practice (MoWR & al 2006). The policy within the urban sanitation sector still needs refinement to balance affordability with the environmental and health goals of improved sanitation and sewerage. Regulations and guidelines, although rapidly developing, are still missing in important areas such as provision of spare parts, codes of practice and environmental control (Ibid).

However, implementation is lagging behind policy, although there have been many advances such as the restructuring of the MOWR and the creation of the Water Resources Development Fund. Decentralisation of the sector is held back by delays in the wider processes governing overall public sector reform.

Greater use of the private sector has leapt ahead in some areas (e.g. with the engagement of local artisans) but a consistent, money-backed demand for formal private sector involvement has not yet developed. Adoption of gender strategies is another area where adherence falls behind.

In some cases transition steps need to be developed to allow a gradual implementation of policies and strategies that are well conceived but too ambitious to allow immediate implementation. Some regions are more advanced than others in terms of policy implementation. This raises opportunities for learning from those regions that are ahead.

At policy and strategy level, there is a mixed degree of compliance, which is further weakened by the lack of government resources to implement the full scope of the policy. At the regulatory level, there is good to excellent compliance where the regulations are clear, specific, official and realistic (Ibid 2006).

4.6-Other Policy Developments

During the last three decades or more, many rural development and food security government policies have impacted upon the wetlands of Ethiopia. In Illubabor zone research has shown that government policies, often supported by donors, have had both positive and, more often, negative impacts upon the sustainability of the wetlands (Wood 2001). Government policies generally impact indirectly upon wetlands through measures which are taken for economic, social or development reasons. Local level, community-developed policies also impact upon wetlands often more directly and more positively. There is a need to ensure that all government policies, developed at whatever level, go through some process of environmental assessment which looks at their wider environmental impacts, both direct and indirect. The current work to establish such procedures at Federal level is to be encouraged but application of similar mechanisms at regional and zonal levels must be supported. Similar procedures must be developed for use at community levels to support local policy formulation for managing wetlands in a sustainable manner.

A number of other policies bear on the interface of development and environment in Ethiopia, and in some cases there is evidence that concern for environmental issues has been integrated into these policies. For example, the Water Development Policy refers to the need for environmental conservation and protection and the use of environmental impact assessment procedures, and the draft Land Use and Land Administration Policy cites the need for regulations to ensure “sustained land use.” In addition, in response to donor pressures, two infrastructure agencies, roads and power, have developed their own environmental units with the aim of minimizing the negative environmental impacts of development in these sectors. Much more remains to be done, however, to identify how improved environmental management can enhance the effectiveness and economic life of the investments.

As outlined in the previous section on PASDEP, pressures on government agencies to speed up economic development have led to an emphasis on investment and industrial development and to a tendency to focus on increased output now and consider environmental issues later. The idea that attention to environment will slow development is based on the belief that environmental cleanup is the main relationship between environment and development. Sadly, this interpretation completely ignores the kinds of situations where changes in environmental management can produce benefits for both the environment and those who are using it (MoARD & al 2004).

4.7-Implications for Environmental Management

This brief review of Ethiopia’s changing development policy and institutional context highlights several important issues. A number of policies have been developed to guide and speed up development. Some of them refer to the need to consider environment, but most of them are weak in this regard. Even though the CSE process went far toward raising awareness of environmental issues and contributed to key achievements with respect to environmental policies and institutions, environment still remains extremely marginalized, in theory and in practice, in the main components of the government’s poverty reduction program. The limited inclusion and integration of environmental issues in ADLI and in strategies for rural development, food security, capacity building and overall poverty reduction show that much remains to be done toward linking environmental issues to the country’s key priorities, such as food security and disaster preparedness.

In addition, the discrepancy between the strong rhetorics of institutional environmental setup and the meagre financial attention to environmental management capacity in the ongoing decentralization and governance reforms underlines the need to articulate environment management as a key to economic growth and sustainable development and thus link it to capacity-building initiatives.

5 - ANALYSIS OF AID

In Ethiopia, most donors are active to some extent in the field of environment.

The very active donors who have established environmental restoration, preservation and sustainable development as core development strategies include the Norwegian, Finnish and German governments. In many cases, and not surprisingly given the nature of their support, the focus of their intervention is on the peripheral, less populated areas of the country (Western and southern parts in particular). In an almost generalised context of donor refusal to support the government initiated resettlement program in 2003, NORAD and GTZ are virtually the only donors to intervene in these sensitive areas.

Other major donors in Ethiopia, including the EC, the World Bank, USAID or DFID focus the bulk of their support on productive investments aimed at boosting economic growth or providing social safety nets in the central and populated areas of the country. The principles underlying such initiatives are that environmental issues should be systematically mainstreamed in the various sectors of intervention (transport, industry, trade, etc).

The EC has funded a few localised environmental projects in the past decade (Conservation of the Nech Sar Park, wetland restoration in Illubabor, participatory forest management projects in the South and South-West see forestry section below)) but they were not part of a coherent environmental strategy linking the populated central highlands with the less populated peripheral lowland areas of the country.

Overall, donor support in the field of environment can be clustered around 5 main themes: forestry, biodiversity, water and sanitation, land and SWC, climate change initiatives. The recent donor intervention is briefly presented and analysed for these 5 intervention clusters. For further details on other past and present environmental related donor interventions, see ANNEXES 7, 8 and 9.

5.1-Forestry

5.1.1-Agro-forestry

As explained earlier, the current agro-forestry trend is to favour exogenous species at the expense of locally adapted and known indigenous species.

In the past decade, most donors have often contributed to increasing this trend through their direct program intervention or through NGO funding in various woredas of the highlands. To date, too many donor / NGO staff still believe that exogenous is synonymous with progress and that a transfer of technology approach is the only agro-forestry development methodology available. Too many government and NGO/donor staff alike ignore the tremendous indigenous agro-forestry potential of Ethiopia and are

blind to the fact that this country is a (agro)-biodiversity hotspot, simultaneously rich in locally adapted species and in ethno-biological knowledge.

To date, few NGOs, let alone donors, have put local species at the heart of their agro-forestry strategies. Important initiatives in this respect funded by the EC ought to be mentioned and strengthened: SC(UK) and its emphasis on local species used as pesticides, Farm Africa and SOS Sahel with their efforts to initiate participatory natural resources management systems and to carry out enrichment planting with mixes of exogenous and locally adapted species.

In due fairness, it is important to note that government agencies and institutions are increasingly beginning to consider the existing wealth of indigenous plant and tree species and have begun to address this issue by focusing their nursery and dissemination efforts on a (small) number of local appreciated species, Koso (Hagenia abyssinica), Wanza (*Cordia africana*), Weyra (*Olea europea* var. *Africana*), etc. This is a positive trend that ought to be supported and expanded.

5.1.2-Participatory Forestry Management (PFM) initiatives

Realising that both the resettlement and the commercial investment programmes were potentially counterproductive to the overall objectives of food security and to the stability of social systems in the Western and South Western areas of the country, recognising also that key NTFP products and livelihoods were undervalued, that forestry and wetland ecosystems of the South West are complex and fragile and play key roles in wider sub-regional watersheds and ecosystems (Nile basin) and to reverse the overall deforestation trend, the EC and other donors (GTZ, NORAD, Dutch government, JICA, World Bank) have invested in Participatory Forestry Management approaches aimed at increasing the role and responsibilities of local communities in the management and conservation of their natural resources, mainly forests. GTZ and JICA have invested in the promotion and institutionalisation of PFM in the Oromya Region. Concurrently, the EC has begun promoting two models of PFM through its Environment and Tropical Forest Budget line and its funding of two NGOS in Kefa and Borena Zones (Farm Africa-SOS Sahel consortium) and in Bench Maji Zone (NTFP project implemented by the University of Huddersfield).

All PFM activities have had noticeable and immediate impacts which can be summarised as follows:

- Relocation of previous forest dwellers outside of the forest
- Nearby investors including nearby coffee investors repelled from several communities
- Reduced illegal timber cutting, collecting and selling from urban centres. Overall reduced pressure from outsiders on forest resources.

- Reduced prevalence of conflicts between local communities and settlers.
- Maintenance of air and water quality (springs, water table level) and availability and reduced prevalence of livestock pests and diseases commonly observed in deforested areas.
- On the whole, disturbances associated with the transfer from an open access regime to a restricted access regime have been minimal.

All PFM and NTFP related interventions have been highly instrumental in restoring a form of balance in local forestry politics, in defusing potentially threatening tensions between various forestry users and in halting deforestation, whilst contributing to guaranteeing the co-existence of previously conflicting livelihoods (agriculture versus forestry). An unsuspected added value of the PFM implementation process has been the political revalorisation of minority groups (for example the Menja people in Kefa Zone), until very recently marginalised and isolated.

The combined efforts of the GTZ and EC-funded FARM Africa-SOS Sahel in the Oromya Region in particular have yielded positive results in terms of institutionalisation. The Oromya Region has issued a forestry proclamation that makes specific mentions of the relevance of the PFM approach for conservation and livelihood development purposes. The Dutch government is also supporting the further dissemination of PFM approaches in the SNNPR Region.

In comparison, the new resettlement areas located in the Western part of the country (Tigray, Amhara and parts of Oromyia) have been largely neglected by the donor community at an un-auspicious time when natural resource related conflicts are on the rise, jeopardising the sustainability of the resettlement program as well as the rural development / food security potential of these areas.

5.2-Bio-diversity

5.2.1-IBC and ABS

The German government has been actively supporting the strengthening of the IBC since its inauguration in 1998 (storage facilities, capacity building, etc). More recently, the GTZ and the Dutch Cooperation have joined their efforts to support regional ABS capacity building. Ethiopia has an important role to play in this respect as it is ahead of other countries in terms of ABS legislation and as the country is a key negotiator in the international arena on matters related to biodiversity and genetic resources.

5.2.2-Conservation

The Frankfurter Zoological Society has implemented several projects in the afro-alpine areas with an emphasis on ecosystem and fauna research, monitoring and conservation (centred on the red wolf). During the past five years, the projects increasingly began to focus their efforts on reducing the negative incidence of the interaction of human beings with the critically endangered afro-alpine wildlife and ecosystems. Project activities have included the strict monitoring of rabies, rabies vaccination campaigns for dogs living in and on the fringes of the afro-alpine areas, the strengthening of traditional grassland management systems (in Menz particularly), awareness campaigns among farmers and feasibility studies to convert afro-alpine areas in Wello into national parks and to assess their potential for tourism.

After signing a 25 year lease agreement with the Ethiopian government, African Parks has recently taken over the management of the Nech Sar and Omo parks. The agreement states that the rights and responsibilities of African Parks include park management and community involvement and development:

“The Company shall be responsible for all park management including but not limited to road and building construction, maintenance, fencing construction and maintenance, fire breaks, burning programmes and other range management practices, water provisioning, culling, tourism and visitor use management,..., game introduction, sale of live game if authorised by the relevant authority, community involvement, concession terms, sourcing donor funds, administration,..., fishing and boating, all of which will be executed in an environmentally sound manner and in accordance with best conservation and business practice and in compliance with the Wildlife Policy of Ethiopia and the National Parks and Wildlife Act.”

“The Company undertakes, as far as is practically possible, to take community interests into consideration. A Joint Liaison Committee will be established with the local communities and existing Community Based Organisations which will meet on a quarterly basis. Local communities will be the primary beneficiaries of employment opportunities. The Company intends to establish a structure together with third parties that will focus on the establishment of small businesses, the creation of employment opportunities and support of development programmes in the surrounding communities.”

The responsibilities of the Government include resettling people living in the Park:

“The Government, in accordance with its intention that the Park shall meet the IUCN criteria for Category II Protected Areas and for other reasons, undertakes to relocate all people living with the boundaries of the Park, their livestock and possessions, and to deal with all matters of compensation that may arise.”
(Source: Freeman 2006).

The agriculturalist Kore people who used to live on the fringes of the park were resettled in 2004 in Albulo and Alfecho some 15 km south of the park and received the regular government allowance for resettlement schemes (ox, plough equipment, 2 hectares of land, etc) (Freeman 2006). Attempts have also been made to resettle the Gudji people in November 2004 by force (New Internationalist magazine 2005) but with inconclusive results. As of early 2006, they were still residing in the park and had taken over the land inside the park previously farmed by the Kore people (Freeman 2006). The situation of African Parks in and around the Omo Park regarding the involvement of local populations (Mursi, Nyangatom, etc) is still unclear.

The Simen Mountains National Park Integrated Development Project (SMNP-IDP) implemented by the Austrian Development Agency aims to alleviate poverty in and around the Simen Mountains National Park by conserving, developing and managing a sustainable basis for the environment and natural resources of the park, by maintaining its world heritage status and by enhancing its income generation capacity for the local communities and the country.

In Bale, two nongovernmental organizations, Farm Africa and SOS Sahel, were very recently granted six million euros by the Netherlands, Ireland and Norway embassies for a Bale region sustainable management program which aims to improve the environmental management of the BMPM and its surroundings by taking a regional ecosystem approach.

The Protected Areas System funded by UNDP-GEF has been launched in 2006 with the aim of preparing a master plan of the protected areas for future investment to improve the conservation and management of the protected areas system in Ethiopia and of strengthening the management capacity and coordination both at national and regional levels. In addition, the goal of the project is to prepare site-specific Protected Area Action plan focused on the threats and priorities for the whole country.

5.2.3 – Geographical Indications and “produits de terroir”

A recent French funded initiative established in partnership with the EPA intends to study the existing backyard agro-biodiversity and to test the feasibility of establishing a system of Geographical Indications in the country with the ultimate aim of developing high value niche markets. Preliminary findings indicate that more than a hundred Ethiopian home-garden and backyard crops/trees could qualify as “produits de terroir” and be included in a Geographical Indications system.

5.3-Water and sanitation

UNICEF invests about \$US 10 million per year in its Rural Water Supply and Environmental Health and Sanitation projects. UNDP is supporting the development of sector policy, planning and co-ordination and also supports rehabilitation of existing systems. The Addis Ababa water supply project has funding from the EU and the World

Bank. SIDA and DCI provide funding through their integrated rural development projects. COOPI, FINNIDA, JICA and ADF also provide project funding to the sector. A new World Bank programme, with a budget of \$US 100 million over 5 years, is providing support at woreda level, this is now being co-financed by an ADB project of \$US 65 million and an expectation of a \$US 100 million project to be financed by the Netherlands via UNICEF. Dfid has stationed an adviser in MOWR and may provide increased funding in the future (MWR & al 2006).

There does not seem to be any complete mapping of external inputs in the sector – although there are several ongoing attempts to do so. Other donors, including USAID, SIDA, EU and CIDA, also fund substantial programmes through NGOs.

Overall, there are no areas of support that can be described as saturated or over crowded (MWR & al 2006). However, sanitation has generally been under supported and it appears that there has been a tendency to channel more funds to the urban than to the rural sector (Ibid). The needs are so great across a very wide area that all support finds relevant targets for its assistance.

Historically, the selection of interventions could best be described as ad hoc. There is a lack of an overall guidance and plan where donor and national policies are matched and coordinated (Ibid). The sector is however moving towards a situation where coordination is improving and tools such as the woreda level plans are being put into place to help this process.

In terms of delivery, donors providing direct budget support transfer finance to the MOFED as part of the block grant allocated to regions according to population, revenue and development criteria. There are efforts to link this to the PASDEP process (MWR & al 2006). Other donors that are active at Federal level prioritize their finance to a particular sector and have established partnerships with either the Ministry of Health or Ministry of Water Resources. Donors that operate at regional levels link their activity to a particular sector bureau. For instance, UNICEF is linked to the Bureau of Health while UNDP and World Bank are linked to the Bureau of Water Resources.

5.4- Land issues (Certification, SWC, SLM)

Several donors, including the Swedish International Development Agency (SIDA), have supported the recently implemented Land Certification Program. It is yet too early to assess the impact of this program on land degradation, levels of productive investments by farmers and ultimately on land productivity.

Regarding the PSNP which is supported by all major donors, and as outlined in a previous section, the key assumption that public works at community level focused on natural resource management (SWC, water harvesting, reforestation, etc) will contribute to the restoration of the environment and therefore of the productive capacity of rural areas in the highly populated central and northern highlands is only partially true. In the

worst cases, there is a risk that the opposite will happen. Farmers have no sense of ownership of those works and don't assume any responsibility for their maintenance.

In parallel and in an effort to address the land degradation issue, several donors are currently pooling their resources to promote the concept and implementation of Sustainable Land Management (SLM) methodologies within the MoARD. In its current design and with its strong focus on scaling up of de-contextualised "best" practices, it is yet unclear how this program will avoid the pitfalls of similar initiatives undertaken in Ethiopia over the last decades and ultimately contribute to increased senses of ownership and maintenance of SWC activities.

5.5 – Climate change initiatives

The concept of climate change is perceived by a few donors as having some relevance to the humanitarian and development framework of Ethiopia. It is being argued that Ethiopian rural livelihoods are increasingly threatened by the impact of climate change and that rural populations are becoming more vulnerable to the effects of extreme weather events, mainly droughts and floods. For donors and government alike, the current approach emphasises the need to focus on adaptation and mitigation measures to climate change.

A recently funded UNDP project entitled "Coping with drought and climate change" will be implemented in Kalu Woreda, one of the most food insecure areas of South Wello Zone in the Amhara Region. It aims to build resilience of rural households in Ethiopia to deal with climate variability and climate change by analyzing and addressing the major barriers to adaptive capacity of the community to mitigate and cope with climate variability and changes.

Such initiatives tend to present and underline climate change and vulnerability to droughts as new entry points into the Ethiopian food security debate. However, the intervention framework designed for mitigation and adaptation measures fails to highlight the critical fact that previous food security / rural development programmes and measures were already implemented with drought and flood mitigation as their core strategy. This has been done in Ethiopia over the last three or four decades through various programs / projects. Government and donors alike have consistently placed a heavy emphasis on activities such as irrigation, soil and water conservation works and water harvesting to name but a few.

Moreover, government agencies and most NGOs knowledgeable with the rural realities in Ethiopia have always integrated the Ethiopian climatic variability and erratic nature in their programming and planning of rural development activities. Such basic "mitigation and adaptation" measures were internalised in Ethiopia decades before the concept of climate change even entered the development terminology. This is because vulnerability to extreme weather events is an intrinsic physical and cultural component of life in the rural areas of Ethiopia.

At farmers' level, such development projects tend to portray farmers as passive and ignorant actors in the face of climate change and variability. They omit the fact that numerous climate mitigation strategies at household level have already been internalised by farmers to the point of forming the foundation of their traditional knowledge, institutions and systems (traditional early warning systems, temporary migrations, indigenous water harvesting schemes for human beings or for livestock, traditional irrigation schemes, etc). More importantly, such mitigation strategies are at the centre of basic livelihood and anti-risk strategies (splitting of fields at various altitudes, planting of fields at different times, splitting of herds, temporary migration of herds, etc) commonly found throughout Ethiopia.

6-CONCLUSION

The environmental well-being of Ethiopia is of regional importance. While natural resources are not distributed evenly between the highland and lowland areas, it is essential to bear in mind that they are dynamically interlinked. Thus, the environmental health of Ethiopia can affect the environmental well-being of several neighbouring countries including Kenya, Somalia, Sudan and even Egypt.

Within Ethiopia itself, the same principle applies between different neighbouring ecosystems. For instance, the continued functioning of wetlands is essential for the environmental and economic well-being of many parts of the country. In particular, wetlands are important for the maintenance of the hydrological systems of watersheds. They also have positive influences upon other environmental processes and conditions at the local level.

Throughout Ethiopia, these complex and fragile ecosystem equilibriums and interdependencies are being increasingly disturbed while the ecosystems themselves are being degraded to an alarming extent.

In the densely populated highlands, population increases, poorly maintained NRM based public works and the concurrent push for increased and accelerated urbanisation are driving the environment and its reproductive capacity towards a point of meltdown. For instance, the urbanisation policy sought after by the government and donors as enshrined in PASDEP has all the ingredients of a major environmental and public health crisis in numerous areas of the highlands where water scarcity and the availability of fuel wood and charcoal are critical constraining factors.

In the less populated peripheral areas, the remaining and less disturbed forest, grassland and wetland ecosystems are being systematically encroached upon and degraded as a result of natural and artificial (resettlement) population increases. In recent years, this phenomenon has been compounded by three significant factors:

- Rural development policies of sedentarisation of pastoralist and forestry - to - agriculture livelihood shifts,

- The extremely aggressive and geographically wide-ranging spread of invasive alien species and,
- The emergence of a “green” rush in Ethiopia. Public / communally managed natural resources (springs, forests, grazing areas, parks, minerals, etc) are being increasingly privatised.

As far as the environment is concerned, the policy framework of the country is well established, covering all the relevant issues and sectors. Specific environment related policies exist, and most economic and sector development policies contain environmental provisions and regulations. However, there is a tendency for most government rural development policies and programs to be designed and implemented with an insufficient consideration of the comparative advantages prevailing in each area and with a systematic emphasis on crop production and agricultural livelihoods at the expense of forestry or livestock-based and pastoralist livelihoods, reflecting an ancient rift and dichotomy in Ethiopia between the centres of power in the highlands and the lowland periphery. Such a focus ignores the numerous interdependencies and links that exist between different altitude levels, agro-ecosystems and livelihoods. The current emphasis on crop based livelihoods is potentially dangerous as it ignores the interdependencies and mutually benefiting relationships that exist between various forms of livelihoods spanning different ecosystems. To give one simple but self explanatory example, pastoralist and agro-pastoralist areas play a critical role in the aftermath of prolonged famine episodes in the highland agricultural areas when farmers face the uphill task of restocking their livestock herds. Moreover, to aim for a uniform agricultural livelihood based rural development strategy is a serious risk to take. It may be promising theoretically and in the short run but is likely to be counterproductive at ulterior stages as the conversion from forestry and grasslands to agricultural systems is at best very complex and at worst technically, socially, and culturally not feasible resulting ultimately in increased food insecurity and conflicts over natural resources. The current resettlement and commercial farming initiatives launched over the past five years in the West, South West and in pastoralist areas have already painfully highlighted this fact.

A higher degree of consideration and inclusion of pastoral and forestry livelihood processes should therefore go into future policy designs, with in the case of forested areas, a much stronger focus on NTFPs.

Secondly, despite claims in the SDPRP and PASDEP that all rural development interventions should take into account the specificities of each agro-ecosystem and area, in practice this has rarely been the case, the blanket recommendation approach still being the preferred strategy of implementation of the government. To date, this approach has precluded the consideration and understanding of the diversity and of the mosaic of physical and social environments that characterise the highlands of Ethiopia. Together with an excessive reliance on the transfer of technology model, this strategy has had the net result that most rural development / natural resource based interventions have met with little success and replication and worst, have almost systematically by-passed the

vast untapped biodiversity-related development potential of the country. This is again a reflection of the insufficient consideration of the natural comparative advantages that Ethiopia offers as a biodiversity hotspot. The PASDEP document says little about the underutilisation and under-exploitation of the country's unique biodiversity and genetic resources. Future PASDEP initiatives in rural development should take hints from the current development interests of the private farming / food sector.

From an environmental perspective, the Ethiopian institutional framework offers a mixed perspective. On the positive side, structures and institutions have been established at federal, regional and in some cases zonal and woreda level. On the negative side, the environmental management capacity of the country is persistently undermined by chronic capacity issues, serious turnover problems and financial constraints observed almost everywhere at woreda and even zonal level. In such conditions, the mainstreaming of the environment to as many line ministries as possible would appear to be a questionable strategic choice. Much simpler environmental organigrams should perhaps be thought of. The fact that political will is generally insufficient and limited to the sustained efforts of a few very dedicated government professionals who remain a minority has important consequences for future environment related program design and implementation.

On the donor side, the current and dominant view / understanding is that environmental issues should be mainstreamed into the major economic sectors (transport, energy, etc). Such an approach fails to recognise and address the urgency of the environmental crisis currently unfolding in many parts of the country and the fact that short of immediate and direct interventions aimed at preserving / restoring the environment and fostering the sustainable use of environmental resources, there is a significant risk that food insecurity will spread to peripheral areas currently categorised as food secure.

In short, the information and the analysis of the data available no longer point out to the need for environmental mainstreaming but for the upgrading of the environment as a focal sector of intervention. In light of the strong rural development / food security bearing of the country, it would seem realistic to conceive of an environmental focal sector intimately intertwined with rural development initiatives.

Based on the diagnostic of the various rural development and natural resources necessities and issues presented in previous paragraphs and taking into account the strategic guidelines of the PASDEP, the following program orientations should therefore be explored:

Accompanying growth in the densely populated areas of the highlands

By:

Supporting and strengthening geographically differentiated water harvesting initiatives that take effectively into account the local knowledge of water harvesting of the targeted people and the complexity of local water needs (between human beings, livestock and crops) and make clear provisions for the optimisation of the use of local materials in the design of the structures.

Strengthening the management capacity of the numerous existing small scale irrigation perimeters, both at community and government level.

Accompanying the (re)settlement process and optimising its development potential in the western areas of Tigray, Amhara, Oromya and SNNPR

By:

Supporting participatory and / or joint natural management systems that conciliate and establish clear responsibilities between government and local communities in the management and use of natural resources (forest, water, wetlands, pastures) with the ultimate objective of enhancing conservation, mutually beneficial use and of defusing conflicts.

Protecting forestry based livelihoods by actively promoting the development of Non Timber Forest Products (coffee, spices, beekeeping, bamboo, etc) through the strengthening of relevant research, extension and marketing initiatives.

Protecting and strengthening pastoralist livelihood systems

By:

Strengthening, expanding and improving local institutions and interdependencies within pastoralist groups and between pastoralist and agro-pastoralist or sedentary farming communities,

Maintaining, rehabilitating and strengthening traditional knowledge and institutions related to natural resource management and where relevant promoting participatory natural resource management systems that build on local institutions

Supporting water harvesting development initiatives that take effectively into account the local knowledge of water harvesting of the targeted people, the preferred social water management institutions and systems, the diversity of local water needs (between human beings, livestock) and the complexity and fragility of pastoral systems and dynamics.

Supporting awareness raising and policy harmonisation on Invasive Alien Species at Federal and Regional level

Promoting the conservation, use and the national and international valorisation of Ethiopian biodiversity in all parts of the country

By:

- Supporting participatory resource management, conservation and eco-tourism oriented initiatives in endangered afro-alpine ecosystems
- Strengthening *ex situ* and *in situ* wild coffee conservation through PFM interventions in remaining wild coffee forests
- Strengthening national institutions (IBC, EPA) mandated with the conservation and valorisation of the Ethiopian biodiversity as well as their capacity to implement and enforce ABS legislation
- Promoting horticulture for indigenous crops / plants, niche market development and outgrowing schemes among smallholders for ornamentals, medicinal plants, stimulants, spices and other relevant high value horticultural cash crops.
- Promoting the development of Non Timber Forest Products (coffee, spices, beekeeping, bamboo, etc) through the strengthening of relevant research, extension and marketing initiatives.
- Supporting research multiplication / propagation techniques for indigenous multipurpose species
- Supporting awareness raising and policy harmonisation on Invasive Alien Species at Federal and Regional level

Strengthening much needed environmental research in the country by:

- Launching targeted research studies in areas where they are lacking such as the impact of the land certification scheme on productive investments and the social, economic and environmental impacts of the emerging agro-fuel, floriculture and horticulture industries.

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ANNEX 1- FORESTRY DEFINITIONS

| National class | definition |
|----------------|--|
| Forest | Land with relatively continuous cover of trees, which are evergreen or semi-deciduous, only being leafless for a short period, and then not simultaneously for all species. The canopy should preferably have more than one story. |
| High woodland | High Wood Land Combretum-Terminalia Woodland with trees >5 m and crown tree cover > 20%. It is found in East and West Wellega , Jima & Illubabor zone of Oromia region, in zone 2 of Gambella Region, all of Benishangul -Gumuz Region, and west Gojam, Awi and north Gonder zone of Amhara region. In other areas, it is woodland lying above 1250m above sea level. This class does not include shrubs and bushes. |
| Plantation | Plantation Mainly Eucalyptus, Cupressus and Pinus plantation with >5 m and crown density > 20% & thus is included in "Forest " as defined by FAO. |
| Low woodland | Low woodland All other woodlands and shrubland <5m in height and with crown cover >20% |
| Other land | Other land Other land is land area that is not categorized as forest. This includes agricultural land, settlements, etc |

Source FAO 2005

ANNEX 2 – WBISSP FORESTRY FIGURES

| Estimates for 2000 | | | | | | | |
|------------------------------|----------------|---|------------------------------|---|-----------------------------|---------------|-------------------|
| Regions (1) | Forest | “High” Wood land | Plantati on | Low Woodland + Shrubland | Other land | Water | Total |
| | ha | ha | ha | ha | ha | ha | ha |
| Oromiya | 2205619 | 5257683 | 62770 | 9806112 | 18422447 | 260500 | 36015130 |
| SNNPR | 740271 | 560000 | 237198 | 1349431 | 7667390 | 152860 | 10707150 |
| Gambella | 491805 | 899578 | 0 | 422042 | 1371684 | 0 | 3185109 |
| Dire Dawa | 0 | 0 | 0 | 36635 | 92163 | 0 | 128798 |
| Harari | 216 | 0 | 0 | 7497 | 24839 | 0 | 32552 |
| Amhara | 92744 | 841896 | 199496 | 7863448 | 6456317 | 310379 | 15764280 |
| Tigray | 9332 | 0 | 649 | 2135637 | 2788537 | 6212 | 4940367 |
| Beneshangul | 68495 | 2471761 | 0 | 1416368 | 955145 | 15216 | 4926985 |
| Afar | 39197 | 0 | 0 | 3169871 | 6329065 | 82142 | 9620275 |
| Somali | 4257 | 18160 | 1410 | 20090489 | 9007056 | 968 | 29122340 |
| Addis Ababa | 0 | 0 | 7900 | 0 | 54450 | 0 | 62350 |
| ETHIOPIA | 3651935 | 10049079 | 509422 | 46297530 | 53169093 | 828277 | 11450533 6 |

Source MoARD 2004

Projected figures for 2005

| Regions | Forest | “High” Wood land | Plantation | Low Woodland + Shrubland | Other land | Water | Total |
|-----------------|----------------|---|-------------------|---|-----------------------------|---------------|------------------|
| Oromiya | 2032012 | 4869511 | 62770 | 9806112 | 18984226 | 260500 | 36015130 |
| SNNPR | 638427 | 548480 | 237198 | 1349431 | 7780755 | 152860 | 10707150 |
| Gambella | 461586 | 899578 | 0 | 422042 | 939122 | 0 | 3185109 |
| Dire Dawa | 0 | 0 | 0 | 36635 | 92163 | 0 | 128798 |
| Harari | 216 | 0 | 0 | 7497 | 24839 | 0 | 32552 |
| Amhara | 84466 | 841896 | 199496 | 7863448 | 6464595 | 310379 | 15764280 |
| Tigray | 9332 | 0 | 649 | 2135637 | 2788537 | 6212 | 4940367 |
| Beneshangul | 68495 | 2454991 | 0 | 1416368 | 971915 | 15216 | 4926985 |
| Afar | 39197 | 0 | 0 | 3169871 | 6329065 | 82142 | 9620275 |
| Somali | 4257 | 18160 | 1410 | 20090489 | 9007056 | 968 | 29122340 |
| Addis Ababa | 0 | 0 | 7900 | 0 | 54450 | 0 | 62350 |
| ETHIOPIA | 3337988 | 9632616 | 509422 | 46297530 | 53436723 | 828277 | 114505336 |

Source MoARD 2004

ANNEX 3 – MAJOR WETLAND TYPES AND THEIR DISTRIBUTION ACROSS THE COUNTRY

The major types of wetlands that are found within the country are summarised as follows based on information compiled from different sources (Laykun 2000, Afework 1998, FAO 1984). The list provided here focuses only on the major types of wetlands and is by no means exhaustive. Numerous unrecorded wetlands exist all over the country.

- Lake Tana and Associated wetlands (Lake Tana, Fogera Floodplain, Dembia Floodplain, Dangela and the surrounding wetlands)
- The Ashenge, Hayk and Ardibbo Lakes
- Wetlands of the Bale Highlands (Numerous alpine lakes including Gerba Gurecha, swamps and floodplains)
- Wetlands of the Western Highlands (Keffa, Benchi Maji and Sheka including Ghibe and Gojeb floodplains, Illubababor, Jimma and Wollega valley bottom wetlands, dominated by marsh and swamps)
- Lakes of Bisoftu (Crater lakes – Hora, Bishoftu Guda and Zukala, Grean, Babogaya, Bishoftu Lakes, etc.)
- Lakes and associated wetlands of the SW Rift Valley (Lake Ziway, Langan, Abjiyata, Shalla, Awassa Lake and Chelekleka wetland system, Lake Abaya, Chamo, Chew Bahir, Lake Turkana)
- Lakes and Swamps of the Awash River System (The upper Awash Valley – Dillu Meda, Aba Samuel, the Lake Beda Sector, the Gewane Lakes/Swamp Complex, the Dubti, Afambo and Gemari Lakes/Swamp complex, Lake Abe and delta)
- Lakes of the Afar Depression (Lake Afera, lake Asale, Dallol depression)
- Western River Floodplains (Alwero, Baro, Akobo, Gilo, Chomen, Fincha swamps, Dabos swamp, Beles floodplain).

ANNEX 4 – BIOMES AND ECOSYSTEMS OF ETHIOPIA

| Hotspot | Biomes | § Ecosystems | WWF ecoregions | Pichi- Sermolli^o |
|---|--------------------------|---|---|---|
| Horn of Africa | Somali-Maasai | Acacia-Commiphora woodland Arid ecosystems Acacia woodland and thickets Lakes, wetlands & river systems | Somali Acacia-Commiphora bushland and thickets* Ethiopian xeric grassland and shrubland* Rift Valley Lakes* | Subdesert scrub Open xerophilous woodland Xerophilous woodland Grass steppe Various types of savannah Desert Subdesert scrub with succulents Shrub steppe |
| Ethiopian Highlands (part of Eastern Afromontane Hotspot) | Afrotropical and montane | Afroalpine and sub-alpine dry evergreen montane forest and grassland moist evergreen montane forest lakes, wetlands & river systems | Ethiopian montane forests Ethiopian montane moorlands* Ethiopian montane grasslands* | Afroalpine-subafroalpine Afroalpine Dry evergreen montane forest Montane savannah Forest with Arundinaria bamboo Montane evergreen thicket and scrub Moist evergreen montane forest |

| | | | |
|------------|-------------------------|---------------|---------------|
| Sudanian | Moist evergreen lowland | Sudanian | Xerophilous |
| Sahel arid | forest | savannah* | woodland |
| zone | Congo-Guinean forest* | Victoria | Various types |
| Congo- | Acacia woodland and | basin forest- | of savannah |
| Guinean | thickets | savannah | Woodland with |
| | Combretum-Terminalia | mosaic | Oxytenanthera |
| | woodland/savannah | Northern | bamboo |
| | Lakes, wetlands & river | Acacia- | |
| | systems | Commiphora | Lowland dry |
| | | bushland and | evergreen |
| | | thickets* | forest |
| | | Sahelian | Deciduous |
| | | Acacia | woodland |
| | | savannah | Shrub steppe |
| | | Saharan | |
| | | flooded | |
| | | grassland* | |
| | | Maasai xeric | |
| | | grasslands | |
| | | and shrubland | |

Source: GEF 2006

ANNEX 5: PROTECTED AREA LISTS FOR ETHIOPIA

Summary of Information on Wildlife Reserve Areas of Ethiopia

| Name | Area (Km2) | Region | Ecosystem | Major wild animal species conserved |
|---------------|------------|-------------------|--|--|
| Alledeghi | 1,832 | Oromiya | Desert and semi-desert scrubland & <i>Acacia-Commiphora</i> woodland | Oryx, Soemmerring's Gazelle, Greater & Lesser Kudu, Ostrich, etc |
| Awash west | 1781 | Oromiya | <i>Acacia-Commiphora</i> woodland & Evergreen scrub | Greater and Lesser kudus and Oryx |
| Bale | 1766 | Oromiya | Dry evergreen montane forest & Afroalpine and Subafroalpine | Mountain Nyala and Menelik's Bush buck |
| Chew Bahir | 4212 | Southern Ethiopia | Desert and semi-desert scrubland | Grevy's Zebra, Grant's gazelle, Gerenuk, Oryx, Lesser kudu |
| Gewane | 2431 | Afar | Desert and semi-desert scrubland & <i>Acacia-Commiphora</i> woodland | Soemmerring's gazelle, Greater & Lesser kudus, Ostrich |
| Mille-Serdo | 8766 | Afar | Desert and semi-desert scrubland & <i>Acacia-Commiphora</i> woodland | Soemmerring's gazelle, Greater & Lesser kudus, Ostrich |
| Shiraro-Kefta | 753 | Tigray | Combretum-Terminalia woodland & Savanna, | Elephant, Roan antelope, Greater kudu, Oribi |

| | | | | |
|------|------|-------------------|---|--|
| Tama | 3269 | Southern Ethiopia | Evergreen scrub and <i>Acacia-Commiphora</i> woodland <i>Acacia-Commiphora</i> woodland & <i>Combretum-Terminalia</i> woodland & Savanna | Giraffe, Burchell's Zebra, & Lelwel Hartebeest |
|------|------|-------------------|---|--|

ANNEX 5 CONTINUED

Summary of Information on Controlled Hunting Areas of Ethiopia

| Name | Area (Km2) | Region | Form of hunting | Major Trophy Species |
|-------------------|------------|---------|-----------------|---|
| Hanto | 480 | Oromiya | Concession | Mountain Nyala Menelik's Bush buck |
| Arbagugu | 225 | Oromiya | Concession | Mountain Nyala Menelik's Bush buck |
| Munessa Kuke | 111 | Oromiya | Concession | Mountain Nyala Menelik's Bush buck |
| Ababasheba Demero | 210 | Oromiya | Concession | Mountain Nyala Menelik's Bush buck Giant Forest Hog |
| Besmena Odobulu | 350 | Oromiya | Concession | Mountain Nyala Menelik's Bush buck |

| | | | | |
|----------------------------|------|-------------------|------------|--|
| | | | | Giant Forest Hog |
| Kebena | 300 | Afar | Concession | Beisa Oryx Soemmerring's Gazelle |
| Blen hertele | 1095 | | Concession | Gerenuk Beisa Oryx Soemmering's Gazelle |
| Telalk Dewe Lesser Kudu | 150 | Afar | Concession | Beisa Oryz Soemmering's Gazelle |
| Murulle | 1111 | Souther Peoples' | Concession | Topi Buffalo Greater kudu Grants Gazelle |
| Woleshet Sala | 500 | Southern people' | Concession | Buffalo Grants Gazelle |
| Dindin | 110 | Southern people's | Concession | Mountain Nyala Menelik's Bush Buck |
| Gara Gumbi | n.a | Afar | Open | Salts Dik dik Lesser Kudu |
| Gara Miti | n.a | Oromiya | Open | Klipspringer Dik dik |
| Debrelibanos | n.a | Oromiya | Open | Gelada Baboon |
| Aluto Kulito | n.a | Oromiya | Open | Greater Kudu |
| Jibat | n.a | Oromiya | Open | Giant Forest hog Bush pig Menelik's Bush buck Colobus Monkey |

| | | | | |
|-------------|-----|---------|------|---|
| Koka | n.a | Oromiya | Open | Bohor Reed buck |
| Gelial Dura | n.a | Afar | | Warthog Waterbuck Dikdik Bohor Common Bush buck |

Source GEF 2006

ANNEX 6 - National Forest Priority Areas of Ethiopia (NFPAs) by type and coverage (Hectares)

| | Name of area | High Forest (ha) | | Man-made forest (ha) | Other forest (ha) | Total area (ha) |
|----|-------------------------------|--------------------|-------------------|----------------------|-------------------|-----------------|
| | | Slightly Disturbed | Heavily Disturbed | | | |
| 1 | Arbagugu | n.a | 6300 | 1600 | 13500 | 21400 |
| 2 | Chilalo Galama | n.a | n.a | 1400 | 20600 | 22000 |
| 3 | Munesa Shashemne | 7000 | 10200 | 6800 | 74200 | 98200 |
| 4 | Neshe-Batu Adaba Dodola | n.a | 10000 | 1700 | 28300 | 40000 |
| 5 | Logo | 5000 | 16400 | 900 | 36700 | 59000 |
| 6 | Goro Bele | 9800 | 50000 | 200 | 40000 | 100000 |
| 7 | Harena Kokosa | 20000 | 70000 | n.a | 92000 | 182000 |
| 8 | Kubayo | 5000 | 17900 | 300 | 55200 | 78400 |
| 9 | Mena-Angetu | 20000 | 50000 | 200 | 119800 | 190000 |
| 10 | Bulki Malokoza | n.a | n.a | 500 | 10500 | 11000 |
| 11 | Gidola Gamba | 15000 | 5000 | n.a | 10000 | 30000 |
| 12 | Gidole Gamba | n.a | n.a | 1200 | 14800 | 16000 |
| 13 | Guwanga Kahitas | n.a | 32000 | 2800 | 21700 | 56500 |
| 14 | Sekela Mariam | n.a | n.a | 2000 | 8000 | 10000 |
| 15 | Butiji Melkajebdu | n.a | n.a | 3800 | 41400 | 45200 |
| 16 | Dindin Arbagugu | n.a | n.a | 5900 | 57600 | 66800 |
| 17 | Gara Muleta | n.a | 2600 | 2000 | 2400 | 7000 |
| 18 | Jalo Muktare | n.a | 2500 | 4100 | 14700 | 21300 |
| 19 | Iaro Gursum | n.a | 1500 | 4500 | 46300 | 52300 |
| 20 | Abobo Gog | 150000 | 45000 | 100 | 22900 | 218000 |
| 21 | Gebre Dima | 50000 | 82000 | n.a | 33000 | 165000 |
| 22 | Godere | 40000 | 100000 | 500 | 19500 | 160000 |
| 23 | Sele Anderacha | 100000 | 115000 | 700 | 9300 | 225000 |
| 24 | Sibo Tale Kobo | 28000 | 50000 | 1900 | 20100 | 100000 |
| 25 | Sigemo Geba | 67700 | 190000 | 2300 | 20000 | 280000 |
| 26 | Yayu | 20000 | 100000 | 300 | 29700 | 150000 |
| 27 | Yeki | 10000 | 100000 | 500 | 11500 | 122000 |
| 28 | Wangus | 329900 | n.a | n.a | 85100 | 415000 |
| 29 | Mesenigo | 292350 | n.a | 650 | 32000 | 325000 |
| 30 | Abelti Gibe | n.a | 4700 | 1300 | 4000 | 10000 |

| | | | | | | |
|--------------|--------------------------------|------------------|------------------|--------------|------------------|------------------|
| 31 | Babiya Fola | n.a | 45000 | 900 | 28400 | 74300 |
| 32 | Belate Gera | 76500 | 35200 | 1100 | 35700 | 148500 |
| 33 | Bonga | 7000 | 10000 | 2100 | 142300 | 161400 |
| 34 | Gura Farda | 80000 | 35100 | 800 | 224100 | 340000 |
| 35 | Tiro Boter Becho | 16000 | 23300 | 2300 | 44200 | 85800 |
| 36 | Butajira | n.a | n.a | 1600 | 13400 | 15000 |
| 37 | Chilimo Gaji | n.a | 2000 | 800 | 23200 | 26000 |
| 38 | Gedo | 2000 | 3000 | n.a | 5000 | 10000 |
| 39 | Jibate Muti Jegenfo | n.a | 5000 | n.a | 33500 | 38500 |
| 40 | Menagesha Suba | n.a | 3600 | 1300 | 4900 | 9800 |
| 41 | Wof Washa | n.a | 2000 | 4200 | 2700 | 8900 |
| 42 | Yere Diregebrecha Zukala | 300 | 3800 | 1700 | 3800 | 9600 |
| 43 | Anderara Wadera | n.a | 13000 | 3700 | 89900 | 106600 |
| 44 | Bore Asferara | n.a | 33000 | 1400 | 182900 | 217300 |
| 45 | Megada | 5000 | 10000 | 1300 | 4500 | 20800 |
| 46 | Negele | n.a | 1200 | 300 | 16300 | 17800 |
| 47 | Yabelo Arerò | n.a | 8000 | 150 | 41750 | 49900 |
| 48 | Dasa | n.a | n.a | n.a | 20000 | 20000 |
| 49 | Chato Sengi Dengeb | n.a | 5000 | 60 | 39800 | 44860 |
| 50 | Gergeda | 20000 | 20000 | 1000 | 96400 | 137400 |
| 51 | Gidame | n.a | 10000 | n.a | 7000 | 17000 |
| 52 | Jurgo Wato | n.a | 15000 | 200 | 4700 | 19900 |
| 53 | Komto Waja Tsega | n.a | 1000 | 1200 | 6900 | 9100 |
| 54 | Konchi | 10000 | 5000 | n.a | 8000 | 23000 |
| 55 | Linche dali Gewe | n.a | 15000 | n.a | 25000 | 40000 |
| 56 | Dekoro | n.a | 2300 | n.a | 3000 | 5300 |
| 57 | Guwobirda Girakaso | n.a | 11500 | 2200 | 12300 | 26000 |
| 58 | Yegof Erike | n.a | 2800 | 8400 | 6800 | 18000 |
| Total | | 1,386,550 | 1,385,200 | 84860 | 1,921,250 | 4,777,860 |

(Source: State of Environment Report For Ethiopia, 2003 – EPA).

ANNEX 7 – INTERNATIONAL ASSISTANCE FOR PROJECTS IN THE FIELD OF ENVIRONMENT

| No. | Project | Allocation US\$ million | Implementing Agency | Funding Agency |
|------------|--|------------------------------------|--|---------------------------|
| 1 | A sustainable Development project | 8.49 | Amhara Bureau Agr. | UNCDF |
| 2. | African NGO-Government Partnership for Sustainable Biodiversity Action | 4.33 | EWCO | GEF |
| 3 | Conservation and Sustainable Use of Biodiversity in the Great Rift Valley Lakes | 0.34 | EPA | FAO |
| 4 | Conservation of Ethiopia's Plant Genetic Resources | 2.43 | IBC | FAO |
| 5 | National Biodiversity Action Plan | 0.35 | EPA | GEF |
| 6 | Energy II-Woody Biomass project | 3.91 | MoA | ADB |
| 7 | Forest Conservation in High Priority Forest Areas | 1.74 | MoA | WWF |
| 8 | Industrial Utilization of Medicinal Plants | 0.55 | Eth. Health & Nutrition Research Inst. | UNIDO |
| 9 | Siemen Mountains National Park | 10.0 | Amhara Region | GEF |
| 10 | Protected Area System | 0.30 | EWCO | GEF |
| 11 | Tannery Pollution | 0.66 | MoT&I | UNIDO |
| 12 | Women Fuel Wood Carriers | 1.50 | MoLSA | ILO |
| 13 | Watershed management, forestry advisory, biomass energy, pastoral development, social forestry, forest management, participatory land use planning(1996-01 | 15.0 | Regional Bureaus | Germany |
| 14 | Rural water supply and Env.Protection (1999-02) | 7.0 | Amhara | Finland |
| 15 | Environmental Protection | 1.7 | EPA | Finland |

| | | | | |
|----|---|------|---------------------|---|
| 16 | (1999-02) Ecologically Sustainable Industrial development (2000-02) | 1.8 | EPA | Netherlands |
| 17 | Environment Support Project (1999-02) | 10.0 | MoWR | Netherlands |
| 18 | Biomass, Nature Oriented Tourism Development (1998-02) | 5.5 | Regional Bureaus | Austria |
| 19 | Environmental Protection | 2.0 | EPA | Norway |
| 20 | Disposal of Obsolete Pesticides | 3.8 | MoA | Italy, USA, Japan, Netherlands Sweden |
| 21 | 5 th National Population Program | 24.5 | MoH | UNFPA |

Source: National Agenda 21 Implementation Review Report, SIDA 2003.

ANNEX 8 – DONOR-FUNDED GOVERNMENT PROJECTS CURRENTLY UNDERWAY IN THE WATER AND SANITATION SECTOR

Donor Project

| | | | | | | | | | | | | | |
|--------------------------|--|---|---|---|---|---|---|---|---|---|---|---|---|
| WB | Woreda support programme | & | & | & | & | & | & | & | & | & | u | | |
| WSP | Capacity building for planning and strategy for urban water boards | u | u | U | U | u | u | u | u | u | u | U | √ |
| UNDP | Support to capacity building, governance | | | | | | | | | | | | √ |
| UNICEF | Water and Environmental Sanitation | & | & | & | & | & | & | & | & | u | U | √ | |
| WFP | Component of Food Security Programme | r | | R | R | r | | r | | | | | |
| EU | Addis Ababa Watsan | | | | | | | | | | | U | |
| JICA | Groundwater Development and Water Supply Training Project | | | | √ | | | √ | | | | √ | |
| | Rural Water supply and capacity building | | | | | | | | | | | | |
| | Water and sanitation | r | r | R | R | r | r | r | r | | | | |
| FINNI DA | Rural Water Supply & Environmental Program | | | R | | | | | | | | | |
| ADF | Support to Nile Basin Initiative | | | | | | | | | | | | √ |
| | Water and sanitation | r | r | R | R | r | r | r | r | u | u | | |
| DCI | Water Component in Country Programme | r | | | | | | | | | | | |
| CIDA | Support to Nile Basin Initiative | | | | | | | | | | | | √ |
| | Water harvesting, institution strengthening | r | | R | | | | | | | | | |
| Italian Dev. Cooperation | Integrated rural development project in Oromia. | r | & | & | | r | | | | | | | |
| DFID | Humanitarian, emergency-related | | | | R | | | r | | | | | |
| Sida | Component of Integrated Development | | | | R | | | | | | | | |
| ADB | Rural Water supply | | | | | | | | | | | | |
| AFD | Urban water supply, Irrigation | | | | | | | | | | | | |
| NORA | Hydropower | | | | | | | | | | | | |
| D | | | | | | | | | | | | | |
| KFW | Urban water supply | | | | | | | | | | | | |

r = rural project; u= urban project; & = rural & urban project; √ = capacity building or institutional support only. Source: MWR & al 2006.

ANNEX 9 – UNDP-GEF ENVIRONMENTAL PROJECTS

Water Resources Development and Utilization Programme (CCF2)

The \$5 m Second Country Co-operation Framework Water programme is ongoing both at federal and regional levels in 77 woredas and focuses on three key elements closely linked and builds on the achievements of the CCF 1:

- Strengthening institutional capacity for the management of water resources at federal, regional and woreda levels, with particular emphasis on water points including springs, hand dug wells, boreholes;
- Rehabilitation of rural water supply and small-scale irrigation schemes;
- Empowerment of women in water resources management especially at community levels; and,
- Foster partnership in the water sector.

Environment and Sustainable Dry Land Management (ESDM)

The \$4.5 m Environment and Dry land Management Programme (ESDM) is the first of its kind in Ethiopia to be financed from UNDP TRAC resources very much focused on the development of environment tools such as Environment Impact Assessment, Environment Accounting, pollution standard; mainstreaming same in national/regional development planning processes; environmental awareness; capacity building of the nascent environmental institutions, establishing environment data base and capacity building of communities to cope up and sustainably manage the natural resources, which is the source of livelihood.

Environment and Sustainable Dry lands Management programme, \$4.5 m TRAC, consists of seven outputs and focuses on bridging the gap between policy development and implementation through:

- Implementation of the environment policy and strategy; natural resources accounting and environmental impact assessment that will ensure the valuation of natural resources and incorporation into the national accounts, and budget decisions making it mandatory for all development projects to pass through rigorous EIA process, state of the environment reporting, and enhanced implementation of global environment related commitments;
- Environment information data base and networking;
- Focused and purpose oriented capacity building of EPA and relevant institutions to implement the environment policy and the NAP;
- Community Capacity building in natural resource management and utilization; and
- Foster partnership among environment donor groups

Climate Change Enabling Activities (Phase II)

After having successfully submitted its first National Communication to the UNFCCC, Ethiopia was granted additional funds, in order to undertake an analysis of capacity gaps, which may be encountered in activities related to climate change adaptation or mitigation. All parties have approved the document, and activities will begin in 2006. The first steps to be taken include the following:

- Organization of a team to carry out implementation (this team will be almost identical to the team entrusted with the preparation of the first national communication);
- Identification of national consultants;
- Literature review of current climate change technology;
- Inception workshop; and
- Technology Needs Assessment

National Adaptation Plan of Action (NAPA)

This GEF Enabling Activity is complementary to the above-mentioned projects on climate change. The objective is to prioritize among possible climate change adaptation projects, and to create a plan of action for essential human coping mechanisms. MoFED and NMSA have approved the project document after almost one-year negotiation on differences. Preliminary steps include:

- Creation of a Multidisciplinary Assessment Team;
- Inception Workshop;
- Identification of consultants; and
- Develop a portfolio of projects to address the adverse impact of climate change.

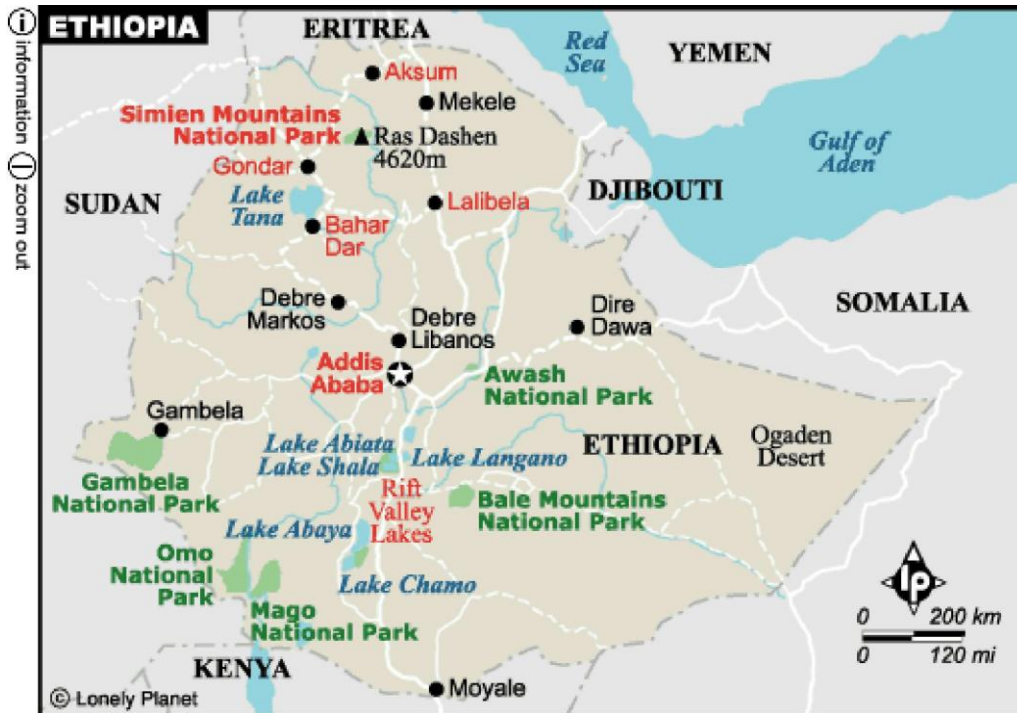
Coping with Drought and Climate Change(CWDCC)

This is a sub regional project focused on studies that look into desertification processes by observing rainfall pattern, vegetation and other agro ecological indicators in 4 East African Countries comprising Ethiopia, Kenya, Mozambique and Zimbabwe. Subsequently, early warning systems, adaptation approaches and appropriate technology consolidation will take place in order to provide the selected drought prone African countries with a Medium Size project to improve the climate information system that will benefit the rural community especially farmers and pastoralists.

Mainstreaming UNCCD issues in the PASDEP

This is a new initiative by the Global Mechanism (GM) from Norway's financial grant to UNCCD. MoU has been signed and funds released to be utilized by EPA in 2006. In addition, Norway has agreed to be the Chef de File for UNCCD activities in Ethiopia. Source: UNDP-GEF

ANNEX 10: MAP OF ETHIOPIA



Annex 11: Agreement on Access to, and Benefit Sharing from, Teff Genetic Resources

**Addis Abeba
December 2004**

Version 5 final

1 Parties

This **agreement** is signed between:

The Institute of Biodiversity Conservation, whose address is Yeka Kifle Ketema, Kebele 08, P.O.Box 30726; telephone 251-1-627504/612244, fax: 251-1- 627730/613722; e-mail: ibcar@telecom.net.et or Biod@telecom.net.et, Addis Ababa, Ethiopia, hereafter referred to as the “**Provider**”

The Ethiopian Agricultural Research Organization, whose address is Bole Kifle Ketema, Kebele 12/13, P.O.Box 2003; Tel: 251-1-462270; fax: 251-1-461251; e-mail: dg@earo.org.et; Addis Ababa, Ethiopia, hereafter referred to as “**EARO**”

And

Health and Performance Food International bv. (HPFI), whose registered address is P.O. Box 427, Azieweg 4, 9407 TG Assen, NL-9400, the Netherlands, Tel: +31 (0) 6 53 413847, e.mail j.turkensteen@soilandcrop.com, hereafter referred to as the “**Company**”.

2 Preamble

2.1 Whereas Teff (*Eragrostis tef*) is a crop species of Ethiopian origin and has various attributes of interest to the food industry.

2.2 Whereas the **Company** has come up with new applications of Teff and thus wants to have access to Teff varieties to be used for producing Teff-based food and beverage products and to develop new Teff varieties more suitable for producing such products.

2.3 Whereas the **Company** acknowledges that the genetic resources of Teff the **Company** has acquired or will acquire irrespective of the source are of Ethiopian origin and thus belongs to Ethiopia, and it agrees to respect this fact.

2.4 Whereas the **Provider** is a national institution in Ethiopia with the authority to grant and regulate access to genetic resources of Teff and other species and is responsible for effecting the sharing of the benefits from those genetic resources.

2.5 Whereas the **EARO** is a national research institution responsible for the coordination of national agricultural research on Teff in Ethiopia and has developed various Teff varieties.

2.6 Whereas Articles 1 and 15-19 of the ‘Convention on Biological Diversity’ and the ‘Bonn guideline on access to genetic resources and fair and equitable sharing of the benefits arising out of their utilization,’ which "are a useful first step of an evolutionary process in the implementation of relevant provisions of the Convention", require that the benefits arising out of the utilization of genetic resources be shared fairly and equitably between the **Provider** and the **Company**; and whereas the access to genetic resources and the fair and equitable sharing of the benefits arising from the utilization thereof is to be determined by terms mutually agreed by the two parties.

2.7 Whereas the **Company** wants to use the genetic resources of Teff and is willing to share with the **Provider** the benefits arising out of the use; and whereas the **Provider** has consented to the use of the genetic resources of Teff by the **Company**.

2.8 Therefore, in witness thereof, the following **agreement** on access to Teff genetic resources and the fair and equitable sharing of the benefits arising from the access has been concluded by the two parties.

3 The scope of access

3.1 The **Provider** agrees that the **Company** accesses and uses the genetic resources of Teff specified in Annex 1 to this **agreement**.

3.2 Under this **agreement**, the **Company** is permitted to use the genetic resources of Teff only for the purpose of developing non-traditional Teff based food and beverage products that are listed in Annex 3 to this **agreement**.

3.3 The **Company** cannot use Teff for any other purposes (e.g. chemical, pharmaceutical etc.) whatsoever unless explicit written consent is given by the **Provider**.

3.4 The **Provider** shall not grant to other parties access to Teff genetic resources for the purpose of producing the products of the **Company** listed in Annex 3 of this **agreement** unless it secures the consent of the **Company**.

3.5 The **Company** is not permitted to access the traditional knowledge of Ethiopian communities on the conservation, cultivation and use of Teff. Therefore, the **Company** shall not claim any rights over, nor make commercial benefit out of, such traditional knowledge unless explicit written **agreement** is given to it by the **Provider**.

3.6 To avoid possible confusion between the traditional knowledge of Ethiopian local communities and inventions made by the **Company**, the **Provider** shall, upon submission by the **Company** of its research proposals, inform the **Company** of the existing traditional knowledge of relevance to the research areas proposed by the **Company**.

3.7 The **Company** acknowledges that the genetic resources of Teff it has acquired or will acquire, irrespective of the source, is of Ethiopian origin and thus belongs to Ethiopia. It agrees to respect this fact.

3.8 Should there arise any claim challenging the origin or ownership of Teff, the **Provider** shall take the responsibility to defend the parties against that claim, and the **Company** shall assist the **Provider** in the defence.

3.9 The **Company** shall assist in identifying and bringing to court infringers upon the rights of Ethiopia over Teff.

4 Intellectual property ownership

4.1 The **Company** shall neither claim nor obtain intellectual property rights over the genetic resources of Teff or over any component of the genetic resources. However, plant variety protection may be obtained over Teff varieties.

4.2 The plant variety protection rights over new Teff varieties the **Company** will develop shall be co-owned by the **Company** and **EARO**. Such varieties shall be used by **EARO** and the **Company** in such a way as not to damage the business interests of the **Company** in so far as the products listed in Annex 3 or the interests of **EARO** or the **Provider** are concerned.

4.3 The Teff varieties that are not developed by the **Company** shall be owned by the **Provider** on behalf of the Teff farming local communities of Ethiopia. If it is found to be in the interest of the **Provider** or the **Company**, such varieties may be registered in the name of **EARO**. The **Company** shall handle and cover the cost of such registration outside of Ethiopia, provided that it has the finances in the given budget year.

5 Transfer to third parties

The **Company** shall not transfer Teff seed samples or any component of the genetic resources of Teff to third parties without first having explicit written consent from the **Provider**.

6 Effect of the agreement

6.1 The **agreement** shall not affect the sovereign rights of Ethiopia over the genetic resources of Teff and the **Provider** shall always retain the authority to grant other parties access to any genetic resources of Teff.

6.2 This **agreement** shall not affect whatsoever any traditional products of Teff, be it in Ethiopia or abroad.

6.3 This **agreement** shall not affect whatsoever any non-traditional products of Teff, be it in Ethiopia or abroad, except for those the Company has specified in Annex 3 to this agreement.

6.4 This **agreement** shall not prohibit the exporting of Teff from Ethiopia to other parties. However, if an importer or anyone who buys Teff from that importer wants to use or uses Teff for making any of the products specified in Annex 3 to this agreement and this fact is brought to the attention of the **Provider**, Ethiopia will refuse to export Teff to that importer.

7 Benefit sharing

The **Company** has agreed to share the benefits that arise out of the utilization of the genetic resources of Teff.

7.1 The **Company** agrees to pay to the **Provider** a lump sum equal to the amount $1\% \times \text{Gross net income in the years } 2007 + 2008 + 2009 / 3$

This payment shall be made immediately after the publication of the annual account of the **Company** for the year 2009 (i.e. shortly after publication and shareholder approval in June 2010).

7.2 The **Company** agrees to pay to the **Provider** annually a royalty of 30% of the net profit from the sale of basic and certified seeds of the Teff varieties specified in column 3 of Annex 1 to this **agreement**.

7.3 The **Company** agrees to pay to the **Provider** annually a license fee equal to the amount defined in Annex 2.

7.4 The **Company** agrees to contribute 5% of its net profit, which shall not be less than 20,000 Euro per year, to the **Financial Resource Support for Teff**, hereafter referred to as **FiRST**. The **FiRST** shall be used for improving the living conditions of local farming communities and for developing Teff business in Ethiopia.

7.5 The **FiRST** shall be administered jointly by the **Provider** and the **Company**. The University of van Hall/Larenstein will participate in the administration of the **FiRST**. The role of van Hall/Larenstein University in the administration of the **FiRST** will be to ensure that Dutch scientific knowledge and experience with product innovation are transferred into Ethiopia in the process of using the **FiRST**. Other details of the administration of the **FiRST** shall be specified by another agreement of the parties.

7.6 The **Company** agrees to share with the **Provider** and **EARO** the results of research it will undertake on Teff. Accordingly, the **Company** shall share with the **Provider** and **EARO** the knowledge or technologies it may generate using Teff except when it constitutes Undisclosed Information to the **Company** according to Article 39 of the

Agreement on Trade-related Aspects of Intellectual Property Rights of the World Trade Organization.

7.7 The **Company** agrees to involve Ethiopian scientists in the research it will undertake. The kinds of research on which Ethiopian scientists will participate and the mode of participation shall be specified by mutual agreement of the parties in the research plan of the **Company**. As appropriate, the **Company** will contract out research to Ethiopian research institutions.

7.8 The **Company** will take the **EARO** as the most preferred institution to breed Teff varieties.

7.9 By way of contributing to the Ethiopian local economy in connection with the access to Teff genetic resources, the **Company** agrees to establish profitable Teff businesses in Ethiopia, such as establishing Teff farming, cleaning and milling enterprises, bakeries, etc. The **Company** will therefore create joint ventures with Ethiopian counterparts.

7.10 Furthermore the **Company** will find funding that will augment the **FiRST** specified in paragraph 0 using the opportunity created by the joint ventures.

7.11 The **Company** shall acknowledge, in all its publications and application for the registration of Teff varieties and other intellectual property rights over products it will develop from Teff, that Ethiopia is the country of origin of that Teff.

8 Ownership and confidentiality

8.1 Results of any joint research conducted on Teff materials shall be owned by both parties and shall be released only upon written consent of both parties.

8.2 Information that is identified by either party as confidential shall be kept as such by both parties.

9 Duration of the agreement

The **agreement** shall remain in force for a period of 10 years. The parties may renegotiate the **agreement** at the end of that period.

10 Penalty

10.1 A party that breaches the terms of this **agreement** shall pay to the aggrieved party a penalty of 50,000 Euro if asked to do so by the aggrieved party.

10.2 The penalty that is specified in paragraph 0 is applicable on the **Provider** if it breaches the terms of this **agreement**, particularly those given in paragraphs 0, 0, 0, 0, 0, 0 and 0

10.3 The penalty that is specified in paragraph 0 is applicable on the **Company** if it breaches the terms of this **agreement**, particularly those given in paragraphs 0, 0, 0, 0, 0, 0, 0, 0, 0 and 0.

10.4 If the **Company** fails to fulfil its financial obligations as specified in part 0 of this **agreement** on ‘7 Benefit sharing’, the **Provider** may add a penalty of 5% of the due payment for any delay of between 90 and 180 days, and 25% thereafter.

11 Termination

11.1 If the company is in the process of bankruptcy, the **Provider** can immediately terminate the **agreement**.

11.2 If one of the parties repeatedly fails to fulfil or repeatedly violates its obligations under this **agreement**, then the aggrieved party may terminate the **agreement** upon 30 days notice given in writing to the other party.

11.3 Termination of this **agreement**, except in the case of bankruptcy, will be done through mutual agreement by both parties.

11.4 The termination of this **agreement** shall not affect the rights and obligations that were due to accrue to either party prior to the effective date of termination.

11.5 Starting with the day of termination of the agreement, the **Company** shall stop using the genetic resources of Teff. However, the **Company** is entitled to continue the use of co-owned Teff varieties upon payment of royalties to be mutually agreed upon by both parties.

12 Dispute settlement

12.1 If any dispute arises in connection with the interpretation or application of this agreement, both parties shall seek solution by negotiation. If the dispute cannot be resolved by negotiation, it shall be submitted to an arbitration body in accordance with the procedure laid down in part I of Annex II of the Convention on Biological Diversity.

12.2 For the purpose of Paragraph 13.1, the word “party” in Part I of Annex II of the Convention on Biological Diversity shall mean “**Provider**” or “**Company**”.

12.3 The decision of the arbitral tribunal shall be final and binding on the parties without appeal.

12.4 If either of the parties fails to comply with the award of the arbitral tribunal, the aggrieved party may, in accordance with Paragraph 16 (d) (iv) of the Annex to Section A of Decision VI/24 of the 6th Conference of the Parties of the Convention on Biological Diversity, UNEP/CBD/COP/ 6/20, the Hague, 7-19 April 2002, ask the Government of

the Federal Democratic Republic of Ethiopia or the Government of the Netherlands to enforce the award given by the arbitral tribunal.

13 Guarantee

Each year, the **Company** shall pay a sufficient sum of money in advance from which the requests by the provider for payment will be subtracted.

14 Applicable laws

14.1 The Convention on Biological Diversity (CBD) and the relevant decisions, guidelines and laws that emanate from it, including the International Treaty on Plant Genetic Resources for Food and Agriculture, in particular but not restricted to, its Article 9 on Farmers' Rights, the Bonn Guidelines, decisions of the various Conferences of the parties as well as those provisions of the Union for the Protection of New Plant Varieties (UPOV) that are consistent with the CBD and the relevant decisions, guidelines, and laws that emanate from it shall apply to matters not addressed in this agreement.

14.2 The CBD and the decisions, guidelines or laws that emanate from it shall prevail over the UPOV in cases on which the two do not agree.

15 Monitoring and follow-up

15.1 The **Company** shall submit to the **Provider** annual research and financial reports.

15.2 The **Provider** has the right to review at any moment, through an independent accountant if it so wishes, the bookkeeping as well as the relevant administrative details of the items covered by this **agreement**.

15.3 Meetings between the two parties will be held as required to exchange information.

16 Annexes to the agreement

The following Annexes shall form part of this **agreement**.

16.1 Annex 1: Varieties of Teff accessed by S&C. This Annex shows the different varieties of Teff and the authorization of use given by the **Provider** to the **Company**. This Annex may be updated by mutual agreement of the parties as needed.

16.2 Annex 2: Annual payments of licence fee per hectare for growing Teff. The annual payment of the licence fee provided for in Paragraph 0 will be determined after each harvest season based on this Annex.

16.3 Annex 3: List of products of the **Company**. This Annex shall be updated by mutual agreement of the parties as needed.

SOURCE (Feyissa 2006)

Annex 12 : Proclamation No. 482/2006: Access to Genetic Resources and Community Knowledge, and Community Rights Proclamation

FEDERAL NEGARIT GAZETA OF THE DEMOCRATIC REPUBLIC OF ETHIOPIA

13TH Year No. 13

ADDIS ABABA – 27th February, 2006

Proclamation No. 482/2006

Access to Genetic Resources and Community Knowledge,
and Community Rights Proclamation....Page 3353.

PROCLAMATION NO. 482/2006

A PROCLAMATION TO PROVIDE FOR ACCESS TO GENETIC RESOURCES AND COMMUNITY KNOWLEDGE AND COMMUNITY RIGHT

WHEREAS, the immense biodiversity wealth Ethiopia is endowed with must be conserved and sustainably utilized for the benefit and development of its peoples;

WHEREAS, it is necessary to recognize the historical contributions Ethiopian communities made to the conservation, development and sustainable utilization of biodiversity resources;

WHEREAS, Ethiopia is party to the Convention on Biological Diversity and the Convention requires the enactment of access legislation;

WHEREAS, Ethiopia has agreed to the African Model Law on Community, Farmers' and Plant Breeders' Rights and Access to Biological Resources;

WHEREAS, it is necessary to protect and encourage the customary uses of genetic resources by Ethiopian communities which are relevant to the conservation and sustainable use of the biodiversity resources of the country;

WHEREAS, it is necessary to recognize and protect the knowledge of Ethiopian communities generated and accumulated with respect to the conservation and utilization of genetic resources and promote the wider application of such knowledge with the approval of and sharing benefits by such communities;

WHEREAS, it is necessary to involve communities in the making of decisions concerning the use of genetic resources and community knowledge and sharing of benefits derived from the utilization thereof;

WHEREAS, in order to realize these objectives, it is necessary to determine by law the access to genetic resources and community knowledge, and to provide for the rights of communities over genetic resources and community knowledge;

NOW, THEREFORE, in accordance with Article 55(1) of the Constitution of the Federal Democratic Republic of Ethiopia, it is hereby proclaimed as follows:

PART ONE GENERAL PROVISIONS

1. Short Title

This Proclamation may be cited as "Access to Genetic Resources and Community Knowledge, and Community Rights Proclamation No. 482/20056."

2. Definitions

In this Proclamation, unless the context requires otherwise:-1/ "access" means the collection, acquisition, transfer or use of genetic resources and/or community knowledge;

2/ "biological resource" includes genetic resources, organisms or parts thereof, populations or any other biotic component of ecosystems with actual or potential value for humanity;

3/ "derivative" means product extracted or developed from biological resource; this may include products such as plant varieties, oils, resins, gums, chemicals and proteins;

4/ "ex situ" means a condition in which genetic resource is found outside of its natural habitat;

5/ "exploration" means an activity to find out the existence or the status of a given genetic resources;

6/ "genetic resource" means any genetic material of biological resource containing genetic information having actual or potential value for humanity; and it includes derivatives;

7/ "in situ" means a condition in which genetic resource is found in its natural habitat or ecosystem;

8/ "Institute" means the Institute of Biodiversity Conservation established by Proclamation No. 120/1998 (as amended);

9/ "local community" means a human population living in a distinct geographical area in Ethiopia as a custodian of a given genetic resource or creator of a given community knowledge;

10/ "person" means a natural or juridical person;

11/ "prior informed consent" means the consent given by the Institute and the concerned local community based on an access application containing a complete and accurate access information to a person seeking access to a specified genetic resource or community knowledge;

12/ "relevant institution" means a state organ responsible for administering or having special technical expertise on a specific sector of genetic resources or community knowledge;

13/ "state" means, the Government of the Federal Democratic Republic of Ethiopia or its Regional States, as applicable;

14/ "community knowledge" means knowledge, practices, innovations or technologies created or developed over generations by local communities on the conservation and use of genetic resources.

15/ "Biodiversity" means the variability among living organisms from all sources of ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems;

3. Objectives

The objective of this Proclamation is to ensure that the country and its communities obtain fair and equitable share from the benefits arising out of the use of genetic resources so as to promote the conservation and sustainable utilization of the country's biodiversity resources.

4. Scope of Application

This Proclamation shall apply to access to genetic resources found in in-situ or ex-situ conditions and community knowledge. Notwithstanding the provision of sub-article (1) of this Article, this Proclamation shall not apply to:

- a) the customary use and exchange of genetic resources and community knowledge by and among Ethiopian local communities; and
- b) the sale of a produce of biological resources for direct consumption, that do not involve the use of the genetic resource thereof.

5. Ownership

1/ The ownership of genetic resources shall be vested in the state and the Ethiopian people.

2/ The ownership of community knowledge shall be vested in the concerned local community.

PART TWO PROTECTION OF COMMUNITY RIGHTS

6. Principle

Local communities shall have the following rights over their genetic resources and community knowledge:

- 1/ the right to regulate the access to their community knowledge.
- 2/ an inalienable right to use their genetic resources and community knowledge;
- 3/ the right to share from the benefit arising out of the utilization of their genetic resources and community knowledge.

7. Right to regulate access

1. The right of local communities to regulate access to their community knowledge shall include the following:

a) the right to give prior informed consent for access to their community knowledge;

b) when exercising the right to give prior informed consent, the right to refuse consent when they believe that the intended access will be detrimental to the integrity of their cultural or natural heritages;

c) the right to withdraw or place restriction on the prior informed consent they have given for access to their community knowledge where they find out that such consent is likely to be detrimental to their socio-economic life or their natural or cultural heritages;

d) the right to demand the restriction or withdrawal of the prior informed consent given by the Institute for access to their genetic resources where they found out that is likely to be detrimental to their socio-economic life or their natural or cultural heritages;

2. The conditions and the procedure in accordance to which local communities shall give prior informed consent for access to their community knowledge shall be specified by a regulation;

8. Use Right

1/ Local communities shall have an inalienable right to use or exchange among themselves their genetic resources or community knowledge in the course of sustaining their livelihood systems in accordance with their customary practices and norms.

2/ No legal restriction shall be placed on the traditional system of local communities on the use and exchange of genetic resources and community knowledge;

9. Right to share benefit

1. Local communities shall have the right to share from the benefit arising out of the utilization of their community knowledge;

2. Local communities shall have the right to obtain 50% of the benefit shared by the state in the form of money from the benefits derived out of the utilization of their genetic resources in accordance with article 18(1) of this proclamation;

3. The money obtained pursuant to sub-article (1) and (2) of this article shall be put to the common advantage of the concerned local communities.

4. The procedure in accordance to which such money shall be used for the common advantage of local communities shall be specified by regulation to be issued under this proclamation.

10. Protection of Community Rights

1/ The rights of local communities over their genetic resources and community knowledge shall be protected as they are enshrined in the customary practices and norms of the concerned communities.

2/ An item of community knowledge shall be identified, interpreted and ascertained in accordance with the customary practices and norms of the concerned local community.

3/ The non-registration of any community knowledge shall not render it unprotected by community rights.

4/ The publication or oral description of a given genetic resource or community knowledge, or the presence of the genetic resources in gene bank or any other conservation center or that it is in use shall not affect its protection as community rights.

PART THREE CONDITION OF ACCESS

11. Requirement of Permit

1/ Without prejudice to the provision of Sub-Article 2(a) of Article 4 of this Proclamation, no person shall access genetic resources or community knowledge unless in possession of written access permit granted by the Institute based on prior informed consent.

2/ Unless otherwise explicitly expressed, the granting of permit to access genetic resources shall not be construed to constitute permit to access the community knowledge associated therewith and vice versa.

3/ Without prejudice to the provisions of Sub-Article 2(b) of Article 4 of this Proclamation, no person shall export genetic resources out of Ethiopia unless in possession of permit granted by the Institute to this effect.

4/ Notwithstanding the provisions of Sub-Article (1) of this Article, organs of the state which are empowered by law to conserve genetic resources may not be required to obtain access permit from the Institute to collect genetic resource or community knowledge in the discharge of their duties; provided, however, that they shall not transfer the genetic resources or community knowledge to third persons or export same out of Ethiopia unless they are given explicit permit by the Institute. While collecting genetic resources and community knowledge, employees of such institutions must carry with them a letter to this effect.

12. Basic Conditions of Access

1/ Access to genetic resources shall be subject to the prior informed consent of the Institute.

2/ Access to community knowledge shall be subject to the prior informed consent of the concerned local community.

3/ The state and the concerned local community shall obtain fair and equitable share from the benefits arising out of the utilization of genetic resources and community knowledge accessed.

4/ An access applicant who is a foreigner shall present a letter from the competent authority of his national state or that of his domicile assuring that it shall uphold and enforce the access obligations of the applicant.

5/ In cases of access by foreigners, the collection of genetic resources and community knowledge shall be accompanied by the personnel of the Institute or the personnel of the relevant institution to be designated by the Institute.

6/ The research based on the genetic resources accessed shall be carried out in Ethiopia and with the participation of Ethiopian nationals designated by the Institute, unless where it is impossible.

7/ Where the research based on the genetic resources accessed is permitted to be carried out abroad, the institution sponsoring and/or hosting the research shall give a letter of assurance that they shall observe the access obligations attached thereto.

13. Conditions for Denial of Access

The Institute may deny access to genetic resources; where:

- 1/ the access requested is in relation to the genetic resource of an endangered species;
- 2/ the access may have adverse effects upon human health or the cultural values of the local community;
- 3/ the access may cause undesirable impact on the environment;
- 4/ the access may cause danger of loss of ecosystem;
- 5/ the access is intended to use genetic resources for purposes contrary to the national laws of Ethiopia or the international treaties to which Ethiopia is a party;
- 6/ the applicant has violated hitherto access conditions or access agreements.

14. Issuance of Access Permit

1. A person who wants to obtain permit to access genetic resources or community knowledge shall present an application in writing to the Institute. The conditions and procedure in accordance with which access applications shall be presented, examined and prior informed consent shall be given shall be specified by regulation.
2. Upon giving of prior informed consent, the Institute shall, based on the provisions of this proclamation, negotiate and conclude genetic resources access agreement.
3. Where the access application involves access to community knowledge, the Institute shall negotiate and conclude the access agreement based on the prior informed consent of the concerned local community to that effect.
4. The Institute shall not grant permit for exporting genetic resources out of Ethiopia unless the condition provided under Article 12 (6) of this Proclamation is met.

15. Special Access Permit

- 1/ The Institute may, without the need to strictly follow the access procedure provided for in this Proclamation, grant special access permit to Ethiopian national public research and higher learning institutions and intergovernmental institutions based in the country, so that they have facilitated access to genetic resources and community knowledge for purpose of development and academic research activities they undertake within the country. When the Institute grants special access permit to such institutions, it shall determine, as appropriate, the obligations they shall have while having access under such permit.

2/ An access to genetic resources under a multilateral system of access to which Ethiopia is a party shall be made in accordance with the conditions and procedure specified thereof. The condition and procedure in accordance with which access to genetic resources under multilateral systems shall be implemented shall be determined by regulation.

16. Contents of Access Agreement

An access agreement shall specify, among other things, the following issues:

- 1/ the identity of the parties to the agreement;
- 2/ the type and quantitative description of the genetic resource permitted to be accessed;
- 3/ the description of the community knowledge permitted to be accessed or associated with the genetic resource to be accessed;
- 4/ the locality where the genetic resource or community knowledge is to be collected or the person providing same;
- 5/ the institution with which the sample of the genetic resource and the description of community knowledge accessed shall be deposited;
- 6/ the intended use of genetic resource or community knowledge;
- 7/ the relationship of the access agreement with existing or future access agreements on the same genetic resource or community knowledge;
- 8/ the relevant institution designated by the Institute to participate in the collection of and/or the research based on the genetic resource to be accessed and be in charge of monitoring the implementation of the access agreement;
- 9/ the benefit the state shall get from the access to genetic resources;
- 10/ where the agreement involves access to community knowledge, the benefit the concerned local community shall obtain from the use thereof;
- 11/ the duration of the access agreement;
- 12/ dispute settlement mechanisms; and
- 13/ the obligations the access permit holder shall have under this Proclamation.

17. Obligations of Access Permit Holder

A person who shall be given an access permit shall have the following obligations:

- 1/ deposit the copy of the access permit granted to him with the relevant regional institution in the district where the genetic resource is to be collected and show the access permit up on request;
- 2/ not deplete population of farmers planting stock or wild species or to remove significant genetic variation from local gene pool during collection;
- 3/ Where the genetic resource is to be collected from protected areas, to observe the rules and regulations of the administration of the protected area;
- 4/ deposit the sample of the genetic resources collected and the collection data, and the description of community knowledge accessed with the Institute or the relevant institution the Institute may designate;
- 5/ observe the type and quantitative limits of the genetic resource permitted to access;
- 6/ upon request, supply to the Institute a sample from the genetic resource and copy of the description of the community knowledge accessed;
- 7/ submit to the Institute regular status reports of the research; and where genetic resource is collected repeatedly, follow up the environmental and socio-economic impact of the access and submit a report thereon;
- 8/ inform the Institute in writing of all the findings of the research and development based on the genetic resource and community knowledge accessed;
- 9/ not transfer the genetic resource and community knowledge accessed to any other third party or use same for any purpose other than that originally intended, without first notifying to and obtaining written authorization from the Institute;
- 10/ return any unused genetic material at the end of the planned research or upon termination of the access agreement;
- 11/ not transfer to third parties the access permit or the rights and obligations there under without obtaining the consent of the Institute to that effect;
- 12/ where he seeks to acquire intellectual property right over the genetic resources accessed or parts thereof, negotiate new agreement with the Institute based on the relevant laws of Ethiopia;
- 13/ not apply for a patent or any other intellectual property protection over the community knowledge accessed without first obtaining explicit written consent from the Institute;

14/ recognize the locality where the genetic resource or community knowledge accessed from as origin in the application for commercial property protection of the product developed there from;

15/ share the benefit that may be obtained from the utilization of the genetic resource or community knowledge accessed to the state and the concerned local communities;

16/ respect the laws of the country, particularly those relating to sanitary control, biosafety and protection of the environment;

17/ respect the cultural practices, traditional, values and customs of local communities;

18/ observe the terms and conditions of the access agreement.

18. Benefit Sharing

1/ The kind and the amount of the benefit to be shared by the state and local communities from access to genetic resources or community knowledge shall be determined case by case in each specific access agreements to be signed.

2/ The remaining portion of the monetary benefit from access to genetic resources, after deducting the share of the local community as determined pursuant to Article 9(1) of this Proclamation, shall be allocated for conservation of biodiversity and the promotion of community knowledge. The conditions how the money shall be put to such use shall be determined by regulation.

3/ The sharing of non-monetary benefits from access to genetic resources among the state and the concerned local community shall be specified in each specific access agreement taking into account the kinds of benefits agreed to share with the access permit holder.

19. Types of Benefits

The benefits to be shared from an access to genetic resources and community knowledge may include the following modes:

1/ License fee;

2/ upfront payment;

3/ milestone payment;

4/ royalty;

5/ research funding;

6/ joint ownership of intellectual property;

- 7/ employment opportunity;
- 8/ participation of Ethiopian nationals from the Institute or the relevant institutions in the research based on the genetic resources or community knowledge accessed;
- 9/ priority to supply the raw material of genetic resource required for producing products there form;
- 10/ access to products and technologies developed from the use of genetic resource or community knowledge accessed;
- 11/ training, both at institutional and local community levels, to enhance local skills in genetic resources conservation, evaluation, development, propagation and use;
- 12/ provision of equipment, infrastructure and technology support; and
- 13/ any other benefit as appropriate.

PART FOUR FOLLOW UP AND COMPLIANCE MEASURE

20. Follow-up

- 1/ The Institute shall follow-up the execution of access agreements through the following mechanisms:
 - a) Inspection;
 - b) Periodic progress and status report by access permit holders and the relevant institutions designated to accompany the collection, participate in the research and monitor the implementation of access agreement;
 - c) A report by any other person or individual; and
 - d) Any other mechanism deemed appropriate.
- 2/ The access permit holder and the relevant institutions designated to take part in the collection of and the research based on the genetic resources accessed and to monitor the implementation of access agreements shall give periodic reports to the Institute on the collection conducted, the progress of the research and the findings there from.
- 3/ The Institute shall inform the concerned local communities of the progress of the research and the findings thereof, the utilization of community knowledge and the benefit shared there from.

21. Compliance Measure

1/ The Institute may alter an access agreement and limit the size of the genetic resource to access or put any other limitations as appropriate, where it is recognized that the access has posed threat of genetic erosion, degradation of the environment or violation of the cultural values of communities which can not be easily averted.

2/ Where the access permit holder has violated or failed to comply with the provisions of this Proclamation or the terms and conditions of the access agreement or where the access causes risk of damage to genetic resources or the environment or affects overriding public interest, the Institute shall suspend or terminate an access agreement and prohibit the access to genetic resources or community knowledge.

3/ Where the Institute decides to alter, suspend or terminate an access agreement, it shall communicate same to the concerned local community and the access permit holder.

PART FIVE EXPLORATION OF GENETIC RESOURCES

22. Prohibition

1/ Without prejudice to the provisions of Article 4(2) of this Proclamation, no person may conduct exploration of genetic resources unless in possession of exploration permit from the Institute.

2/ Notwithstanding the provisions of Sub-Article (1) of this Article, organs of the state which are empowered by law to conserve genetic resources are not required to obtain exploration permit to conduct exploration of genetic resources in the discharge of their duties.

23. Application

1/ Any person who wants to obtain exploration permit shall present written application to the Institute.

2/ The application shall specify the purpose of the exploration, the types of the genetic resources to be explored, the locality where the exploration shall be conducted and the time schedule for the exploration.

24. Granting Exploration Permit

1/ Upon receiving a complete exploration application, the Institute shall, in consultation with the relevant institution where appropriate, grant an exploration permit to the applicant.

2/ The exploration permit shall specify the types of the genetic resources to be explored, the locality where the exploration shall take place, the time schedule of the exploration and any other condition which the Institute deems necessary.

3/ Where the Institute grants exploration permit to a foreigner, it shall assign its scientific personnel or designate other relevant institution to accompany the exploration mission.

25. Obligations of Explorers

Any holder of an exploration permit shall have the following obligations:

1/ deposit a copy of the exploration permit with the relevant institution in the district of the locality where the exploration will be conducted;

2/ strictly observe the terms and conditions specified in the exploration permit;

3/ present to the Institute a detailed and complete report of the exploration mission upon its completion;

4/ show, up on request, the exploration permit issued to him;

5/ respect local customs, traditions, values, property rights in the locality where the exploration shall be conducted and the laws of the country.

PART SIX ADMINISTRATION OF ACCESS

26. Powers of Ministry of Agriculture and Rural Development

The implementation of the provisions of this proclamation that deal with genetic resources of wild animals shall be the responsibility of Ministry of Agriculture and Rural Development

27. Powers and Duties of the Institute

Without prejudice to the powers and duties entrusted to it in other provisions of this Proclamation, the Institute shall have the powers and duties to:

1/ Follow-up and ensure that access is carried out in accordance with this Proclamation as well as regulations and directives issued hereunder;

2/ collect the benefits to be obtained from access agreements and pass over to beneficiaries;

3/ prepare model access agreements;

4/ sensitize contents of this Proclamation;

5/ collect, analyze and as necessary disseminate to users information on access to genetic resources and community knowledge;

6/ cause that legal action be taken against offences committed in violations of this Proclamation;

7/ issue directives and perform such other activities necessary for the implementation of this Proclamation;

8/ delegate its powers and duties to other legally established bodies where deemed necessary and convenient to carry out its duties in a better way.

28. Responsibilities of Local Communities

Local communities shall have the responsibility to:

1/ prohibit any person, who does not belong to their communities, from collecting or taking genetic resources from their localities without having the necessary permit; and

2/ require any person, who does not belong to their communities and who is collecting or taking genetic resource from their localities, to show his access permit, and if he is without permit immediately notify or present him to the nearest kebele or wereda administration.

29. Responsibilities of Regional Bodies

Kebele administration and regional bodies at all levels responsible for the conservation of genetic resources shall:

1/ regulate that genetic resources is not accessed from their respective jurisdiction without permit by any person who does not belong to the communities thereof; and

2/ require access permit from any person, who does not belong to the communities thereof and who is collecting or taking genetic resources from their respective jurisdiction, and if he is without permit, seize the genetic resource and present him to the law and notify the Institute the detailed particulars of the genetic resource and the person found in possession of same.

30. Responsibility of Customs Officers

In accordance with directives to be given to them by the Institute, customs officers shall have the responsibilities to:

1/ inspect that any genetic resources being taken out of the country has been accompanied with an export permit given by the Institute;

2/ require any person leaving the country who is transporting or is in possession of genetic resource to produce the necessary permit to this effect from the Institute;

3/ seize genetic resource being transported out of the country and the person transporting same without permit from the Institute and immediately report same to the nearby relevant body and the Institute;

4/ Ensure that a statement is written on the package of a biological resource product to be exported indicating that the use of the genetic material contained in the product is prohibited and doing so would constitute a penal offence.

31. Responsibilities of Mail Service Institutions

Postal and other courier service institutions shall, before receiving and transporting genetic resources out of the country as mail, require their clients to produce permit from the Institute to export the genetic resources out of the country.

32. Responsibilities of Quarantine Control Institutions

Quarantine control institutions shall, ensure that the quarantine certificate they issue to biological resource products, contain a statement indicating that the certificate does not constitute a permit to use the product as genetic resource and that doing so is prohibited and would constitute an offence.

PART SEVEN MISCELLANEOUS PROVISIONS

33. Transitory Provisions

1/ Access agreements made prior to the coming into force of this Proclamation shall be revised and harmonized with the provisions of this Proclamation.

2/ The access to genetic resources under agreements concluded prior to the coming into force of this Proclamation shall be suspended until they are revised and harmonized with the provisions of this Proclamation.

34. Duty to Cooperate

Any person shall have the duty to cooperate with the Institute, the relevant institutions, and local communities in the implementation of this Proclamation as well as regulations and directives issued hereunder.

35. Penalty

1/ Any person who:

- a) Accesses genetic resources or community knowledge without obtaining an access permit from the Institute;
- b) Provides false information in the access application or in the course of subsequent monitoring of access agreement;
- c) Subsequently changes the purpose of access specified in the access agreement without obtaining permit from the Institute to the effect;
- d) Explores genetic resources without obtaining exploration permit from the Institute or provides false information in the application for exploration permit;

shall, with out prejudice to the confiscation of the genetic resource accessed, the cancellation of the access permit granted, and the civil liability arising thereof, be punished, depending on the gravity of the circumstance, with rigorous imprisonment of not less than three years and a fine of not less than ten-thousand and not exceeding thirty-thousand birr.

2/ Where the offence committed is in relation to genetic resources endemic to Ethiopia:-
The punishment shall be, depending on the circumstance, rigorous imprisonment of not less than five years and not exceeding twelve-years and a fine ranging from fifty-thousand birr to hundred-thousand birr.

Annex 13: Estimated Annual Costs of Deforestation of (a) High Forest and (b) Woodland in the Baro-Akobo Sub-basin (US\$/yr)

a. High Forest

| VALUE | Unit | Amount | Cost (ETB million/yr) | Cost (US \$ million/yr) |
|---|----------------|-----------|-----------------------|-------------------------|
| A. DIRECT USE | | | | |
| Timber | m ³ | 1,156,652 | 364.3 | 40.5 |
| Poles | m ³ | 289,163 | 13.0 | 1.4 |
| Fuelwood | m ³ | 1,156,652 | 52.1 | 5.8 |
| Sub-total | | | 429.4 | 47.7 |
| B. INDIRECT USE | | | | |
| Carbon sequestration | ton Carbon | 867,489 | 23.4 | 2.6 |
| Watershed services | ha | 28,916 | 10.9 | 1.2 |
| Potential pharmaceutical products | ha | 28,916 | 1.3 | 0.1 |
| Species & habitat biodiversity (High forest) | ha | 28,916 | 1.3 | 0.1 |
| Coffee gene pool | ha | 23,884 | 54.1 | 6.0 |
| Sub-total | | | 91.0 | 10.0 |
| C. BENEFITS | | | | |
| Less value of Agricultural production | ha | 28,916 | 33.1 | 3.7 |
| Less value of continued watershed services | ha | 28,916 | 4.4 | 0.5 |
| Sub-total | | | 37.5 | 4.2 |
| TOTAL NET COST | | | 482.9 | 53.5 |

b. Woodland

| VALUE | Unit | Amount | Cost (ETB million/yr) | Cost (US \$ million/yr) |
|---|----------------|---------|-----------------------|-------------------------|
| A. DIRECT USE | | | | |
| Timber | m ³ | 0 | 0 | 0 |
| Poles | m ³ | 123,563 | 5.6 | 0.6 |
| Fuelwood | m ³ | 463,362 | 20.9 | 2.3 |
| Sub-total | | | 26.5 | 2.9 |
| B. INDIRECT USE | | | | |
| Carbon sequestration | ton Carbon | 185,345 | 5.0 | 0.6 |
| Watershed services | ha | 30,891 | 5.8 | 0.7 |
| Potential pharmaceutical products | ha | 30,891 | 1.4 | 0.2 |
| Species & habitat biodiversity (High forest) | ha | 30,891 | 1.4 | 0.2 |

| | | | | |
|--|----|--------|-------------|------------|
| Coffee gene pool | ha | 0 | 0 | 0 |
| Sub-total | | | 13.6 | 1.9 |
| C. BENEFITS | | | | |
| Less value of Agricultural production | ha | 30,891 | 35.4 | 3.9 |
| Less value of continued watershed services | ha | 30,891 | 4.7 | 0.5 |
| Sub-total | | | 40.1 | 4.4 |
| TOTAL NET COST | | | 0.0 | 0.0 |

c. Total

| VALUE | Cost (ETB million/yr) | Cost (US \$ million/yr) |
|---------------------------------------|-----------------------|-------------------------|
| A. Direct use value | 455.9 | 50.6 |
| B. Indirect use Values | 104.6 | 11.8 |
| Less value of agricultural production | 77.2 | 8.4 |
| TOTAL NET COSTS | 482.9 | 53.8 |

