

Efforts Initiated to Ensure Environmental Sustainability in Ethiopia

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ABSTRACT

This seminar paper review the effort initiated to ensure environmental sustainability in Ethiopia from different information, report and research made by scholars and organizations. "Environmental Sustainability" focuses on maintaining the ability of natural resources (soil, air, water and biodiversity) to support and strengthen agriculture, food and byproduct sectors and rural communities. The efforts that ensure the sustainability of environmental resources may require links to other levels of decision-making and spatial scales. These links may be drawn through formulation of environmental management and planning at other levels and spatial scales. The formulation of national Environmental Impact Assessments, Environmental policy, Biodiversity conservation strategy, Solid waste management and integrated pollution control, Risk Assessments Environmental Management systems, sectoral plans and monitoring programmes are the most promising way to make a better understanding of how environmental, social and economic considerations fit together. Environmental impact assessment is used to predict and manage the environmental effects which a proposed development activity as a result of its design sitting, construction, operation, or an ongoing one as a result of its modification or termination, entails and thus helps to bring about intended development. By proclamation No. 9/1995 the Ethiopian Environmental Protection Authority (EPA) has created an environmental policy, environmental impact assessment, national biodiversity conservation strategy as well as legal and regulatory reforms to manage its environmental and natural resources. The overall aim of the Ethiopian Environmental Protection Authority (EPA) is to "... improve and enhance the health and quality of life of all Ethiopians and to promote sustainable social and economic development through the sound management and use of natural, human-made and cultural resources and the environment as a whole so as to meet the needs of the present generation without compromising the ability of future generations to meet their own needs". Generally these efforts should become part of future plan, programme and project formulation to ensure sustainability of the environment.

Keywords : Environment, Sustainability, Environmental Impact

I. INTRODUCTION

As the new millennium dawns, many leading companies in the US, Europe and Japan are responding to the challenges of global population growth and environmental pressures by adopting a commitment to "sustainability" (Hart, 1996; as cited by). Business leaders speak of sustainable

development, sustainable growth, sustainable products, sustainable processes, and sustainable technologies. Many have launched proactive programs that include life cycle accounting, design for eco-efficiency, community outreach, clean technology development, and a variety of other initiatives. In 1999, a group of U.S. companies and General Motors collaborated in supporting a high-

visibility National Town Meeting on Sustainability. Their motivations are not purely altruistic – recent research has demonstrated that pursuit of sustainability can not only result in environmental improvements and societal benefits, but can also increase economic value for the firm (Kiernan and Martin, 1998; Dixon, 1999).

The concept of sustainability relates to the maintenance and enhancement of environmental, social and economic resources, in order to meet the needs of current and future generations. The three components of sustainability are: Environmental sustainability: which requires that natural capital remains intact. This means that the source and sink functions of the environment should not be degraded. Therefore, the extraction of renewable resources should not exceed the rate at which they are renewed, and the absorptive capacity to the environment to assimilate wastes should not be exceeded. Furthermore, the extraction of non-renewable resources should be minimized and should not exceed agreed minimum strategic levels. Social sustainability: which requires that the cohesion of society and its ability to work towards common goals be maintained. Individual needs, such as those for health and well-being, nutrition, shelter, education and cultural expression should be met. Economic sustainability: which occurs when development, which moves towards social and environmental sustainability, is financially feasible. (Source: Gilbert, Stevenson, Girardet, Stren, 1996).as cited by FDRE. Guide line on strategic environmental assessment.

Environmental sustainability programs include actions to reduce the use of physical resources, the adoption of a 'recycle everything/buy recycled' approach, the use of renewable rather than depletable resources, the redesign of production processes and products to eliminate the production of toxic materials, and the protection and restoration of natural habitats and environments valued for their

livability or beauty. Ensuring the sustainability of environmental resources may require links to other levels of decision-making and spatial scales. These links may be drawn through formulation of environmental management and planning at other levels and spatial scales. The formulation of national Environmental Impact Assessments, Environmental policy, Biodiversity conservation strategy, Solid waste management and integrated pollution control Risk Assessments Environmental Management systems, sectoral plans and monitoring programmes are the most promising way to make a better understanding of how environmental, social and economic considerations fit together. These efforts should become part of future plan, programme and project formulation to ensure sustainability of the environment(FDRE. Guide line on strategic environmental assessment, 2000).

Generally the main objective of this seminar paper is to review the important effort initiated to ensure environmental sustainability in Ethiopia.

II. METHODS AND MATERIAL

Environmental Impact assessment as tool to Ensure Environmental sustainability

Environmental Impact Assessment" means the methodology of identifying and evaluating in advance any effect, be it positive or negative, which results from the implementation of a proposed project or public instrument (EIA proclamation, 2000).

Environmental impact assessment is used to predict and manage the environmental effects which a proposed development activity as a result of its design sitting, construction, operation, or an ongoing one as a result of its modification or termination, entails and thus helps to bring about intended development.

Environmental impact where magnified after industrial revolution, because in the period before that the technology use was not the sophisticated and could not incur much damage. The first EIA law was adopted in the late 1960 by a USA. From then on other legal instruments like the 1969 US National Environmental Protection Act (NEPA) come out (MELCA Mahiber, 2008). There are number of instrument with similar concern. For example the principle of the 1972 Stockholm Declaration has a rationale underlying EIA. This can be identified in principle 14 which states: rational planning constituted an essential tool for reconciling development and environmental need. The principle 15 also reads: planning must be applied to human settlement and urbanization with view to avoid adverse effect on the environment and opting maximum social, economic and environmental benefit for all. Agenda 21 also call on all countries to assess the environmental sustainability of infrastructure for human settlement, to ensure that relevant decision are preceded by EIA and to take into account the cost of any ecological consequences (FDRE. Environmental policy, 1997).

Unlike the Environmental Protection Policy which lacks specific vision and mission statements, the Environmental Impact Assessment (EIA), begun by the Environmental Protection Authority includes Procedural Guidelines as a prerequisite for the approval of new development activities and projects in any sector. To be well-designed, the EIA has very specific vision and mission statements. Its vision is to "...see a clean and healthy environment by eliminating or, when possible minimizing pollutants at their sources. Its mission statement is to enforce the Pollution Control Proclamation and related laws, in order to eliminate or ...minimize pollutants that generated from industries, agricultural activities, service rendering organizations and urban areas and enhance the health and wellbeing of the citizens"

(Ethiopia Environmental Protection Authority, 2006).

To realize the mission statements, the EIA included the following objectives and goals:

- Promote development that is sustainable and optimize resource use and management opportunities
- Protect the productivity and capacity of natural systems and ecological processes which maintain their functions
- Ensure environmental concerns are explicitly addressed and incorporated into the decision-making process
- Develop, implement and measure programs that promote management systems for the environment
- Prevent or minimize or offset the adverse impacts of municipal waste and other potential pollutants
- Prevent the adverse effects of developmental proposals that may generate hazardous substances or waste (The Ethiopia Environmental Protection Authority, 2006).

As practiced by other developing countries (See Kofi and Desta, 1998), the Environmental Impact Assessment generally includes: a) an assessment of strategic environmental policies and strategies (refers to a proactive approach for integrating environmental considerations with higher levels of decision-making in the development of policies and plans); b) regional, sectional development for an EIA (the concept of regional planning that integrates environmental concerns with plans for developing a specific geographic region); c) project-level EIA effects (refers to development activity and the impact that it exerts on the receiving environment). In other words, the EIA determines: 1) social impacts on health, demography, work, recreation, consumption, culture, and values; 2) economic impacts on markets, technologies, resource management, industrial structure, regional development, business practices,

and trade; and 3) environmental impacts on ecosystems, habitats, resources, air, water, soil.

However, the environment has not featured on the development agenda in the past since the project evaluation and decision-making mechanisms have focused on short-term technical feasibility and economic benefits. Past development practices have not anticipated, eliminated or mitigated potential environmental problems early in the planning process. This has resulted in a situation where the country experiences a seriously degraded natural environment. Further development has the potential to further damage fragile environmental systems. In order to ensure that future developments in Ethiopia are sustainable it is essential to integrate environmental concerns into development activities. Environmental impact assessment has been recognized as effective tools for facilitating the inclusion of the principles of sustainable development (FDRE.Environmental Impact Assessment, 2000).

2.1. The principle of environmental impact assessment

The primary purpose of conducting an EIA is to ensure that the environmental effects of proposed activities are adequately and appropriately considered before decisions are taken. This should serve as a key aid in the decision making process for relevant authorities by providing comprehensive information on the environmental consequences of development. Evaluated information and supporting arguments enable decision makers to evaluate the overall impacts of a proposal and alternatives to that proposal (MELCA Mahiber, 2008)

There are a number of principles which underlie EIA objective, these include:

- ✓ **Early application** - the EIA process should be applied as early as possible in the proposed planning of investment as is practical. This should ensure that environmental issues are considered

pro-actively before irrevocable decisions are taken. Practicality generally dictates that the EIA process is applied during project conceptualization.

- ✓ **Participation** - this requires that all interested and affected parties have the opportunity to participate meaningfully in the EIA process.
- ✓ **Issues based** - EIA should focus on the resolution of issues which are considered to be important to those participating in the process.
- ✓ **Alternatives** - EIA should consider all feasible alternatives which may include different methods of undertaking a development, alternative sites, alternative sources of raw materials.
- ✓ **Accountability** - project proponents are accountable for the potential impacts of activities being undertaken as well as managing impacts. Consultants are accountable for providing sufficient information to enable decision-makers to take sound decisions. The Competent. Agency is accountable for the decisions that are taken (FDRE.EIA, 2000).

The two key objectives of the Ethiopian EIA process are the:

- ❖ Integration of environmental considerations in development planning processes in order to make use of natural resources in a responsible manner; and
- ❖ Protection and enhancement of the quality of all life forms.

2.2. Environmental impact assessment in Ethiopia

In Ethiopia, land degradation, is the most serious environmental problem. Pollution, especially of water is low but increasing fast. Land degradation is caused by combination of natural and anthropogenic factor, the chief among which is the rugged nature of the terrain and removal of the vegetation cover for crop cultivation and for grazing. Consequently the tilling

of the land and over grazing have caused number of environmental problem such as soil erosion and the disruption of hydrological cycle exacerbating both flooding in the rain season and desiccation in dry season(MELCA Mahiber,2008).

It causes losses of both biomass and biodiversity. In the recent past excessive exploitation of natural resource brought about by such intensification of development activities carried out in various part of the county, led to environmental degradation and thus affect the quality of soil, water table, air pollution, and biodiversity losses to mention but few the event that have been happened in the Awash river basin can be take as example.

Experience in the past has shown that irrigation development scheme in the basin have caused massive environmental problem such as pollution, water logging, salinization which are aggravated by improper water management (FDRE. EIA Guide line document, 2000). How ever, through the time, the need to take environmental consideration into account to ensure successful economic development was increasingly recognized. This realization of the importance of forecasting the environmental impact development endeavors on the surrounding areas has served as the basis for formulation of appropriate law, policies and governmental institution to manage and protect environment of the country. The EIA system which has been introduced and applied in the country is one of them. The most important aspect of it is to avoid irreversible environmental damage.

EIA in Ethiopia is voluntary and is not legally binding. It is only applicable to large projects, and ascertains environmental impacts of development activities and how to mitigate negative impacts early in the project planning cycle. The developers of these large projects are required to take an "Initial Environmental Examination (IEE)" in order to determine whether or not a given project requires full Environmental

Impact Assessment. However, the EPA was created to assist developers in addressing environmental issues related to the development of their projects and in meeting environmental impact assessment requirements (EPA, 2006). It is further alleged by the Ethiopian Government that the environmental impact assessment process included the participation of local populations in project planning and design. Thus, properly-conducted EIA lessens conflicts by promoting community participation and informing decision makers, thus helping to lay a suitable foundation for environmentally sound projects.

Based on the goals of the Ethiopian Environmental Policy, it is worth mentioning that its vision statement should have highlighted what Ethiopia aspires to achieve in the future. Through the establishment of sound management of renewable and non-renewable resources, Ethiopia should have envisioned development that ensures a secure and sustainable environment. Similarly, the mission of the environmental policy should have been designed to raise the awareness and empowerment of the Ethiopian people to use environmentally sound technology and the best practices in order to achieve sustainable development. This would include using good management, conservation, and monitoring in order to protect the natural resources of the country (EPA, 2006).

III. RESULTS AND DISCUSSION

3. Environmental Policy of Ethiopia

In a number of developing countries, balancing poverty and socioeconomic needs with environmental concerns creates very pressing problems. To meet this challenge and to realize the spirit of the World Summit on Sustainable Development held in Rio de Janeiro, Brazil, 1992, a number of countries have formulated strategic environmental sustainability policies to: a) include environmental concerns in their mission statements; b) develop long-term

objectives; c) generate alternative strategies to pursue those objectives; d) implement strategies to devise policies, motivate employees, and allocate resources so that the formulated strategies can be executed; e) monitor the execution of strategies and make adjustments according to feedback; and f) assess whether the strategies actually fulfill the countries' mission statements.

Realizing that natural resources are the foundation of an economy, Ethiopia has attempted to develop a policy to protect its ecosystems. To counteract the short term results of economic and technical policies of the past and to meet the needs of present and future generations "the first comprehensive statements of Environmental Policy for the Federal Democratic Republic of Ethiopia were approved by the Council of Ministers in April 1997" (UNEP EIA Training Resource Manual, 2006).

By proclamation No. 9/1995 the Ethiopian Environmental Protection Authority (EPA) has created an environmental policy, as well as legal and regulatory reforms to manage its environmental and natural resources. The overall aim of the Ethiopian Environmental Protection Authority (EPA) is to "... improve and enhance the health and quality of life of all Ethiopians and to promote sustainable social and economic development through the sound management and use of natural, human-made and cultural resources and the environment as a whole so as to meet the needs of the present generation without compromising the ability of future generations to meet their own needs" (EPA, 2010). Some of the specific duties of the Ethiopian Protection Authority include:

- ❖ To prepare environmental protection policy and laws, and upon approval, follow up their implementation.
- ❖ To prepare directives and systems necessary for evaluating the impact of social and economic

development projects on the environment; monitor and follow up their implementation.

3.1. Why Environmental policy

The environmental policy of FDRE of Ethiopia (EPE) was approved by government in April 1997. It was comprehensive policy, which is aimed at safe guarding environmental interest while facilitating development imperatives to ensure the sustainability of development and the continuing sustainability of the environment for the full inter play of all live, but especially of human society. To achieve this environmental policy has divided the interaction of environment and development into sect oral and cross sect oral issue (EPA.Environmental policy, 1997). Because the environmental policy is holistic and it deals with the whole of human society, all forms of live, earth, air and water, it is to be implemented by the whole of Ethiopian government and Ethiopia public. At the country wide level, the environmental problem of greatest importance is land degradation, which arises from the deforestation, overgrazing, slope cultivation, and soil erosion syndrome. These environmental problems affect the quality and quantity of resource and welfare of human being (berhanu, 1999).

3.1.1. The over all policy goal

To improve and enhance the health and quality of live of all Ethiopians and to promote sustainable social and economic development through the sound management and use of Natural, human made and cultural resource and environment as a whole so as to meet the need of present generation without compromising the ability of future generation to meet their own needs (EPA. Environmental policy, 1997). Ethiopian environmental policy is classified into sect oral and cross sect oral policies.

3.1.2. Sectoral environmental policy

- Soil husbandry and sustainable agriculture
- Forest, woodland and tree resource
- Genetic, species and ecosystem biodiversity

- Water resource
- Energy resource
- Mineral resource
- Human settlement, urban environment and environmental health
- Control of hazard materials and pollution from industrial wastes
- Atmospheric pollution and climate change
- Cultural and natural heritage

3.1.2. Cross sectoral environmental policy

- ❖ Population and environment
- ❖ Community participation and environment
- ❖ Tenure and access right to land and natural resource
- ❖ Land use plan
- ❖ Social and gender issue
- ❖ Environmental economics
- ❖ Environmental information system

3.2. The Resource Base and the Need for a policy

3.2.1. The natural resource base and the rural environment

Natural resources are the foundation of the economy. Smallholder peasant agriculture, in some areas including forestry, is the dominant sector accounting for about 45 per cent of the GDP, 85 per cent of exports and 80 per cent of total employment. Agriculture has also been the main source of the stagnation and variability in GDP growth caused in the main by policy failures and exacerbated by recurrent drought, civil war, natural resource degradation and poor infrastructure. Renewable natural resource resources, i.e. land, water, forests and trees as well as other forms of Biodiversity, which meet the basic needs for food, water, clothing and shelter, have now deteriorated to a low level of productivity. The burning of dung as fuel instead of using it as a soil conditioner is considered to cause a reduction in grain production by some 550,000 tones annually.

In 1990, accelerated soil erosion caused a progressive annual loss in grain production estimated at about 40,000 tones, which unless arrested, will reach about 170,000 tones by 2010. Livestock play a number of vital roles in the rural and national economy but according to one estimate some 2 million hectares of pasture land will have been destroyed by soil erosion between 1985 and 1995 (Berhanu, 1999).

The Ethiopian Forestry Action Program (EFAP) estimated the full value of forest Depletion in 1990 to have been about Birr 138 million or some 25 per cent of the Potential forestry GDP of Birr 544 million (Ethiopia. Environmental Policy, 1997). Despite the presence of mineral resources in quantities and qualities suitable for exploitation, they currently contribute only about 2 per cent of the GDP. Only 1 per cent of the potential of Ethiopia's vast water resources for irrigated agriculture and hydropower generation have been developed. The energy sector is one of the least developed in the world with 90 per cent of needs being met from biomass Fuels, particularly wood, charcoal and animal dung. The genetic diversity of Ethiopia's domesticated plants and its unique flora and fauna is increasingly being eroded because the long history of disruptive interventions by the state and the weakening of local management in the face of an expanding population and the increasing needs of agriculture.

3.2.2. The urban environment

The current urban proportion of the population is relatively low at only 15 per cent although the annual rate of growth is 5.4 per cent and this rate is likely to rise to 30 per cent by the year 2020. The current stock of urban housing is both insufficient and of very poor quality. About 31 per cent of households in Addis Ababa have no sanitation facilities, while in other urban areas the proportion is about 48 per cent. The serious deficiencies in sanitation services and the inadequacy of sewerage infrastructure and random defecation in urban areas have created dangerous health and environmental problems. Rivers and

streams in the vicinity of Addis Ababa and other large urban centres have become open sewers and are one of the main sources of infections resulting in diarrhoea and other diseases (EPA.Environmental policy, 1997).

3.2.3. Natural and cultural heritage

Ethiopia's rich natural and cultural heritage permeates every facet of daily life and provides a powerful and socially cohesive force in the national consciousness. It can also provide a major attraction for tourists and is an important element in the development of a tourist industry. However, much of this heritage and culture is under threat through neglect, decay, removal or destruction as well as through the less visible and tangible impacts of changing socio-cultural values, foreign ideas and imported technologies (EPA.Environmental policy, 1997).

3.2.4. The Need for a policy on natural resource and the Environment

The Government of the Federal Democratic Republic of Ethiopia (FDRE) has established a macroeconomic policy and strategy framework. Sectoral development policies and strategies have been, or are currently being, formulated (EPA.Environmental policy, 1997). Environmental sustainability is recognized in the constitution and in the national economic policy and strategy as a key prerequisite for lasting success. However, there is as yet no overall comprehensive formulation of cross-sectional and sectoral issues into a policy framework on natural resources and the environment to harmonize these broad directions and guide the sustainable development, use and management of the natural resources and the environment. Therefore, given the current stage of the country's political and policy development, the time is opportune for developing a comprehensive environmental policy on natural resources and the environment (Berhanu.1999).

4. Integrated pollution control

4.1. Integrated approach

An integrated approach to industrial pollution prevention and control has increasingly become the cornerstone of national and regional pollution and waste management strategies. The reason is that it is recognized that no single part of the environment is separate from any another, it functions as a whole. (Nalini, Bhat, 2009). The functional approach of the integrated system is conducted at three levels of prevention, impact management and remediation. The source-based controls are used to control the generation and discharge of waste. Controlling waste discharge at source supports the management of the receiving environment. In some instances, source-based controls can be extended to prevent waste production altogether. In order to achieve sustainable development, the historical focus on pollution impact management and remediation should shift to a management approach, combining pollution and waste prevention and minimization at source, impact management and, as a last resort, remediation (FDRE.Guideline on integrated pollution control, 2004).

4.2. Techniques of integrated pollution control

1) 4.2.1. The Best available technique

Best Available Techniques (BAT) is a new concept that has evolved in the context of IPPC, replacing Best Available Technology. It forms the basis for setting emission limit values. Under IPPC approach, BAT application is a major tool for actually protecting the environment as a whole and, therefore, BAT is becoming another key provision and demanding requirement for a number of countries in terms of definition, standard setting, enforcement and implementation of IPPC programs.

Best Available Techniques can be defined as the most effective and advanced stage in the development of activities and their methods of operation, which

indicate the practical suitability of particular techniques for a given operational context. BAT in principle provides the basis for emission limit values designed to prevent and, where that is not practicable, generally to reduce emissions and the impact on the environment as a whole (FDRE .Guide lines on Integrated pollution control, 2004). BAT is essentially a combination of the following three concepts: **techniques, available and best. Techniques** shall include both the technology used and the way in which the installation is designed, built, maintained, operated and decommissioned.

Available techniques shall mean those developed on a scale, which allows implementation in the relevant industrial sector under economically and technically viable conditions. This takes into consideration the costs and advantages, whether or not the techniques are used or produced inside the country in question and if they are reasonably accessible to the operator, **best** shall mean .most-effective. in terms of achieving a higher resource efficiency and higher level of protection of the environment as a whole (Nalini, Bhat, 2009).

5. Biodiversity conservation

5.1. Biodiversity status, trends and threats

The rich biodiversity of the country is under serious threat from deforestation and land degradation, overexploitation, overgrazing, habitat loss, invasive species and some water pollution. The underlying causes for these problems emanate from poverty, population growth, lack of alternative livelihoods, inadequate policy support, inappropriate investment and inadequacy of law enforcement. A number of endemic wild animals, birds, trees and herbaceous plants are reported to be endangered or critically endangered. Farmer's varieties are being replaced by uniform improved varieties, and livestock breeds are also similarly threatened through cross-breeding with exotic breeds. Resettlements and agricultural

investment in commercial crop farms are also exerting pressure on the country's precious biodiversity (Australian Museum (AM), (2005)

Efforts to save some of the wildlife and the vegetation by a number of government institutions, NGOs and public-private partnership initiatives are being made and progress is being achieved. To cite some examples, the conservation status of the Walia ibex has improved from being critically endangered to endangered while on sites where area closure has been applied, rehabilitation of the land has occurred and restoration of species which were on the point of local extinction have been reverted (FDRE.NBSAP,2005).

5.2. Implementation of the national biodiversity strategy and action plan (NBSAP)

Cognizant of the problems and in order to discharge its commitment as a signatory to the Convention on Biological Diversity (CBD), Ethiopia has developed a National Biodiversity Strategy and Action Plan (NBSAP). The objectives of this strategy include:

- Conserving representative examples of Ethiopia's remaining ecosystems through a network of effectively managed protected areas;
- Having all remaining natural ecosystems outside of the protected areas under sustainable use and management by 2020;
- Sharing equitably the costs of conserving and benefits from the sustainable use of biodiversity; and
- Conserving the rich agro-biodiversity of Ethiopia effectively through complementing in situ and ex situ conservation programs;

Though the process of preparing the Strategy and Action Plan had been participatory, adequate familiarization of it at the grass-root level, the provision of training and follow-up on whether the stakeholder institutions are using the document as a

roadmap, has not been effectively carried out. The NBSAP is a vital strategic document that should guide biodiversity conservation, sustainable utilization, as well as access and benefit sharing (FDRE.NBSAP, 2005).

5.3. Biodiversity integration and mainstreaming

Sectoral and cross-sectoral integration of concerns for biodiversity is crucial for the effective conservation and sustainable utilization of natural resources. Beyond the sectors that directly deal with biodiversity and environmental issues, there are many other sectors in the country that are supposed to, but that have failed, to integrate biodiversity issues into their strategies and programs. Some of those that have failed include; the health, mining, investment, tourism, and trade and industry sectors. Although many of these sectors are considered as key stakeholders and actors for mainstreaming the NBSAP, their achievements with regard to the integration of concerns for biodiversity are far from adequate (FDRE.NBSAP, 2005).

There is some progress in mainstreaming appreciation of biodiversity which, to some extent, can be attributed to the NBSAP. Some of the regional states (e.g. Southern Nations, Nationalities and People (SNNP) and Tigray Regions) have taken crucial steps towards assigning experts to oversee the conservation of biodiversity.

5.4. Progress towards the 2010 Targets and Implementation of the Strategic Plan

Ethiopia has taken a number of fundamental measures after the ratification of the Convention on Biological Diversity (CBD). The upgrading of the former Plant Genetic Resources Center to the Institute of Biodiversity Conservation (IBC), the development of a National Policy on the Conservation and Research of Biological Resources and a National Biodiversity Strategy and Action Plans (NBSAP), the enactment of

Access and Benefit Sharing, Breeders Rights and the Protection of Indigenous Knowledge laws are manifestations of the country's commitment to the implementation of the Convention (FDRE.NBSAP,2005).Some positive progress has thus been made in the implementation of the Convention, including:

- Improvements in the conservation status and trends of some endemic mammals
- A slight increase in the number and size of protected areas;
- The conclusion of “Access and Benefit Sharing Agreements” for *Eragrostis teff* and *Vernonia galamensis*.
- Field gene banks of endangered forest, medicinal, and forage and pasture plant species have been established and are expanding;
- The implementation of area closures, particularly in northern Ethiopia, resulting in the restoration of some locally extinct fauna and flora; and
- The Ethiopian 3rd Millennium initiative that resulted in the planting of about 1.6 billion tree seedlings in degraded areas and areas designated for Millennium Parks in many localities

6. Solid waste management

6.1. What is solid waste management?

Solid wastes are all the wastes arising from human and animal activities that are normally solid and are discarded as useless or unwanted. The term solid waste as used in this text is all-inclusive, encompassing the heterogeneous mass of throwaways from the urban community as well as the more homogeneous accumulation of agricultural, industrial, and mineral wastes. Problems with the disposal of wastes can be traced from the time when humans first began to congregate in tribes, villages, and communities and the accumulation of wastes became a consequence of life (FDRE. Solid waste management proclamation, 2007).

The relation between public health and improper storage, collection, and disposal of solid wastes is quite clear. Public health authorities have shown that rats, flies, and other disease vectors breed in open dumps, as well as in poorly constructed or poorly maintained housing, in food storage facilities, and in many other places where food and harborage are available for rats and the insects associated with them. Ecological phenomena such as water and air pollution have also been attributed to improper management of solid wastes. For instance, liquid from dumps and poorly engineered land fills has contaminated surface waters from waste dumps may contain toxic elements, such as copper, arsenic, uranium, or it may contaminate water supplies with unwanted salts of calcium and magnesium. Although nature has the capacity to dilute, disperse, degrade, absorb, or otherwise reduce the impact of unwanted residues in the atmosphere, in the waterways, and on the land, ecological imbalances have occurred where the natural assimilative capacity has been exceeded (FEPA. Technical Guide lines on house hold waste management, 2004).

Solid waste management may be defined as the discipline associated with the control of generation, storage, collection, transfer and transport, processing, and disposal of solid wastes in a manner that is in accordance with the best principles of public health, economics, engineering, conservations , and that is also responsive to public attitudes.

The identification of waste management as integral to sustainable urban development is increasingly recognized by the international aid and development community. The United Nations Conference on Environment and Development stressed that ‘...solid waste production should be **minimized**, **reuse** and **recycling**, **maximized**, environmentally sound waste disposal and treatment promoted and waste service coverage extended’. Solid waste management in urban centers of Ethiopia are under the jurisdiction of

Municipal Division of Health, all municipalities (except Addis Ababa) and certified urban centers are mandated by Proc. No. 206 of 1981 to provide, maintain and supervise environmental health services along with their other activities in their municipalities and urban centers. Thus, solid wastes management services, are the responsibilities of these municipalities and urban centers (Takele, 2004).

6.2. Scope of solid waste management

According to Takele(2004) solid waste management includes all administrative, financial, legal, planning, and engineering functions involved in solution to all problems of solid wastes. The solutions may involve complex interdisciplinary relationships among such fields as political science, city and regional planning, geography, economics, public health sociology, demography, communications, and conservation, as well as engineering and material science. Successful solid waste management is rarely achieved without thought, effort and much learning from mistakes. The preparation and management of a good solid waste management system needs inputs from a range of disciplines, and careful consideration of local conditions.

6.3. Risks and problems associated with solid wastes

If solid wastes are not managed properly, there are many negative impacts that may result.

Some of the most important are mentioned in the following list:

- Uncollected wastes often end up in drains, causing blockages which result in flooding and unsanitary conditions.
- Flies breed in some constituents of solid wastes, and flies are very effective vectors that spread disease.
- Mosquitoes breed in blocked drains and in rainwater that is retained in discarded cans, tires and other objects. Mosquitoes spread disease, including malaria and dengue.

- The open burning of waste causes air pollution; the products of combustion include dioxins which are particularly hazardous.
- Uncollected waste degrades the urban environment, discouraging efforts to keep streets and open spaces in a clean and attractive condition. Solid waste management is a clear indicator of the effectiveness of a municipal administration - if the provision of this service is inadequate large numbers of citizens (voters) are aware of it. Plastic bags are a particular aesthetic nuisance and they cause the death of grazing animals which eat them.
- Waste collection workers face particular occupational hazards, including strains from lifting, injuries from sharp objects and traffic accidents.
- Methane (one of the main components of landfill gas) is much more effective than carbon dioxide as a greenhouse gas, leading to climate change (FEPA. Technical guide lines on house hold waste management, 2004).

6.4. Policy and programme matrix on solid waste management

Most local governments and urban agencies have, time and again, identified solid waste as a major problem that has reached proportions requiring drastic measures. Three key trends observed with respect to solid waste are - increase in sheer volume of waste generated by urban residents; change in the quality or make-up of waste generated; and the disposal method of waste collected, by land-fill, incineration etc(FDRE. Solid waste management proclamation, 2007).

It is critical to adopt a broad approach in developing a working framework for solid waste management (solid waste management). This covers the **social, economic, technology, political and administrative dimensions**. For example the **social dimension** of solid

waste management involves waste minimization; the economic dimension of solid waste management involves waste recycling; the **technology dimension** of solid waste management involves waste disposal; and the **political and administrative dimensions** cuts across all the three issues of minimization, recycling and disposal waste (FEPA. Technical guide lines on house hold waste management, 2004).

IV. CONCLUSION

Generally the concept of sustainability relates to the maintenance and enhancement of environmental, social and economic resources, in order to meet the needs of current and future generations. Environmental sustainability requires that natural capital of the environment remains intact. This means that the source and sink functions of the environment should not be degraded. Therefore, the extraction of renewable resources should not exceed the rate at which they are renewed, and the absorptive capacity to the environment to assimilate wastes should not be exceeded. Furthermore, the extraction of non-renewable resources should be minimized and should not exceed agreed minimum strategic levels.

Since in Ethiopia, land degradation, is the most serious environmental problem. Pollution, especially of water is low but increasing fast. Land degradation is caused by combination of natural and anthropogenic factor, the chief among which is the rugged nature of the terrain and removal of the vegetation cover for crop cultivation and for grazing. Consequently the tilling of the land and over grazing have caused number of environmental problem such as soil erosion and the disruption of hydrological cycle exacerbating both flooding in the rain season and desiccation in dry season . How ever, through the time, the need to take environmental consideration into account to ensure successful economic development was increasingly recognized. This realization of the importance of forecasting the

environmental impact development endeavors on the surrounding areas has served as the basis for formulation of appropriate law, policies and governmental institution to manage and protect environment of the country.

Environmental sustainability programs include actions to reduce the use of physical resources, the adoption of a 'recycle everything/buy recycled' approach, the use of renewable rather than depletable resources, the redesign of production processes and products to eliminate the production of toxic materials, and the protection and restoration of natural habitats and environments valued for their livability or beauty. Ensuring the sustainability of environmental resources may require links to other levels of decision-making and spatial scales. These links may be drawn through formulation of environmental management and planning at other levels and spatial scales. The formulation of national Environmental Impact Assessments, Environmental policy, Biodiversity conservation strategy, Solid waste management and integrated pollution control Risk, Assessments Environmental Management systems, sectoral plans and monitoring programmes are the most promising way to make a better understanding of how environmental, social and economic considerations fit together.

V. RECOMMENDATION

Poor people in developing countries (Ethiopia) often depend more directly on natural resources than any other group in society. These have caused number of environmental problem such as soil erosion and the disruption of hydrological cycle exacerbating both flooding in the rain season and desiccation in dry season. Therefore to ensure the sustainability of the environment the following measures are recommended as the way forward:

- We must consider the environment when making decisions, just as we consider economic and social issues.
- Utmost efforts should be exerted to bridge the gap between the strategy document and its implementation.
- Further research should be conducted on a range of related issues, including the need for appropriate feed stocks for different agro-ecological conditions.
- The lack of coordination among the relevant government bodies should be rectified as soon as possible
- Initiation of community participation, NGO and other stake holder in environmental protection should be made to ensure sustainability of the environment.

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