

The role of Environmental Impact Assessment for sustainable development

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Abstract

An Environmental Impact Assessment (EIA) study was conducted in Ethiopia to assess the environmental and social impacts of a planned floriculture project. The aim of the project was to grow and export good quality flowers. The proposed site is located about 16 km from Bahir Dar city, Amhara region, Ethiopia. The study was conducted in three-phases. In phase one the existing project documents and different proclamations, regulations and conventions related to EIA were assessed. In the second phase biophysical and socio-economic data was collected from the proposed project area and its surrounding. In addition the opinion of the wider community and the stakeholders was gathered through discussion. In the third phase, the data were analyzed using quantitative and qualitative techniques and interpreted based on available standards and legal requirements. The study showed that the project has a number of potentially positive impacts such as, high income tax, job opportunities, introduction of modern technology, etc. However, there are potentially negative impacts including, water resource depletion, water pollution, soil degradation, human health problems, emergence of new pests and improper waste disposal. Water resource depletion was found to be the most serious problem as the flower farm requires high amounts of water and the ground water potential of the surrounding area is below the required amount. The local community uses the surface and ground water for small scale irrigation and for their cattle, resulting in potential conflicts. The EIA study suggested that an alternative site should be identified to implement the project at full scale or reduce its size so as to make the project sustainable at the proposed site.

Key words: EIA, planned floriculture project, potential impacts, sustainable development

1. Introduction

Environmental concern has become one of the major global issue that affects all nations individually and/or collectively (Garg 2006). Cognizant of this the Ethiopian government has set environmental policies, laws and regulations, and administrative frameworks requiring environmental assessment prior to the launching of any investment and development activity in the country (EPA 2012). The government of Ethiopia has also set up a regulatory body - the Environmental Protection Authority (EPA) of Ethiopia. This agency is mandated to predict and manage the environmental impacts that may be caused by any investment activity as a result of its construction, operations, or an ongoing modification or termination, and thereby helps to promote the proposed development.

In Ethiopia, agriculture is the backbone of the country's economy and the foundation for the economic welfare of the population. The current government of the country has given special emphasis to the contribution of private investment in agricultural development such as in modern flower farm, crop production, and fruit and vegetables productions which have a significant ripple effect throughout the economy. Proclamation No. 280/2002 (Re-Enactment of the

Investment Proclamation), and Council of Ministers Regulations No. 84/2003 encourage both local and foreign investors to actively participate in this strategy. The rapidly increasing demand in developed countries has made flowers the best of exportable commodities. Ethiopia has fairly constant climate that allows farming throughout the entire year. In addition, its accessibility to the European, Asian and Middle East markets, gives the country a huge potential to supply high quality flowers to the world. Cognizant of these advantages, several investors are committed to engage in the sector and to produce highest quality cut flowers for domestic and export market.

In the past, development endeavors have not considered environmental issues in the evaluation of development projects. Decision-making about implementation of development projects was merely focused on short-term technical feasibility and economic benefits. This negligence and unwise utilization of the natural resources resulted in degradation of the environment and scarcity of the resources (Adohinzin et al. 2010, Joshi et al.2007, Garg 2006, Katyal 2001). The trend toward natural resource and environmental degradation stimulated the concept of sustainable development. According to the World Commission of the Environment and Development (1987) sustainable development is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It encompasses three pillars namely: economy, environment and society. The social pillar refers to meeting the basic needs of society, the economic component refers to efficiently managing the economy to meet material needs and the environmental component is concerned with the conservation and enhancement of the physical and biological resource base and ecosystems (UN DESA 2002).

An assessment of potential impacts on the environment prior to the approval of investment proposals provides a means of harmonizing and integrating the three pillars of sustainable development. Thus EIA, which is the process of identifying, predicting, evaluating and mitigating the biophysical, social, and other relevant effects of development proposals prior to major decisions being taken and commitments made (Wood 2003, IAIA 1999), has become one of the preconditions for permitting investment projects prior to implementation. Therefore this paper aims to show the importance of EIA for sustainable development.

2. Policy, Legal and Administrative framework

The Ethiopian government attempts to integrate environmental concerns in its Development Strategies so as to address sustainable livelihoods of the population within the context of sound environmental management considerations in decision making and project planning (EPA 2012, EPA 2003). To this end it is pertinent to mention the relevant policies and constitutional support in undertaking EIA in Ethiopia.

Constitutional support

The constitution of Ethiopia contains a number of articles, pertinent to environmental issues concerning development projects. The concept of sustainable development and environmental rights are enshrined in Article 43(the Right to Development), Article 44(Environment Rights) and Article 92(Environmental Objective) of the constitution of Ethiopia.

Environmental Policy of Ethiopia

The government of Ethiopia formulated and approved the Environmental policy of the country in 1997 (EPA 2012). The key objective of the policy is to update and suggest corrective measures to remove deficiencies of the previous policies for the environmental protection and conservation. The thrust of Environmental policy in Ethiopia is to achieve sustainable development in agriculture, water resources, and industrial and infrastructure sectors and as a result improve and enhance the quality of life of its citizens. One of the principles that has been relatively easy to agree upon is environmental policy integration, which is the integration of environmental aspects and policy objectives into sector policies (Persson 2004). The policy contains several sectoral and cross-sectoral policies and various guidelines for its implementations.

3. Materials and methods

Project site

The proposed project site, Meshenti, is located about 16 kms from Bahir Dar city, Ethiopia. It covers a total area of 425 hectares. It was completely owned by farmers. Primarily the site was selected and made available by the regional administration, considering its agro-climatic feature to the targeted project and its respective socio-economic to the country.

Approaches of the study

The study consists of three-phases.

Phase one

The project documents and available information and data that describe the most relevant features of the project were collected. This was followed by an intensive review of relevant legal frameworks and guidelines such as the Environmental Impact Assessment Proclamation (proc. No. 299/2002), the Environmental Pollution Control Proclamation (proc.no. 300/2002), Solid Waste Management Proclamation (proc. no. 513/2007), Ethiopian Water Resources Management Regulation (proc.no.115/2005), Labor Proclamation (42/93) and Special Decree for Pesticides Registration (Proc.no.20/1990) and ratified International Agreement including Rotterdam Convention Proclamation (proc. no.278/2002), Basel Convention (proc. no. 357/2002) and Stockholm Convention (POPs,) (proc. No.279/2002). To collect data and design successive phases of studies, checklists were prepared based on the information obtained from the office review and the knowledge obtained from prior engagement in similar projects.

Phase two

After visiting the proposed site, baseline data such as soil and water test data, meteorological and hydrogeological data were collected. Data such as type and sources of planting materials, pesticides and fertilizers, irrigation system, pest management system, drainage system, etc. were also collected. In addition scientific information was gathered on the biophysical and socio-economic conditions of the project area. This came from concerned bodies such as; proponent, Agricultural and Rural Development Bureau, Environmental Protection, Land Administration and Use Authority, Water Resources Development Bureau, Water Supply Office, Social and Labour Affairs Office, Health Bureau, Development Agents, community representatives and Kebele administration.

Phase three

Data were analyzed using quantitative and qualitative techniques and interpreted based on available standards and legal requirements.

4. Environmental impact of the project

Potential environmental impacts could arise during construction and operation phases of the project. The positive impacts of the flower farm project include generating high income tax, creating job opportunities, introducing modern technology, supporting the nearby schools and health centers. The negative impacts could arise mainly during the operation phase of the project. Therefore, based on the nature and size of projects and features of the project's environment the following issues have been identified and analyzed so as to identify the critical issues and to make the project sustainable.

Water resources depletion

The main sources of water for the flower farm are from a nearby stream and ground water. The ground water potential is about 15 L/sec at depth of 65m. According to similar projects ongoing in Ethiopia the water requirement of the flower farm is about 70m³/hectare –day. Thus, the water demand for the flower farm is estimated at 19,390 m³/day, by estimating 277 hectares will be effectively used for flower farm. The flower farm project will extract about 9.19 million m³ of water from the ground annually, which significantly affect the ground water potential of the nearby area. It should be noted that local farmers have practiced traditional well constructions for water supply for irrigation. They also use the nearby streams as sources of drinking water for themselves and their livestock. It is beyond question that when the water resources become scarce particularly during the dry season, there will be conflict between the project and the local people. All of the farmers involved in the focus group discussion stated that they would not voluntarily leave their land whatever the amount of compensation is and the project could be operational if its impact were negligible. Therefore, it is better to reduce the size of the project to implement it within the proposed site.

Water pollution

Water will be stored in service storage by constructing surface ponds at the farm. However, because of reservoir alkalinity, growth of algae and stagnancy of water may occur, which would impact water quality. The project planned to use a drip and furrow irrigation system. Drip irrigation is effective and enables the utilization of about 99% of the water effectively. However, surface irrigation (furrow method) may cause impacts on the ground water and natural drainage ways (Unger 2006). The other possible causes of water pollution are due to the application of fertilizers and pesticides. Frequent application of chemical pesticides can result in a risk of pesticide leaching to ground water and the nearby source of drinking water. During the rainy season pesticides may enter into the nearby water body. When synthetic fertilizers are used in much larger quantities than required, the unused portion may enter and leach into the ground and surface water. The excess amount of phosphate and nitrate may lead to pollution (particularly the nitrate pollution) of ground water and the nearby drinking water source.

In order to protect both ground and surface water from any agricultural related pollutants such as pesticides and fertilizers, there must be sufficient buffering zone; and planting vetiver grass at

the boundary of the farm would serve to filter harmful wastes (Xuhui et al. 2003) and thus minimize the expected impacts.

Soil pollution

At the project site the proponent intends to plant a single species of flower. This monoculture will result in depletion of the macro nutrients (nitrogen, phosphorous and potassium). Therefore to improve the fertility of the soil they will apply about 140 quintals/year of synthetic chemical fertilizers for the first five years. When these synthetic fertilizers are used in much larger quantities than what are actually required, the unused portion can cause soil acidification and change in biological and physical soil properties due to heavy use of nitrogen. The project planned to use furrow irrigation which is not effective and thus may pollute the soil by making it saline, and in extreme cases, alkaline. To control pests the project intends to use chemical pesticides which may kill beneficial micro-organisms dwelling in the soil.

Impacts on human health

Agricultural fertilizers and pesticides are hazardous, in certain circumstances, to human health especially on those who are engaged in application. The effect of fertilizers includes dust exposure and ingesting of nitrate which causes gastric and bladder esophageal cancer. The effects of pesticides on human beings are headache, irritability, dizziness, loss of appetite, nausea, muscle twitching, convulsion and loss of consciousness, carcinogenic effects, neurobehavioral effect, reproductive effects and diabetes. The nearby farmers depend on ground water from wells for their daily life. Therefore, frequent application of chemical pesticides will result in increased risk of pesticide leaching to the sources of water or may result in odour and thus affect the quality of life of the community.

Outbreak of pests and diseases

Frequent applications of chemical pesticides can result in emergence of new and/or more resistant pests. Insect pests, pathogens, and weed plants will be resistant to some pesticides and create difficulties in controlling related project impacts on surrounding farmers.

Improper solid and liquid waste disposal

The major sources of wastes (solid/liquid) are dead plants, plant residues, containers of used pesticide and chemicals and packaging materials, empty fertilizer bags, damaged green house plastics, garbage from offices, living rooms and canteen, spoil of oil, flushes from the grading hall and human effluents. Workers may simply dispose of such wastes in the nearby area.

5. Discussion

The proposed flower farm project will have significant economic benefits to the region as well as the country as its aim is to produce and export high quality cut flowers. There is no doubt that it will create job opportunities and may introduce modern technology for local farmers. However, there are potential negative impacts which are expected to happen. These include water resource depletion, water pollution, soil degradation, health problem, conflict, emergence of new pests and improper waste disposal. Water resource depletion was found to be the most serious problem and will likely be one of the main causes of conflict. Because of this primary negative impact the EIA study suggests a reduction in the size of the project to make it sustainable.

6. Conclusion

This EIA study identifies both the potential positive and negative impacts of the project in advance. For those negative impacts upon the natural and the socio-economic environment, possible paths/ mitigation measures were identified in advance. This enabled avoidance and/or minimization of impacts and make the project environmentally friendly and acceptable to the nearby community. Therefore EIA was an instrument that facilitated identification of potential impacts and development of mitigation measures to reduce adverse significant impacts and foster sustainable development: Development that does not cost the Earth!

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