



Environmental and Social Impact Assessment Report

Tigray Region Raya Azebo District

Unifruit Ethiopia

Nexus Investment Solution PLC

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CONTENTS

1	Introduction.....	1
1.1	General.....	1
1.2	Objective of the Environmental & Social Impact Assessment Study.....	2
1.3	Approaches and Methodology.....	3
1.3.1	General	3
1.3.2	Collection of Available Information.....	4
1.3.3	Field Survey.....	4
1.3.4	Key Stakeholders Consultations	4
1.3.5	Public Consultations	5
1.3.6	Public Participations	7
1.4	Report Structure.....	8
2	Environmental Scoping	9
2.1	Limits of the Study Area	9
2.2	Concerns of Key Stakeholders.....	10
3	Relevant Policies, Legislative and Institutional Framework	11
3.1	International Conventions.....	11
	<i>II. Convention on Biological Diversity.....</i>	<i>12</i>
	<i>III. Framework Convention on Climate Change</i>	<i>12</i>
	<i>IV. The United Nations Conventions to Combat Desertification</i>	<i>13</i>
	<i>V. The Basel Convention</i>	<i>13</i>

VI. <i>The Stockholm Convention</i>	13
VII. <i>Convention on International Trade in Endangered Species of Fauna and Flora</i>	13
3.2 Economic Development Policies and Strategies	14
a) <i>The National Economic Development Strategy</i>	14
b) <i>The Agriculture Sector Policy and Strategy</i>	14
c) <i>Ethiopian Investment Strategy</i>	15
3.3 Environmental Policies and Strategies.....	16
i. <i>Constitution of the Federal Democratic Republic of Ethiopia</i>	16
ii. <i>The Conservation Strategy of Ethiopia</i>	17
iii. <i>The Environmental Policy of Ethiopia</i>	18
iv. <i>Environmental Impact Assessment Guideline Document</i>	19
3.4 Sectoral Policies and Strategies.....	20
3.5 Legislative Instruments.....	23
1. <i>Environmental Impact Assessment (Proclamation No. 299/2002)</i>	23
2. <i>Environmental Pollution Control (Proclamation No. 300/2002)</i>	25
3. <i>Solid Waste Management (Proclamation No. 513/2007)</i>	25
3.4 Institutional Framework.....	26
3.4.1 National	26
4 Project Description.....	30
4.1 Background to the Project	30
4.1.1 Location & Description	30
4.1.2 Project Goal	33
4.2 Baseline Environment	33
4.2.1 Physical Environment	33

5	Environmental Impacts identification, prediction and analysis.....	42
5.1	Pre-construction Phase Impacts	42
5.2	Construction Phase Impacts.....	42
5.2.1	Removal of vegetation, landscape and land use pattern alteration.....	43
5.2.2	Impact on Air Quality.....	43
5.2.3	Impact on flora and fauna	43
5.2.4	Nuisance Noise	43
5.2.5	Work accident.....	44
5.3	Operation Phase Impacts.....	44
5.3.1	Impact ground water	44
5.3.2	Impacts on soil.....	45
5.3.3	Impacts on terrestrial fauna and flora.....	47
5.3.4	Impacts on Socio Economic Environment	48
5.3.5	Loss of sites of cultural and/or religious values	49
6	Impact mitigation measures	53
6.1	Preconstruction Phase Impacts Mitigation Measures	53
6.1.1	Mitigation Measures for Loss of Grazing land and other Assets.....	53
6.2	Construction Phase Impacts Mitigation Measures	53
6.2.1	Mitigation Measures for Removal of vegetation, landscape and land use pattern alteration.....	53
6.2.2	Mitigation Measures for Impact on Air Quality	54
6.2.3	Mitigation Measures for Impact on flora and fauna	54
6.2.4	Mitigation Measures for Nuisance Noise	54
6.2.5	Mitigation Measures Work accident	55

6.3	Operation Phase Impacts Mitigation Measures	55
6.3.1	Mitigation measures for impacts on water quality	55
6.3.2	Mitigation measures for impacts on soil	56
6.3.3	Mitigation measures for impacts on terrestrial fauna and flora.....	58
6.3.4	Mitigation measures for socioeconomic impacts	58
6.4	Mitigation measure for Pollution from Solid and Liquid waste from packaging plant	61
6.5	Positive Socioeconomic impacts (Expected Benefits).....	62
6.5.1	Creation of Job Opportunity.....	62
6.5.2	Contribution to Food security	62
7	Environmental Management Plan	63
7.1	Pre-Construction Phase.....	63
7.2	Construction Phase	64
7.3	Operational phase.....	65
7.4	Environmental Monitoring Program and Parameters	67
8	Conclusion & Recommendation.....	69
8.1	Conclusions.....	69
8.2	Recommendations	70

List of Tables

Table 4:1 Rainfall Data of 2002 -2011-----	34
Table 4:2 Major crops in the district -----	39
Table 4:3 Livestock resources in the district-----	39
Table 4:4 Number of students by Sex education level -----	41
Table 5:1 Matrix showing the type and magnitude of identified impacts from the project -----	51
Table 7:1: Plan of the monitoring program. -----	68

List of Figures

Figure 1-1: Consultation Mehoni administration -----	5
Figure 1-2: Community Consultation Kara Adishaw PA of Raya Azebo district -----	7
Figure 4-1: Project Location Map-----	32
Figure 5-1: Bushes and Scattered Acacia Vegetation on the site -----	48

1 Introduction

1.1 General

Unifruit Limited (Ethiopia Branch) planned to establish horticultural production farm in Raya Azebo district, Raya Valley, Tigray Regional State with the name FRUITFUL VALLEY. The project is planned to cultivate short term vegetables and fruits such as garlic, onions, pumpkin, butternut and strawberries and also asparagus, raspberries, boysenberries & grapes as long term vegetables and fruits on 1,000 hectares. The farm in its production process, will involve modern development and production methods. It utilizes tractors, ploughs, disc cultivators and planters in the development of the farm. The major of crops to be grown will be predominantly fruits and vegetables that will be exported and some will be supplied to local markets. The company is expected to apply for Global Gap certification in 2012.

The project farm site is located in Tigray Regional State, Southern zone, Raya Azebo district, Kara Adishaw locality, about 662km away from the capital Addis Ababa along Addis-Mekele main asphalt road, and 128km away from the regional capital, Mekele.

The overall objective of the project is to cultivate and supply different fruits and vegetables to the international and domestic markets. Pertinent to the Ethiopian Environmental Impact Assessment (EIA) Proclamation (No. 299/2002) and International Finance Corporation's Guidance on performance Standards on Social & Environmental Sustainability, the company has commissioned Nexus Investment Solution, a consulting firm to conduct a full environmental impact assessment study on the proposed project.

In view of the this, the report is prepared in line with the EIA requirements stipulated in the, International Finance Corporation's Guidance on Performance Standards on Social

& Environmental Sustainability, EIA proclamation of the government of the Federal Democratic Republic of Ethiopia, proclamation No. 299/2002.

The basic purpose of the Environmental and Social Impact Assessment (ESIA) study is to identify, predict and analyze the magnitude of environmental and social impacts and propose enhancement and/or mitigation measures for significant environmental and social effects that are likely to arise from the various activities of the fruit and vegetables farm project during pre-construction, construction and operation phases.

Various ESIA tools for identification, prediction and analysis of impacts were used. Biophysical resources survey, field observation and socioeconomic assessments and utilization of secondary data sources were utilized tools. In addition, national Environmental Impact Assessment Guidelines and International Finance Corporation's Guidance on Performance Standards on Social & Environmental Sustainability were used in identification, prediction and analysis procedures. Significant positive and negative project impacts have been identified. On top of this, environmentally sound and socially acceptable impacts enhancement and management options were also suggested

Public consultations were held with the communities living in the vicinity of the project site, and the outcome of consultations included in the report. During discussions, emphasis was given to public participation and procedures by which their participation could be initiated and promoted from the early planning of the project up to its implementation, monitoring and evaluation.

1.2 Objective of the Environmental & Social Impact Assessment Study

The fundamental objective of the environmental & social impact assessment is to ensure that the proposed fruit and vegetables production project is environmentally sound and socially acceptable, and hence contributes to the development of environmental and social functions of local communities. It is also expected to provide a

means whereby the overall environmental performance and social benefits of the project can be enhanced through:

- Identification of sensitive environmental components likely to be affected by the proposed fruit and vegetables farming,
- Defining positive social and economic benefits local communities can derive from the proposed project implementation,
- Identification, prediction and synthesis of the potential environmental impacts associated with the project implementation and;
- Designing subsequent operation, and preparation of plans and recommendations regarding measures that will minimize adverse impacts and enhance beneficial impacts.

1.3 Approaches and Methodology

1.3.1 General

The methodology adopted for conducting the environmental and social impact assessment study of Unifruit fruit and vegetables farm project follows the conventional methods that meet the requirements of the Federal and Regional Environmental Protection Organs' Environmental Impact Assessment Guidelines as well as International Finance Corporation's Performance on Social and Environmental Sustainability Standards. The collection of primary data, baseline information and secondary data on environment and social components, relevant documents and literature sources, desktop study, impact analysis, choosing mitigation and enhancement measures using different optimization tools and developing environmental protection, monitoring and management plans were made. Focus groups discussions, meetings, questionnaires and interviews were common techniques by which local community consultations conducted.

1.3.2 Collection of Available Information

The consultant collected and reviewed published national and regional state policies, legislatives, regulations and guidelines as well as international conventions and protocols ratified by the Federal Democratic Republic of Ethiopia (FDRE), Central Statistical Authority (CSA) Census Reports and Performance Standard on social and environmental sustainability documents.

The existing environmental and socio-economic data were also gathered from relevant sources at Raya Azebo district. Primary data and information on the study area were collected using different tools and techniques including household questionnaires, focus groups interviews, local community representatives' consultations, checklists and matrices appropriate for this project.

1.3.3 Field Survey

Site visits were made from October 10 - 16, 2011 to assess the baseline environmental and social conditions of the proposed project; to define impacted areas and identify environmental and socio-economic components that are likely to be significantly affected by the proposed project. During field survey, basic data and information on the biophysical resources, socio-economic as well as historical and cultural sites have been collected.

1.3.4 Key Stakeholders Consultations

Discussions with decision making bodies, key stakeholders, sector institutions and area specialist experts were made on the very concepts and nature of the proposed project and the importance of fruit and vegetables cultivation, giving emphasis on levels of public participation, role of key stakeholders and joint contributions of these actors to the success of the project. In addition, the scope of the proposed project and possible means of maximizing local communities' social, economic and environmental benefits from the project implementation were underlined.

Key stakeholders and authorities with whom consultations made at the project study areas were Raya Azebo district administrators and cabinet members. The offices

consulted were Agriculture and Rural Development Office, Health Office, Finance and Economic development office and Land and Environmental Protection Office of Raya Azebo district. Similar discussions and consultations were also conducted with Tigray Region, Investment promoting & supporting team to air their issues of concerns on the project in relation to people who derive their means of subsistence and income from resources available at the project site and anticipated project impacts on local communities.



Figure 1-1: Consultation Mehoni administration

1.3.5 Public Consultations

Public Consultation was undertaken in two phases, one during identifying social and environmental issues (scoping) and the other during impacts assessment study. During the impact assessment, individuals and group community members were interviewed and consulted on the project social, economic and environmental impacts. Local communities' consultation meeting was conducted in Raya Azebo district administration premises as part of the EIA methodological process. The participants in the discussions

were represented from all the local farming communities that are found in Raya Azebo district. Community participants were represented from the Peasant Associations surrounding the project.

The consultation discussion involved those local communities who directly affected by the project implementation. The participants were community elders, locality representatives and youth group members in the target communities. The meeting was used by the participants to air their issues of concern in relation to the proposed development project. Following the consultation meeting, an agreement was reached on the issues of the community and their opinions and ideas were incorporated in the statement report.





Figure 1-2: Community Consultation Kara Adishaw PA of Raya Azebo district

1.3.6 Public Participations

The proposed fruit and vegetables production project is modern irrigation mechanized farm project. The existence and success of this project strongly tied with strong participations of local communities through all the project life cycles from planning, implementation to progress evaluation. Accordingly, public participations and level of participations were underlined at the initial environmental examination (scoping), and emphasis given to lay down detail procedures of local communities' participation during impacts assessment study period.

Accordingly, discussions were conducted with local community to gather their opinions and views on public participations in general and local community in particular with regard to the fruit and vegetables cultivation.

The participants in the discussions were represented from local communities living in the vicinity of the project site (Raya Azebo districts and specifically Kara Adishaw locality). The communities were represented with participants and one day meeting was held. Similarly, consecutive meeting and discussions were held with other local key stakeholders from the districts' administration offices and sector bureaus on procedures of initiating and promoting local community participations in the project implementation and responsibilities of key stakeholders to promote and enhance public participations. Representatives from local community and key stakeholders will regularly discuss on the project's overall benefits and impacts on socioeconomic aspects of the area. Accordingly, quarterly meeting will be arranged on which the project proponent, key sectoral stakeholders and representatives from the local community discuss on benefits and impacts of the project to ensure project's sustainability and maximize its socio-economic and environmental benefits.

1.4 Report Structure

The main body of the ESIA report is structured under 8 sections. The first section deals with the introduction part; Section 2 discusses about the initial environmental examination and scoping; Section 3 reviews the policy, legal and institutional frameworks that are relevant to the project under consideration. This is followed by the description of the project, which is presented under section 4. The description of the existing baseline environmental and social conditions is covered under section 5. This section deals with the bio-physical, socio-economic and cultural resources.

Section 6 is the section that covers the environmental and social impact assessment and proposed mitigation/enhancement measures. Under this section, the potential positive and negative impacts as well as their enhancement/mitigation measures are covered. Section 7 of the report presents Environmental Management Plan for the implementation of the mitigation measures and the proposed Environmental Monitoring Program. In the last section; section 8 of the report, conclusive remarks and recommendations are highlighted under the conclusion and recommendation section.

2 Environmental Scoping

In the aim of defining the limits of the study area for the project and drawing lists of activities and impacts to be studied during the assessment, the Consultant carried out an initial environmental examination and scoping.

The scoping exercise has been carried out with the following main objectives:

- To define the limits of the study area,
- To define list of Valued Ecosystem Components within the study area,
- To define lists of activities, type and magnitude of the proposed project, and
- To assess and include views and concerns of key stakeholders on the scope of ESIA study.

In order to carry out the above tasks, the Consultant employed different tools and techniques relevant to the proposed project like using environmental scoping checklists, consultations with different stakeholders (including experts, project affected communities, local administrators and sector institutions, etc) and informal discussions and talks with prominent individuals, local elders, women groups and general public in the project area.

2.1 Limits of the Study Area

The Environmental and Social Impact Assessment study is conducted for those areas that would be influenced or impacted by the fruit and vegetables production project implementation. The project site is defined as the fruit and vegetables areas located in the Raya Azebo district on 1000ha of land. The study also considers peasant association surrounding the project area which could be directly or indirectly affected by the implementation of the project.

2.2 Concerns of Key Stakeholders

Views and concerns of key stakeholders were assessed in Raya Azebo district with special emphasis to communities around the project which probably affected directly or indirectly by the project. The stakeholders' concerns in the implementation of the project are about ensuring community participation, employment opportunity priority for unemployed local community, assisting local community with supply of electric power and water for home consumption and irrigation to ensure sustainability of the project.

3 Relevant Policies, Legislative and Institutional Framework

This section covers the policy, legislative and institutional issues that are most relevant to agricultural projects in general and the fruit and vegetables project in particular. The first part this discussion looks at the national economic development policies and strategies. The second section deals with sectoral policies and strategies related to the project. The third part focuses on existing environmental policies and strategies at the national and international levels. Finally, the fourth section presents the existing institutional framework for environmental protection and management.

3.1 International Conventions

In addition to national environmental legislations, the federal democratic republic of Ethiopia is also a party to a number of regional and international conventions and protocols on environment. The government has established an Environmental Protection Authority, and this Authority is designated as focal point for the implementation of these conventions and protocols.

Accordingly; Article 9(4) of the constitution of the Federal Democratic Republic of Ethiopia provides that once an international agreement is ratified through the accepted or established procedure, it automatically becomes an integral part of the law of the land. Consequently, the convention and the protocol are the laws of this land. Therefore; the following international conventions and protocols are relevant to the proposed fruit and vegetables production project.

I. International Finance Corporation's (IFC) Guidance on Performance Standards on Social & Environmental Sustainability

These Guidance Notes offer helpful guidance on the requirements contained in the Performance Standards, including reference materials, and on good sustainability practices to improve project performance.

IFC expects that each client will employ methods best suited to its business to meet the requirements of the Performance Standards. In assisting the client to meet the Performance Standards, IFC will take into account variables such as host country context, the scale and complexity of project impacts, and the associated cost-benefit considerations, as well as those of project performance beyond the level required in the Performance Standards.

II. Convention on Biological Diversity

The convention on biological diversity has three goals. These are:

- Conservation of biodiversity;
- Sustainable use of the components of biodiversity; and
- Fair and equitable sharing of the benefits arising from the use of genetic resources.

The convention was ratified by Ethiopia through proclamation No.98/94 on May 31, 1994.

III. Framework Convention on Climate Change

Ethiopia ratified this convention through proclamation No. 97/1994 on May 2/1994. This convention takes into account the fact that climate change has trans-boundary impacts. The basic objective of this convention is to provide for agreed limits on the release of greenhouse gases into the atmosphere so as to prevent the occurrence of

climate change. It also aims to prepare countries to minimize the impact of climate change, should it occur.

IV. The United Nations Conventions to Combat Desertification

The objective of the convention is to combat desertification and mitigate the effects of droughts in countries experiencing serious drought and desertification, particularly in Africa. Ethiopia has ratified the convention through its proclamation No. 80/1997.

V. The Basel Convention

The objective of the Basel convention is to control and regulate the Trans boundary movement of hazardous wastes. The Bamako convention of 1991 plays a similar role at the level of the African continent. Ethiopia ratified the Basel convention through its proclamation No. 357/2002. Its amendment was ratified through proclamation No. 356/2002. The country has also ratified the Bamako convention through proclamation No. 355/2002.

VI. The Stockholm Convention

In the year 2002, Ethiopia fully accepted and ratified the Stockholm convention on persistent organic pollutants by proclamation No. 279/2002 designed to ban the use of persistent organic pollutants. The Environmental protection authority has the full mandate to implement the convention at the national level.

VII. Convention on International Trade in Endangered Species of Fauna and Flora

The objectives of the convention are to control international trade in endangered species and to ensure that international trade in non-endangered species is carried out in a manner which ensures stable markets and economic benefits for the exporting countries as well as to control and regulate illegal trade in such non endangered species, fossils and/ or their derivatives. Ethiopia ratified the convention through proclamation No.14/1970. The mandate to implement the convention at federal level is the responsibility of the Ethiopian wildlife protection and development organization.

3.2 Economic Development Policies and Strategies

a) *The National Economic Development Strategy*

The guiding strategy under the National Economic Development is known as the 'Agricultural Development Led Industrialization' (ADLI). This strategy further developed into sectoral strategies that include Agriculture, Industry, Mining, Population growth, technological progress, Economic and Social infrastructure, etc. The following can be identified as the core elements of the agro-industrial development strategy component of ADLI (MoPED, 1993).

- The promotion of labor intensive technologies and utilization of domestic raw materials,
- Determination of the composition of industrial output based on the needs and income levels of the population, and
- Government intervention to motivate the choice of labor intensive technology that makes extensive use of domestic raw materials.

ADLI has provided that basis for the development of the other national and sectoral policies and strategies that have direct relevance to the development of export oriented agriculture in the country.

b) *The Agriculture Sector Policy and Strategy*

The policy objectives are:

- to substantially enhance the production and productivity of agricultural sector for improvement of the living conditions of the people,
- to conserve and rational utilization of natural resource for sustainable agricultural development,
- Policy elements on crop protection focus on non –migratory and Migratory pests.
- The policy statements include:

- Importation and handing over of crop protection technologies should be based on testing their effectiveness,
- spraying pesticides considered as effective control of Migratory pests,
- the need for the establishment of plant quarantine system to prevent intrusion of exotic pests or move out of the country,
- Development of pesticide registration and control system, etc.

c) Ethiopian Investment Strategy

There had been a number of investment proclamation and regulations issued by successive governments as the country started to move away from 'centralized economy' to 'mixed economy' (since 1992). These policy issues influence the project in different aspects.

Above all; the following two documents that constitute the building blocks of the current Ethiopian investment strategy, directly affect investment in the country in general.

Proclamation No.37/1996: Investment proclamation of the federal Democratic Republic of Ethiopia,

Proclamation of Ministers Regulation No. 7/1996: Council of Ministers regulations to provide for investment Incentives.

According to the Investment Proclamation No.37/1996, the objective of the investment policy of the federal Democratic Republic of Ethiopia (FDRE) are designed to improve the living standard of the peoples of Ethiopia through the realization of sustainable economic and social development. Article 13 of the proclamation specifies the required information for submitting an application for investment permit. The first sub article under article 14, prescribes the procedure for issuance of investment permit, stating the following:

Upon receiving an application for investment permit made in full compliance with the provisions of Article 13 of this proclamation, and after ascertaining within 10 days that the included investment activity would not be contravening the operational laws of the

country and that, in particular, it complies with conditions stipulated in environmental protection laws, the appropriate investment organ shall issue an investment permit to the applicant.

The Council of Ministers regulation No. 7/1996 provides the terms and conditions under which investment incentives provided for investors. The investment incentive is divided into the following two categories: exemption from income tax and exemption from customs duty on imported machinery and equipment. The exemption from income tax is based on the following two criteria. The first criterion is the class of the investment as pioneer investment, promoted investment, or expansion and upgrading of existing investment. The second criterion is the location of the investment with respect to its potential contribution to equitable distribution of regional development.

In 1998, the government of FDRE issued the following proclamation and regulations with the objective of amending the investment proclamation and regulation issued in 1996. Regulation No. 116/1998: A proclamation to amend the investment proclamation, Proclamation No. 35/1998: Council of Ministers Regulations on Investment Areas Reserved for Domestic Investors, and Regulation No. 36/1998: Council of Ministers Regulations to Amend the Investment Incentives Regulations.

3.3 Environmental Policies and Strategies

i. Constitution of the Federal Democratic Republic of Ethiopia

The Constitution is the supreme law of the country, whose provisions all other policies, regulations and institutional frameworks must comply with. The Constitution of the FDRE (Proclamation No. 1/1995 as amended) is the foundation for human rights, and natural resources and environmental management. The Constitution states that:

- Government and all Ethiopian citizens shall have the duty to protect the country's environment and natural resources,
- Design and implementation of programs and projects of development shall not damage or destroy the environment,

- The People have the right to full consultation and expression of views in the planning and implementation of environment policies and projects that affect them directly.

The concepts of sustainable development and environmental rights are enshrined in the Constitution of the FDRE. Article 44 of the revised Constitution of the FDRE states that all persons who have been displaced or whose livelihood has been adversely affected because of state programs have the right to commensurate monetary or alternative means of compensation, including relocation with adequate state assistance. However, the compensation does not take into account the value of land.

ii. The Conservation Strategy of Ethiopia

The major environmental and natural resources management issues facing Ethiopia are well documented in the Conservation Strategy of Ethiopia (FDRE, 1997). The CSE sets out detailed strategies and action plans as well as the institutional arrangements required for the implementation of sectoral as well as cross-sectoral interventions for the management of Ethiopia's natural, man-made and cultural resources. The CSE provides a strategic framework detailing principles, guidelines and strategies for the effective management of the environment. The most important areas that are considered in the document include the following:

- Improvement of soils, crop and animal husbandry for sustainable agricultural production.
- Management of forest and woodland resources.
- Development of water resources for irrigation, hydroelectricity and water supply.
- Rangeland management and pastoral development.
- Promotion of individual participation in sustainable development of natural, artificial and cultural resources, and environmental protection.

- Land resource use policy and strategies; physical land use planning.
- Integration of social, cultural and gender issues in sustainable resources and environmental management.
- Development of environmental education, public awareness and human resources.

iii. The Environmental Policy of Ethiopia

The major policy framework document with respect to environmental management of Ethiopia is the Environmental Policy (EPE) of the FDRE approved by the Council of Ministers in April 1997. The Policy was prepared under the joint-effort of the Environmental Protection Authority (EPA) and the Environmental Planning Unit (EPU) of the then Ministry of Economic Development and cooperation (MEDaC).

The policy contains elements that imply the importance of main streaming socio-ecologic aspects in development programs. More specifically, there are two cross-sectoral policies components with a mainstreaming effect in the EPE. Article 4.6 of EPE covers different aspects of the importance of incorporating environmental costs and benefits in the development planning process. Under this Article, the initiation of a pilot project on the application of Environmental accounting in Ethiopia was identified as one of the policies directions. Furthermore, Article 4.6 states (EPA 1997, 21):

To explicitly consider in 5-, 10-, and 100- years time perspective the economic costs & benefits to the environment in the planning of all Major Development Programs, projects and activities.

Article 4.9 of EPE covers the policy directive on E1A. The Article contains eleven sub-articles covering different aspects of EIA and the conditions under which EIA must be performed. Article 4.9.g (EPA 1997, 23) provides a provision:

To create a law on EIA process which requires appropriate Environmental Impact Statements and Environmental Audits for private and state development projects.

The sectoral policies of EPE contain policy directions that may ensure the the promotion of sustainable industrial development in the country. More specifically, Article 3.8 of EPE provides policy directions for the control of hazards materials and pollution from industrial waste. This sectoral policy emphasizes the importance of pollution prevention and minimization as the primary approach for pollution control. To this effect, Article 3.6 states (EPA 1997, 15):

To adhere to the precautionary principle of minimizing and where possible preventing discharge of substances and to disallow the discharge when they are likely to be hazardous.

Article 3.8., more specifically (EPA 1997, 16) states:

- To promote waste minimization processes including the efficient recycling of materials wherever possible.

iv. Environmental Impact Assessment Guideline Document

The guide to EIA document that was prepared by EPA provides a background to EIA and environmental management in Ethiopia .In effect the document aims at being a reference material to ensure effective environmental assessment and management practice in Ethiopia for all parties who engage in the process. The basic objectives of the guide are:

- Providing all interested parties with a consistent approach in EIA
- Providing background information for the context of EIA in Ethiopia
- Assisting proponents in identifying their EIA responsibility
- Assisting communities and NGO groups in realizing their environmental rights with regard to EIA
- Assisting the authority in determining their roles and responsibility as decision makers in the EIA process: and

- Assisting in decision-making with regard to cost and benefits of proposed development projects.

3.4 Sectoral Policies and Strategies

A. Water Resources Management Policy and Strategies

Water resources management and administration in the country should be based on Ethiopia's Water Resource Management Policy and the water resources laws of the country as indicated in Proclamation No. 197/2000. MoWR is entrusted with broad powers of "planning, management, utilization administration and protection of water resources". This includes promoting the implementation of medium and large multipurpose dam projects. According to Proclamation No. 197/2000, MoWR's duties include inventory of water resources, allocation of water resources, establishment of standards for design and construction of waterworks, issuance of guidelines and directives for the prevention of water resources pollution as well as water quality and health standards, establishment of water users' associations, and settlement of disputes. Water Resource Utilization Proclamation No. 92/2002 is another important proclamation put in place with a view to proper management of the country's water resources.

B. National Rural Land Administration and Use (Proclamation No. 456/2005)

The Rural Land Administration and Use Proclamation (Proclamation No. 456/2005) defines the state ownership of rural land and the tenure rights of the land occupant, including rights to "property produced on his land", rights of inter-generational tenure transfer, and rights of exchange land and limited leasing rights. Provisions are made for the registration and certification of tenure rights. Part three of the proclamation presents regulations relating to the use of rural land, particularly as it relates to soil and water conservation and watershed management. The rural land administration and land use laws are to be implemented by the regional states.

Land holding right gives the right to use the land for agricultural purposes as well as to lease it and, while the right remains in effect, bequeath it to family members, as well as

the right to acquire property thereon, by labour or capital, and to sell, exchange and bequeath the same. The proclamation also addresses environmental concerns, including non-compliance with directives on environmental protection.

An important feature of this proclamation is that it stipulates rural land use and restrictions based on proper land use planning, providing for the proper use of various types of land, such as slopes, gullies and wetlands, as well as the utilization of rural land for villages and social services. In addition, it is envisaged that the proclamation will create a sense of ownership among the vast majority of the rural population and enable them to take initiatives and collectively engage in environmental management activities.

C. Measures Related to Occupational Health Control

Any employer shall ensure the availability of occupational health service to his employees. The use of any machinery or instrument which generates excessive noise is prohibited. Any person who uses such machinery or instruments shall install noise reducing apparatus or instrument.

D. Proclamations No. 42/1993 Labor Proclamation

The proclamation stipulates that an employer shall take the necessary measures to safeguard adequately the health and safety of the workers; he shall in particular:

- Comply with the occupational health and safety requirements provided for in this proclamation,
- Take appropriate pre-cautions to ensure that all the processes of work shall not be a source or cause of physical, chemical, biological, agronomical damages.

E. Special Decree No, 20/1990 Council of State Special Decree to Provide for the Registration and Control of Pesticide

In the preamble it is states that the purpose of the proclamation is to make it possible to minimize, to the extent reliable, the adverse effects that utilization of pesticides might cause to human beings, animals, plants and the environment.

According to the this proclamation, any substance, mixtures thereof or a living organism intended for use in preventing, destroying or controlling any pest; the following in particular is termed as "pesticide":

- unwanted species of plants or animals causing harm during, or otherwise interfering with, the production, processing, storage, transport or marketing of food commodities, agricultural produces, wood and wood products or animal feedstuffs;
- insects or other pests in or on the bodies of animals and causing harm to their health
- vectors of human and animal disease: it also includes substances or mixtures thereof intended for use as a plant-growth regulator, defoliant, desiccant or agent for thinning fruit or preventing the premature fall of fruit and substances applied to crops, either before or after harvest, to protect the commodity form deterioration during storage or transport.

The proclamation prohibits;

- The manufacture, import, sells or use of pesticide not registered in accordance with this special decree,
- The import, storage, transport or offer for sale of pesticides where not packed or labeled as provided in this special decree and directives issued hereunder.
- Authorization of registration is granted if the pesticide is used or handled according to the instructions contained in its proposed label, would constitute a risk to human beings, animals and the environment of such a minimal extent or degree as to be outweighed by the necessity or advantages of using it.

F. National Biodiversity Policy and Strategies

The National Biodiversity Policy (NBP) was established in 1998 based on a holistic ecosystem approach to conserve, develop and utilize the country's biodiversity resources. Integration of biodiversity conservation and development in federal and regional sectoral development initiatives, and mobilization of international cooperation

and assistance, have been identified as the principal strategies for implementation of the policy.

The policy provides for guidance towards effective conservation, rational development and sustainable utilization of the country's biodiversity, and contains comprehensive policy provisions for the conservation and sustainable utilization of biodiversity. Protection of biodiversity-related traditional indigenous knowledge and communities' benefit sharing arrangements are not yet effective. Similarly, the potential of biodiversity-related opportunities has not yet been exploited to enhance sustainable livelihood to the desired level. However, there is a general understanding with respect to changing the management approach in order to bring about the desired benefits.

Wetlands are considered among the most productive type of ecosystem in the world, providing benefits far in excess of those obtained from alternative uses to which they are subjected. Ethiopia is endowed with vast wetlands, including a tract in the project area; however, efforts towards their conservation and sustainable utilization are very limited, and no clear policy and legislative framework have been designed. The EPA and Ethiopian Wildlife & Natural History Society (EWNHS), in collaboration with Ramsar Bureau and other funding organizations, are focusing efforts in this direction, and have conducted successful workshops and awareness raising programs.

3.5 Legislative Instruments

The Federal Government of Ethiopia is in the process of passing number of proclamations that are aimed at providing the legislative instruments for the implementation of the national environmental policy objectives and strategies. The following environmental protection proclamations were enacted by the council of Representative of FDRE.

1. *Environnemental Impact Assessment (Proclamation No. 299/2002)*

This Proclamation (No 299/2002) aims primarily at making the EIA mandatory for categories of projects specified under a directive issued by the EPA. The law specifies the projects and activities that will require an environmental impact assessment (EIA).

The proponent of the project must prepare the EIA following the format specified in the legislation. The EPA will then review the EIA and either approve the project (with or without conditions) or reject it. Under this legislation, the EPA has to prepare procedures, regulations, environmental guidelines and standards for the EIA. Environmental guidelines are among the tools for facilitating the consideration of environmental issues and principles of sustainable development and their inclusion in development proposals. The Proclamation requires, among other things:

- Specified categories of projects to be subjected to an EIA and receive an authorization from the EPA or the relevant regional environmental agency prior to commencing implementation of the project.
- Licensing agencies to ensure that the requisite authorization has been duly received prior to issuing an investment permit, a trade or operating license or a work permit to a business organization.

The EPA or the relevant regional environmental agencies may issue an exemption from carrying out an EIA in projects with an insignificant environmental impact.

A licensing agency may suspend or cancel a license that has already been issued where the EPA or the relevant regional environmental agency suspends or cancels environmental authorization.

Procedures that need to be followed in the process of conducting an environmental impact assessment are described in the Proclamation. Thus, a project developer is expected to act as follows:

- Undertake a timely environmental impact assessment, identifying the likely adverse impacts, incorporating the means of their prevention, and submitting the environmental impact study report accompanied by the necessary documents to the EPA or the relevant regional environmental agency.

- Ensure that an environmental impact assessment is conducted and an environmental impact study report is prepared by an expert who meets the requirements set forth by the directive issued by the EPA.
- Submit an environmental impact study report to the EPA or the relevant regional environmental agency for review.

2. *Environnemental Pollution Control (Proclamation No. 300/2002)*

Proclamation No. 300/2002 on Environmental Pollution Control primarily aims to ensure the right of citizens to a healthy environment and to impose obligations to protect the environment of the country. The law addresses the management of hazardous waste; establishment of environmental quality standards for air, water and soil; and monitoring of pollution. The problem of improper handling of hazardous substances related to activities such as pest management and industrial development are becoming a serious environmental concern. In this connection the Proclamation provides a basis from which the relevant environmental standards applicable to Ethiopia can be developed, while sanctioning violation of these standards as criminally punishable offences.

In order to ensure implementation of environmental standards and related requirements, inspectors belonging to the EPA or the relevant regional environmental agency are empowered by the Proclamation to enter, without prior notice or court order, any land or premises at any time, at their discretion. Such wide powers derive from Ethiopia's serious concern and commitment to protecting the environment from pollution.

3. *Solid Waste Management (Proclamation No. 513/2007)*

Measures related to waste handling and disposal:

- Any person shall collect waste in an especially designated place and in a manner, which does not affect the health of the society.
- No person shall dispose solid, liquid or any other waste in a manner which contaminate the environment or affects the health of the society.

3.4 Institutional Framework

3.4.1 National

a. Proclamation on Institutional Arrangements

This proclamation establishes the EPA as an autonomous Federal agency with the objective of formulating Environmental policies, strategies, legislatives, standards and directives. The proclamation also provides for the establishment of the Environmental council to ensure integration of Environmental concerns with development policies, strategies and plans, as well as coordination among sectors.

The Environmental council is chaired by the prime minister (or his designate) and is composed of the relevant line ministries, heads of other government agencies and representative of trade associations and NGOs. The executive Director of EPA will serve as member and secretary of the environmental Council. Furthermore, the proclamation requires every competent agency to establish or designate its own environmental unit, which shall ensure collaboration with EPA and be responsible to coordinate and follow up that activities of the agency are taking place in harmony with this proclamation and other Environmental requirements.

b. Environmental Protection Council

The proclamation for the establishment of the Environmental protection Authority establishes Environmental protection council to ensure the integration of Environmental concerns with development policies, strategies and plans as well as coordination among sectors. The council is composed of the Ministry of Agriculture, Ministry of Trade and Industry, Ministry of Health, Ministry of Mines and Energy, the commissioner of Science and technology, the Ministry of water resources and the general manager of EPA. An official to be designated by the government chairs the council.

c. Federal Environmental Protection Authority (EPA)

In 1995, the EPA was created by means of the Environmental Protection Authority Establishment Proclamation (Proclamation No. 9/1995). At the same time, an Environmental Protection Council (EPC) was established, with representatives from

most of the federal ministries to supervise the EPA's activities. The Director-General of the EPA was to serve as the Secretary to the Council and the EPA took on the duties previously assigned to the Ministry of Natural Resources Development and Environmental Protection (MoNREP). The mandate and duties of the EPA were subsequently clarified in the Establishment of Environmental Protection Organs Proclamation (Proclamation No. 295/2002).

The EPA is an independent authority, acting outside the main ministerial structures and reporting directly to the prime minister. The federal EPA is the key national level environmental agency, with a mandate to address environmental issues. The environmental legislation gives the EPA powers to fulfill its role, support all federal agencies in establishing environmental units, and develop skills in strategic environmental analysis of policies and public instruments. The EPA is involved in the development of environmental policy and legislation, setting environmental quality standards for air, water and soils, monitoring pollution, establishing EIA procedures and an environmental information system, and undertaking capacity development in relevant agencies to ensure the integration of environmental management in policy development and decision making.

Regional State

The Tigray regional state is one of the nine regional states under the Federal System of the Federal Democratic Republic of Ethiopia. The executive body of regional state is structured under cabinet offices guide by the office of the president and the vice president. When it comes to ESIA, the national provisions indicate the Federal EPA devolves responsibility to the regional environmental offices, especially for projects that fully under the jurisdiction of the regional governments.

Zone

There are five administrative zones in Tigray regional state in which southern zone is one of them. The zone administration is the highest organ and is composed of the offices headed by the cabinet members.

District

Administrative structure of the district is similar all over the country. The District administration is a major decision-making government organ. The District administration has the following duties and responsibilities, among others:

- Implementation of the policies, laws and directives of the state,
- Coordination of the activities of various offices in the District,
- Maintenance of peace and security in the District, directing the police and security forces,
- Planning and implementation of projects,
- Supervision of development programs within the District, and
- Proper use and accounting for the annual budget.

At the district level, the District is the key focus of the government's commitment to decentralized delivery of services. The various departments at District level have specialists who advise Development Agents (DAs) working at the village level. They are called upon to provide inputs and management controls relating to soil and water conservation, small-scale irrigation development, rainwater harvesting, road development, water supply, sanitation and waste management associated with rehabilitated schools and clinics. The District administrations in the direct area of influence of the project include Raya Azebo.

Peasant Associations (PAs)

The PA is the lowest administrative level structure. It generally comprises cabinet member headed by an elected chairman. These PA areas fall partially or fully within the project area. The main responsibilities of the PA administration include preparation of an annual PA development plan; ensuring the collection of land and agricultural income tax; organizing local labour and in-kind contributions for development activities; and resolving conflicts within the community through the social courts. Three representatives from the each PA administration will be drawn to be members of the

District council. The council will assign nine cabinet members for the District Administration. Some of the cabinet members are heads of the District offices.

Community Based Organizations (CBOs)

Similar to the other rural parts of Ethiopia, community based organizations are present with the aim of providing services of one kind or another to the community. Among the notable ones are the farmer's cooperatives, woman's association, youth associations and community Idir associations.

The farmer's cooperative is engaged in facilitating agricultural extension services such as plant/crop protection, provision of fertilizers and distribution of improved seeds. The woman and youth association works in close cooperation with the farmers association they usually work with their respective members in improving their social and economical well being as well as promoting relevant government policies. The community Idir (burial Society) is one of the oldest traditional institutions which are unique to the country. The principal function of these associations is to organize funerals of its deceased members and usually they undertake all responsibilities from feeding the mourners to digging the graves and providing financial and moral support to the families to which death has taken place. And it also creates a loan service to the members in need.

4 Project Description

4.1 Background to the Project

4.1.1 Location & Description

The proposed project is located in Tigray region, southern zone, Raya Azebo district, approximately 662km away from Addis Ababa along Addis-Mekele main asphalt road, 128km away from the regional capital, Mekele, and 18km from zonal capital Maychew. Specifically the project is located in Kara Adishaw peasant association at 14km from district capital Mehoni to the south eastern direction.

The project will be established on 1,000 hectare under modern irrigation and water for irrigation will be drawn from the underground aquifer. Irrigation water utilization will be efficient (sprinkler type) in which it will be supplied in accordance with crop requirement and wastage of irrigation water is so minimal. Buildings for different purposes like pack houses, offices ablution facilities, staff accommodation and production managers' residents will be erected on 3,000 square meters and wastes from these facilities will be collected in septic tanks. The project will create job opportunity for 35-40 permanent and 800 temporary workers mainly from the local community and most of the products will be supplied to foreign markets and some to domestic markets.

Unifruit's production process will utilize modern techniques throughout the growing, harvesting, grading and packing process. To maximize yield potential, there will be a large capital investment into tractors, cultivation, planting and crop protection equipment along with suitable irrigation systems.

Harvesting of the crops will be implemented through the use of hand labor. This will not only provide work for the local communities but provide a far higher harvesting capacity

than investment in harvesting machinery. It will also elevate the potential for product damage and increase the saleable yields along with product quality.

According to the development plan, the farm will develop 260 hectares in the first year. Out of the total of 260 hectares of land used in year one 235.6 ha (90.62%) will be used for exportable vegetable production, 6 ha (2.31%) will be used for trial and nursery plantings, 17.6 ha (6.77%) will be designated for vehicular and machinery access along with shelter belt plantings and 0.8 ha (0.31%) used for pack house and amenities construction.

Year two land use, a further 260 ha will include the planting out of seedlings from the nursery for the permanent crops along with other short term crops and an increase in the nursery. Year three and beyond will be a repetition of year two excluding the increase to the nursery area.

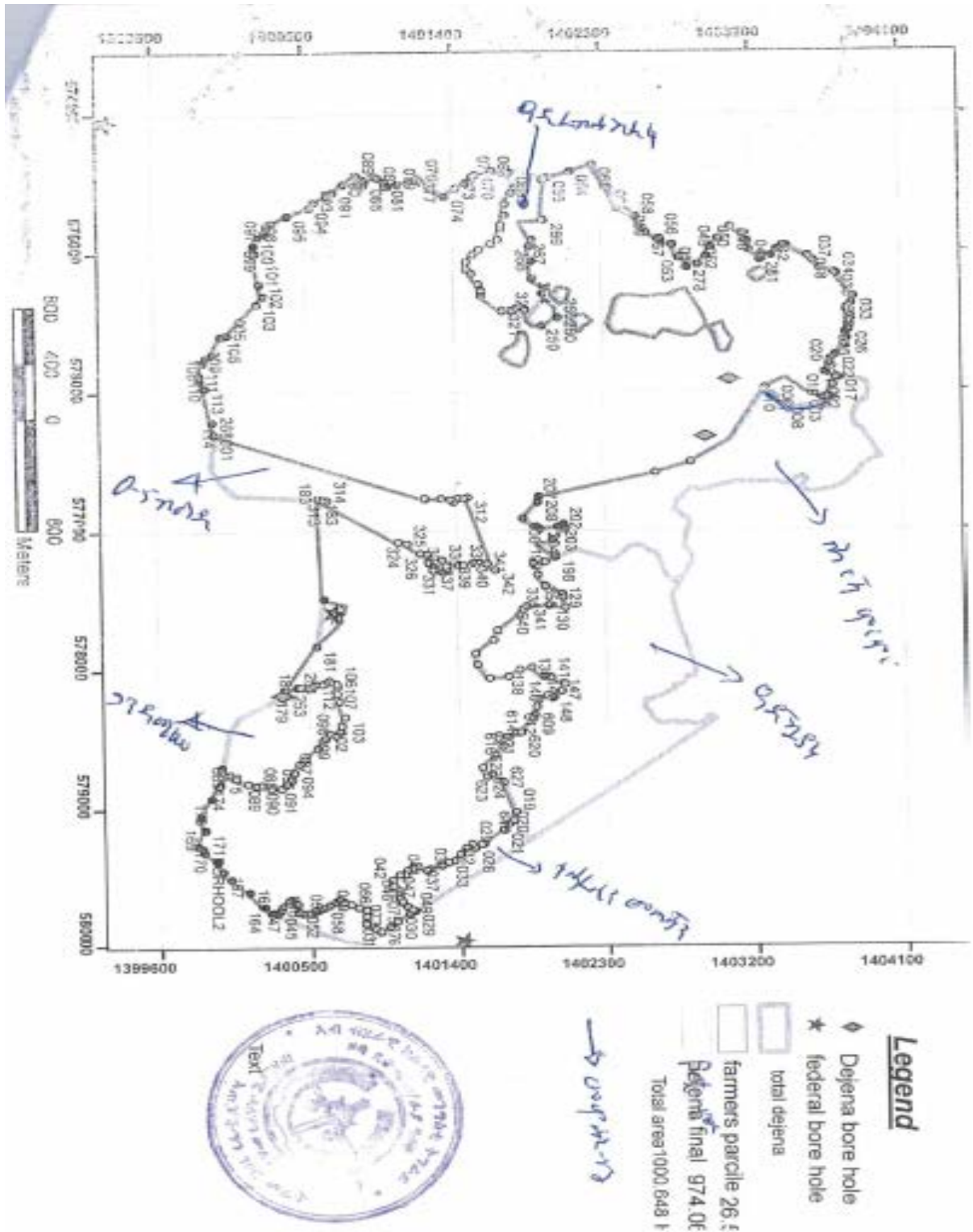


Figure 4-1: Project Location Map

4.12 Project Goal

The proponents proposed this project having an overall goal of taking advantage of opportunities existing in fruit and vegetables development and supply of quality fruit and vegetables products to foreign and domestic markets.

The project will cultivate 1000 hectares of land using mechanized farm on irrigated fields. It also has a state of the art fruit and vegetable packing house.

4.2 Baseline Environment

4.2.1 Physical Environment

4.2.1.1 Land Use and Land Cover

The land use and land cover of the Raya Azebo district comprises cultivation, patches of disturbed natural forests and woodlands, grasslands and settlement areas. The cultivated land is confined to well drain reddish brown soils, occurring on upland and hills. The land uses are mainly for crop production and livestock grazing. The major crops are maize, sorghum and teff.

According to the data from the district, from the total land area (i.e 176,867 ha), cultivated land area comprises 44,481 ha, forest area 27,709 ha and grazing land 15,616 ha.

Climate

The climate of the project area is influenced by its location and elevation. The project site is placed in the low altitude with an elevation of approximately 1,400 meters above sea level. The area lies in the warm humid sub-tropical climate zone. The main rainy seasons run from April to late August with heavy rainfall occurring between July and August.

Rainfall

The project area is situated within high rainfall receiving areas of the country. The annual rainfall varies from 286 to 837mm and the average is estimated to be 450mm.

Most of the rainfall is concentrated through March to April followed by virtual dry season from July to August through March. The four wettest months cover 82% of the total annual rainfall. August month receives the heaviest rainfall record, while May shows the lowest moisture record. (See table- below).

Table 4:1 Rainfall Data of 2002 -2011

Year	Months with rainfall records									
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Total
2002										
2003	-	5	174	137	15	50	166	256	34	837
2004	54	35	63	30	7	0	73	79	36	377
2005	0	5	14	84	0	31	38	144	10	326
2006	52	0	111	35	0	29	159	37	55	478
2007	0	0	211	131	0	30	86	128	2	588
2008	0	60	38	91	44	71	190	122	6	622
2009	12	0	0	40	34	0	60	119	21	286
2010	10	18	48	10	7	17	89	164	0	363
2011	0	15	48	72	16	0	164	263	0	578

Source: Raya Azebo Finance and Economic Development Office

Soils of the Project Area

The geology of the project area is characterized by presence of crystalline rocks (Igneous and metamorphic), which are covered by alluvial and colluvial deposits, residual soils and flood plain deposits. The soils of the project area are mainly Luvisols. The Luvisols are dark reddish brown and silt clay soils. These soils are characterized by well drainage.

Soil Characterization and Suitability Analysis

The majority of the proposed project site is a flat land with an average slope lying between 0-5 percent. The soils are mainly dominated by dark reddish brown and silt clay having a good infiltration capacity. It was observed that the soils are well drained and there is no problem of water logging. The project site has an effective soil depth of over 200 cm. Erosion hazard is very low in the project area. With regards to chemical

properties of the soil in the project area, pH, OC, OM, total Nitrogen and available phosphorus were analyzed to determine soil fertility.

Finally, the most important requirements common for fruit and vegetables are assessed by this study. The following common requirements discussed below are essential for growth of the crop.

Moisture Availability in the project area

Crops are affected by moisture availability through the effect of moisture stress on growth. Moisture availability is affected by climate, rainfall, soil, landforms and hydrology.

Moisture availability to a crop can be assessed in different ways related to the scale of land suitability evaluation. In this study, mean annual rainfall, growing season rainfall and duration of the agro-climatic growing period are employed in evaluating water availability to fruit and vegetables production.

The annual rainfall varies from 286 to 837mm and the average is estimated to be 450mm. Most of the rainfall is concentrated through March to April and July to August followed by dry season from August through March. The four wettest months cover 82% of the total annual rainfall. August month receives the heaviest rainfall record, while May shows the lowest moisture record. As the production of fruit and vegetables production is supplemented by irrigation water, moisture stress due to rainfall will not affect the growth of the crops.

Effective soil depth and soil texture

Absorption of moisture and nutrients by plants is restricted by effective soil depth and root penetration resistance. The effective soil depth is a depth to a root limiting horizon, such as rock, gravel, hardpan or toxic layer. Accordingly, the soil texture of the area falls under silt clay soils with an average effective soil depth of over 200 cm. Subsequently, results of effective soil depth and soil texture of the area were evaluated against the

effective soil depth requirements of fruit, which also needs effective depths of over 200cm. Thus, the project site is highly suitable for fruit and vegetables production.

Erosion hazard

Susceptibility of land to physical loss of soil by water erosion is affected by interrelated factors such as climate, soil type, vegetation cover and management practices and landform. Infiltration is related to soil texture, structure, soil depth, slope gradient and land cover.

As indicated in the preceding sections, proposed project site is a flat land will not be erosion hazards. On top of this, the project site is characterized by silt clay soils that have good infiltration. Soils having good infiltration and low slope gradient are less susceptibility to water erosion.

Potential for Mechanization

This quality refers to conditions of the land which specifically affect mechanized agricultural operations. It is distinct from workability, which refers to ease of cultivation by any kind of implements. The conditions of land which act as limitations to mechanization are slope, poor drainage conditions, rock hindrances, stoniness or extreme shallowness of the soil and the presence of heavy clays. Micro relief may sometimes add an extra impediment to mechanization such as termite mounds or many gullies. Silt clay soils are easy for tillage. It is also recalled from the above discussions that almost all of the project land is flat, and thus, easy and suitable for mechanized agriculture.

Soil Salinity and Alkalinity

Fruit and vegetables production is limited by a number of factors, from which the existences of excess of salts and presence of sodium are the one. The presence of excess salt and sodium are assessed by electrical conductivity. The quality of water to be used for irrigation will affect soil PH of the project site. Hence the electrical conductivity of the soil will be monitored to maintain suitable soil PH for crop growth.

The assessment will be in terms of the evaluation of excess salts (subdivisions: salinity and sodicity/ or alkalinity) using electrical conductivity of the saturation extract and exchangeable sodium percentage, respectively.

Water Resources

Streams from Maichew Mountains are the main surface water resource in the project area. It starts from the highlands of Maichew mountain ranges. More specifically, it originates from the foot of mountains. The main water source of the project is ground water through boreholes. As a result, there won't be a water problem in the area. The water table is close and the recharging rate is quite high. The zonal administration is planning to dig 18 boreholes this year on top of the existing 300 boreholes available in the district.

4.22 Biological Environment

Terrestrial Vegetation

The Raya Azebo District and surrounding areas have been covered with mountain ranges. The lower part of the District is covered with lowland woodlands, bush and Acacia trees (*Acacia abyssinica*). The dominant land cover of the project area is bushes. There are also significant acacia woodlands. The project area is specifically flat area on which about 400ha was developed by irrigation for three years and the rest 600ha is covered by bushes and scattered acacia species. In addition to acacia trees and bushes, *Balanitis aegyptica* is another tree species found in the area.

Wildlife

No significant large animals are observed in the area for many years. The recent development by Dejena has no effect on the animals. Some of the animals seen occasional are

- Hyena(*Crocuta crocuta*)
- Warthog (*Phacochlerus aethiopicus*)

- Monkey (*Cereopithecus aethiops*)

Birds such as white tailed swallow, red eyed dove and wattled lapwing are seen in the area.

Some of the above species are listed as Least Concern and Vulnerable on the IUCN Red List. Although this is not an immediate concern, the project will encourage the creation of new habitats through tree planting on the farm.

4.2.3 The Socio-Economic Environment

The economy of the study area is mainly based on agriculture (crop production and livestock rearing). The farming system is mixed farming system with special emphasis on crop production. However, in the study area, agriculture is characterized by subsistence farming where farmers employ traditional technologies of farming over centuries.

4.2.3.1 District descriptions

Raya Azebo District is located in the Southern Zone of Tigray Regional State. The project site is located within the southern part of the district with some peasant falling adjacent to the project area. Currently, the district is divided into 18 rural and 2 peasant associations.

The District has total land coverage of 176,867 hectares. 85% of the land setting is midland, especially the area around the edge of Maychew Mountains while the remaining 15% is lowland. In general, the altitude of the District ranges from 1400 to 2300 m.a.s.l.

The total population size of the district is estimated to be 150,162 (2011), out of these 94,810 are males and 75,352 are females (63.1% and 37.9%, respectively). About 71% and 29% are followers of Orthodox and Muslim religion respectively.

Agriculture (crop production and mixed farming) is the major economic activities or livelihood for the majority of the population of the district. The productions of the major crops under rain fed agriculture are summarized in the table below.

Table 4:2 Major crops in the district

No	Crops type	Production (tons)
1	Maize	3,903.5
2	Teff	24,311
3	Barely	6,901.5
4	Sorghum	2,773.7
5	Haricot bean	137,674.8
6	Chickpea	598.4

Source: Raya Azebo Finance and Economic Development Office

Livestock resources

The major sources of livestock feed in the district are crop residue and natural pasture. According to the Raya Azebo district Agricultural and Rural Development Office, the livestock population is increasing in the last five years due to better animal husbandry. The zonal administration has outlined a zero grazing scheme relying on processed animal feed. Irrigation with the help of boreholes is the plan to curb erratic and inadequate rain fall.

The total number of livestock found in the district is about 298,214 out of which 48% are cattle 12% goat and sheep and 30.5% are poultry. In addition, there are 2,289 traditional and 734 modern beehives in the district.

Table 4:3 Livestock resources in the district

No	Livestock type	Number
1	Cattle	143,510
2	Goat and sheep	36,257
3	Donkey	15,088
4	Mule and horse	646
5	Camel	11,800
6	Poultry	90,913

No	Livestock type	Number
		298,214

Source: Raya Azebo Finance and Economic Development Office

Infrastructure and social services

Public health

There are 22 health organizations in the district. Out of these, 19 are found in the rural areas of the district while the remaining 4 are found in urban areas. The distribution of these health organizations in district is:

- Rural Area: 12 health posts, 3 clinics, and 8 health center (all are run by government).
- Urban Area: 2 private clinics run by private sector and one health center

There is no hospital in the district. The current total health service coverage in the District is 71%. HIV/AIDS prevalence of the district is about 3.6%.

According to the data obtained from the District Health Bureau, rheumatism, internal parasite, upper respiratory infection and malaria are the top diseases out of the ten top diseases in the district. This is the case when we consider the zone in its totality which is dominantly of high altitude but like the other district, the project is located in low altitude which is prone to malaria disease and thus, malaria is predominant disease in the project area.

Education

The current total number of educational institutions in the zone are 55 among which 19 are first cycle primary(1-4) school, 33 are second cycle primary(1-8) school, 2 secondary schools and 1 primary schools. Gross enrollment rate of primary school is 94.27% and 17.3% for secondary school while net enrollment of primary and secondary schools are 90.9% and 11.2% respectively. According to the data obtained from the Raya Azebo District Education Office, the current gross enrollment ratio of students in the first and

second cycle of primary school level of girls surpassed that of boys which accounts for 51.8% to 49.2 %.

Table 4:4 Number of students by Sex education level

No	Year	Primary school			Girl's ratio	Secondary school	
		Male	Female	Total			
1	2004	6,436	5,785	12,221	47.33	253	145
2	2005	7,677	7,540	15,217	49.54	569	375
3	2006	9,756	9,197	18,953	48.52	9,111	621
4	2007	6,230	3,599	9,829	36.61	1,088	749
5	2008	7,649	6,965	14,614	47.65	936	628
6	2009	9,202	8,778	17,980	48.82	961	773

Source: Raya Azebo Finance and Economic Development Office

Water Supply and Sanitation

The coverage of clean water supply in the district is 56.2%. The improved water supply is managed by the water committee drawn from the locality. The traditional water supply schemes found in the district are, streams, rivers and ponds. According to the information obtained from the water supply office of the district, the underlying problems associated with effectiveness and sustainability of improved water supply schemes in the rural areas of the district is inefficient use of water usage.

There is no designated waste disposal site in the environs of the residence of the local community. In this regard, Unifruit will introduce appropriate solid waste management system.

5 Environmental Impacts identification, prediction and analysis

5.1 Pre-construction Phase Impacts

Potential negative impacts associated with the pre-construction phase activities of the project include loss of open grazing area in the woodlands and about 3 ha of chat farm owned by two farmers

Loss of Grazing land and other Assets

The fruit and vegetables development project is mainly situated in plain land with scattered acacia species in which community uses as common grazing area. Since, site is open for grazing of livestock of surrounding communities, livestock of immediate vicinities will be affected by alteration of land to fruit and vegetables farm.

5.2 Construction Phase Impacts

The construction phase of the project involves clearing, land leveling, and transportation of construction materials, construction of access roads, and installation fruit and vegetables packing facilities. Potential adverse impacts associated with these activities of the project are:

- Removal of vegetation, landscape and land use pattern alteration,
- Impact on Air Quality,
- Impact on flora and fauna,
- Nuisance Noise,
- Work place accidents.

5.21 Removal of vegetation, landscape and land use pattern alteration

Land clearing and removal of the existing vegetation from fruit packaging facility and fruit and vegetables development sites can be a cause for the alteration of landscape integrity, grasses, perennial vegetation and change in land use pattern in the project area. In addition, some of the acacia trees on about 600ha will be selectively removed for the farm.

5.22 Impact on Air Quality

Local land degradation due to earth moving operation during the site preparation and land leveling is the main air quality concern of the project during the construction stage. As the impact that can arise from the problem is localized, the contribution of the project construction to air quality degradation is not significant. However, as the dust storm can have visibility impact on site operation and decrease breathing because of the suspended particles in the air, the problem is an important issue that requires consideration.

5.23 Impact on flora and fauna

Removal of vegetation and cutting trees during land preparation for plantation, installation of fruit and vegetables packaging facilities will affect the biodiversity of the area. Potential impacts include those associated with the loss of flora and fauna communities, and increase in natural instability of the communities. However, because the project site is mainly open woodland, destruction of perennial vegetation and wild animals is insignificant. The project site is neither a recognized wildlife habitat nor an important ecosystem of indigenous tree species; therefore, the construction phase has minimum impact on flora and fauna.

5.24 Nuisance Noise

Construction involves the operation of machinery and vehicles. As a result some noise pollution is expected in and close to the project site. Though the construction doesn't involve the use of explosives or blasting machines that bring about significant noise effect, due care will be taken to minimize negative noise effects.

5.2.5 Work accident

Traffic load in the process of delivering supplies to the construction site coupled with the concentration of casual labor can potentially increase accident. Moreover, visibility problem that may be caused by dust storm during clearing and land leveling may create accident problem in the site operation.

5.3 Operation Phase Impacts

5.3.1 Impact ground water

Agrochemicals that may leach in from the farm fields are the main pollution sources that can cause a likely significant impact on the ground water bodies found in the project area.

Impact prediction and analysis of agrochemicals on ground water bodies

The specific type of agrochemicals that will be applied in the fruit and vegetables farm will be the following:

Acrobat MZ 690	Karmex	AmistarWG
KocideOpti	Ascend	Krovar DF
Authority SC	Kumulus	Basagran
Laso Micro-tech	Batalion	Leopard
Bladex 50SC	Linuron	Bladex 90WG
Lorsban	Bravo	Magister CS
Centurion Plus	Mankocide	Cereous
Mavrik	Chess WG	Melody
Chloro IPC	MesuroI	Chlorpyrifos
Metarex	Confidor	Monceren DS
Coragen	Movento	Decis Forte
Nautile	Diazo	Nebijen 5SCI
Dicarzol	Nimrod	DithaneRainshield NT
Nuvos	Foresite	Phorate 20g

Fertilizers such as:

- DAP
- MAP
- Superphosphate
- 30% Potash super
- Nitrophoska
- Potassium Sulphate
- Potassium Chloride
- Ammonium Sulphate
- Sulphate of Ammonia
- Calcium Ammonium Nitrate
- Urea will be applied to fruit and vegetables. The company will use and apply pesticides and fertilizers that are registered under the applicable National and International laws.

5.3.2 Impacts on soil

One of the impacts that can be anticipated to arise as a result of the activities of the present development project is its impact on soil. The Fruit and vegetables production and processes will not generate wastes that would affect the soil in the project area. Therefore, impact prediction and analysis on soil will focus on the irrigation related activities of the proposed development project.

a) Soil salinity

Soil salinity in any given irrigation scheme can arise from one or combination of the following causes. The first cause that can bring about salinity in irrigated soils is associated with the quality of the water used for the irrigation itself. Salts carried in the irrigation water are liable to build up in the soil profile, as water is removed by plants and by the atmosphere at a much faster rate than salts. In this respect, the FAO

guidelines for irrigation water quality indicates that waters with electrical conductivity (EC_w) value of less than 0.7 dS/m are considered to be completely safe and the guideline put no restriction on its use for irrigation purposes. Moreover waters which have an EC_w value of 0.7 – 3.0 dS/m considers it to be basically safe with slight to moderate restriction on its use as it moves toward the upper limits of the range.

The other cause for the emergence of salinity in soils is the application of artificial fertilizers and pesticides on the farming fields. Solutes applied to the soil in the form of artificial and natural fertilizers as well as some pesticides will not all are utilized by the crop. Excess nutrient that is not assimilated by the crops will start to accumulate in the soil. Salts which occur naturally in soil may move into solution or may already be in solution in the form of saline groundwater. Where the groundwater level is both high and saline, water will rise by capillary action and then evaporate, leaving salts on the surface and in the upper layers of the soil. Thus, under such mechanisms, salts present in soils or saline ground waters can also cause soil salinity.

The likeliness of the irrigation activities of the present development project to cause soil salinity in the project area is almost zero. Ground waters in the area are generally low in EC value. Clearly, when combining these evidences together, it appears that the contribution of ground water and the soil itself for salinity build up is quite low. However, since the ground water table in some of the command area is shallow and especially so during the rainy season, care will be taken to appropriately manage the sprinkler irrigation system to prevent any rise of the ground water table.

In general, the predicted impact of the proposed project on soil salinity will be less significant. However, necessary precautionary measures and appropriate irrigation management methods will be put in place as mitigation measures to prevent the impact.

b) Water logging

Water logging is a phenomenon that lowers land productivity through the rise in groundwater table close to the soil surface. Due to farm management and appropriate irrigation system, water logging won't cause a problem for Unifruit farm.

c) Soil erosion

Soil erosion is another impact that can arise from irrigation development projects. Because irrigated land is wetter, it is less able to absorb rainfall and runoff will therefore be higher. Since Unifruit's irrigation system is computerized one, there will be effective water management in place which will not cause soil erosion. Moreover, the slope of the fruit and vegetable farm land is flat protecting erosion.

5.3.3 Impacts on terrestrial fauna and flora

i. Impacts on terrestrial fauna

As the project area does not contain forest, there is no forest as habitat for wild animals. In some parts of the project footprint there are scattered acacia trees. The irrigation development will not affect areas of wildlife habitats, and not disrupt habitat use patterns of the wild animals.

ii. Impacts on terrestrial flora

The project activities that will affect the vegetation and the terrestrial habitats will include land clearing and leveling, building access roads and establishment of site facilities. When the project is implemented there would be a consequent change in the natural vegetation of the area. The present bush and grass lands will be changed to fruit and vegetables farms.



Figure 5-1: Bushes and Scattered Acacia Vegetation on the site

5.3.4 Impacts on Socio Economic Environment

5.3.4.1 Impacts on Households

Six houses are located within the boundary of the farm land. 23 family members are living in these households. The family members will be affected as a result of the project. The district administration will take the entire responsibility in relocating them.

5.3.4.2 Loss of land under various land use types

There is no land to be inundated by reservoir as the project uses water from boreholes. Hence no area will be lost for this purpose. However, there is huge land to be utilized for fruit and vegetables farm. The total area of land under the boundary delineated for the project area is about 1,000 hectares. At the time of the inception of the project, most of the land is covered by scrub land bushes and scattered acacia trees and was used for casual livestock grazing; however, livestock grazers have sufficient available land in the rest of the valley to allow them to continue their grazing activities. Therefore, changing this area into an intensive agricultural land does not affect the livestock production of the area.

5.3.5 Loss of sites of cultural and/or religious values

There is no any known culturally or historically important site at the project site.

5.3.5.1 Water related disease

While development projects like irrigated fruits and vegetables farm aim to improve socio-economic conditions and the quality of life of the beneficiaries, in many instances their impact on health is, inadvertently a negative one. It is argued that, such negative outcomes are expected when development projects are planned and executed on strictly sectoral lines, as a result of which environmental determinants of health are overlooked. As a consequence of a development of irrigation projects, vector-borne diseases spread into areas where they were not load causing severe clinical symptoms. Outstanding among the parasitic diseases exacerbated by irrigation development projects are lymphatic filariasis, malaria, schistomiasis, onchocerciasis and other water borne diseases such as typhoid fever, bacillary, dysentery, infective hepatitis, some of which are due to faecal contamination of surface water.

The health status in Ethiopia is generally reported to be poor compared to the health status in other low income counties. The situation is attributed to preventable infections ailments and nutritional deficiencies. Water -borne/related diseases in Ethiopia are wide spread. These diseases are mainly spread through contaminated water due to lack of proper sanitary facilities, moreover, a large majority of the rural population obtain their water supplies from unprotected sources; such as streams, ponds, wells.

Unifruit's vegetable and fruit farm is irrigated by using drip and sprinkler irrigation system which uses water economically. Hence there won't be risk of malaria epidemic as accumulation of water that creates favorable condition for breeding of malaria insect is almost zero.

5.3.5.2 Communicable diseases prevention and control

Any communicable disease in an individual or in a community results from a dynamic interactions of the agent, the host and the environment, in order to prevent and/or control the spread of infectious diseases, the chain can be broken by attacking the agent, protecting the host or changing the environment.

From the analysis of the existing situation in the project areas one can easily realize that major constraints related to health sector development in the area have social, cultural and environmental roots. Scarcity of resources either in terms of professional human resources and materials for health services seems to have affected the health delivery system and its development to enable control of infectious diseases.

Considering the baseline situation in the district as reflected in the section four of this report, one can also understand that there are conducive atmosphere whereby existing facilities can be improved to avoid unnecessary burden of major diseases and other health effects on the population; and, these include inter-sectoral coordination and collaboration among government sectors and NGOs operating in the area to upgrade facilities, to change the attitude of the community to safe guard their environment. In this regard the project will implement best practices within its control to minimize communicable diseases.

5.3.5.3 Environmental heath: safe water supply and basic sanitation

The basic sanitary facilities in the project areas are almost none existent and those available may not be properly used. Unifruit will make sure that there is safe water supply throughout the project premises and basic sanitation systems are in place.

5.3.5.4 Health Care Facilities and Health Programs

Scarcity of resources either in terms of professional human resources and materials for health services seems to have affected the health delivery system and its development to enable control of infectious diseases, which may possibly reflect themselves at the regional and national levels.

Standard health care facilities in the project areas are very few and those available are not equipped and staffed adequately. As a result, they cannot handle cases of different types locally and the available referral health facilities are constrained only with minor cases.

5.3.5.5 Pollution from Solid and Liquid waste from pack house

The fruit and vegetables processing and packaging generate effluents arising from washing of fruits and vegetables which could affect the environs if not well managed. Unifruit’s farm will manage the waste water appropriately on the farm.

5.3.5.6 Loss of social service

Although the irrigable vegetable and fruit farm covers large area, there is no social service like schools, health facilities, and potable water supply schemes to be affected by the project.

In general the type of and magnitude of identified impacts from the proposed Vegetable and fruit farm is summarized below.

Table 5:1 Matrix showing the type and magnitude of identified impacts from the project

Environmental component/characteristics	Construction of fruit pack house	Irrigation development	Fruit and vegetables growing
Soil & Geology	X	X	X
Flora	X	Y	X
Fauna / Effect on wildlife habitat	X	N	X
Air quality	X	N	N
Surface and/or ground water quality	X	N	X
Land use effects: loss of grazing and agricultural land	X	X	X

Noise effect	X	X	X
Archeological and religious sites	N	N	N
Traffic	X	X	XX
Employment	YY	YY	YY

Keys for table:

- 'X' represent adverse environmental impacts
 - XXX Highly significant impacts
 - XX Medium significance impact
 - X Low significance impacts
 - N No impacts
- "Y" represent positive and beneficial impacts in the same interpretation order of the circle size as above
 - YYY Highly beneficial impacts
 - YY Medium beneficial impacts
 - Y Low beneficial
 - N No impacts

6 Impact mitigation measures

6.1 Preconstruction Phase Impacts Mitigation Measures

6.1.1 Mitigation Measures for Loss of Grazing land and other Assets

Introduction and supply of alternative fodder by Government Schemes through multiplication and propagation of improved fodder grasses and shrubs in the existing nursery sites of the districts will minimize impacts associated with loss of grazing lands. There are perennial Khat growers in the vicinity, and the development of the project will not affect these farmers. The following are specifically mitigation measures for loss of grazing land due to land acquisition for the project and infrastructure developments are:

- Giving priority for the project affected people for job opportunities available in the project; and
- Implementing appropriate technical support package including training to ensure that the affected people would adapt to the new farming system.
- The project will assist in providing alternative to the livelihood of the affected community by encouraging farmers to start cattle fattening activities using crop by products for animal feed. In order to encourage the farmers the project proponent will supply by products to the farmers.

6.2 Construction Phase Impacts Mitigation Measures

6.2.1 Mitigation Measures for Removal of vegetation, landscape and land use pattern alteration

The following mitigation measures are proposed to minimize and/or prevent the anticipated impacts.

- Maintaining some trees and shrubs while clearing lands for preparation of fruit and vegetables production and restoration of trees and shrubs in a designated area and other degraded areas outside the farm in collaboration with the local community;

- Soil removed from the construction site will be distributed over the farm land and:
- Creating awareness on the value of conserving biodiversity in general and indigenous species such as acacia trees in particular among the workers engaged on the construction activity. In this regard, training will be conducted for workers prior to commencement of construction activities.

6.2.2 Mitigation Measures for Impact on Air Quality

To avoid any adverse consequence of visibility loss due to dust creation during operation, the practical option is to sprinkle water on fresh construction spoil, in line with EHS and OHS guidelines, applicable for project staff and contractors.

6.2.3 Mitigation Measures for Impact on flora and fauna

Though the impact on flora and fauna loss is minimal, in order to avoid damages during the construction activities and keep the greenness of the environment, the following measures are recommended:

- Limit clearing and soil disturbance in the sites in such a way that acacia trees are maintained.
- Limit and control movement of trucks and construction machineries during construction in a manner that trucks will not damage vegetation.
- Record the type and number of trees and shrubs cut in order to replace after construction is completed
- Create an awareness for the local people and workers in every opportunity about the importance of vegetation cover for soil and water conservation
- Grade disturbed areas and restore landscape.

6.2.4 Mitigation Measures for Nuisance Noise

- Conducting construction at the time where most of the people are in the field
- Using modern machineries that have less nuisance noise effect

6.25 Mitigation Measures Work accident

The following proposed measures mitigate the impact:

- Train and equip some of the workers to voluntarily serve as a traffic service person during the beginning and end of daily work
- Aware and train workforce on the safety issues during site operation and on road safety
- Put in place necessary signpost on site and near the gate
- Develop a Traffic Management Manual

6.3 Operation Phase Impacts Mitigation Measures

6.3.1 Mitigation measures for impacts on water quality

In order to mitigate the adverse environmental impacts of the various wastes generated, Unifruit will introduce and implement both preventive and curative mitigation measures that are implemented at different levels during the design and operational phases of the farm. The aim of the preventive mitigation measures is generally to minimize the generation of wastes at source and it will be implemented during the production operation phases. Unifruit will introduce necessary measures to implement the following preventive actions during production period.

- Setup operational procedures for good housekeeping; effective maintenance and efficient production operation. It will also see to it that the use of water and cleaning chemicals is optimized and efficiently used during operation. These will result in considerable reduction in the generation of waste water.
- The other pollutants of concern are oil and lubricants used for agricultural machineries, such as tractors, etc. Maintenance of agricultural machineries will be undertaken in a designated area and used oil and lubricants will be effectively managed. The collected used oil will be appropriately stored in barrels and it will be sold to buyers in line with Performance Standard 3

- After implementing the above preventive mitigation measures, the liquid wastes expected to be generated by the plant will be relatively small in amount and will not be allowed to contaminate nearby water sources.

6.3.2 Mitigation measures for impacts on soil

The majority of organic solid wastes that are generated in the fruit and vegetables farming will be applied to the soils in the fields. That will be done not only to safely dispose the wastes but to condition and enrich the soil with additional nutrients. Therefore, the mitigation measures for the sound management of these organic solid wastes will involve its beneficial application to the soil in the fruit and vegetables farms.

The use of fertilizers and pesticides in the fruit and vegetables fields was identified as another source for soil salinity as well as for ground and surface water pollution. Unifruit's project will set its own procedures to direct and control the application of pesticides and fertilizers in the farm fields. The procedures to be established will help to implement good agrochemicals management and application practices in its fruit and vegetables farming activities. The procedures will ensure that pesticide and fertilizer application rates do not exceed those recommended. It will also maintain accurate records of date and conditions of application, rate applied and effectiveness in order to guide future decisions. The project will undertake chemical application only when environmental conditions are such that the risk of movement into waterways through spray drift is minimal. The application of the agrochemicals could be delayed near watercourses if environmental conditions are not favourable. In the medium term, the planned farm will also start to apply an integrated pest management practices that reduce chemical use to a minimum. The use of agronomic practices to minimise insect pests will also be applied in the project.

As per performance standard 3 of International Finance Corporation, the proponent will select pesticides that are low in human toxicity, known to be effective against the target species, and have minimal effects on non-target species and the environment. The

selection will be based on whether the pesticides are packaged in safe containers, are clearly labeled for safe and proper use, and have been manufactured by an entity currently licensed by relevant regulatory agencies.

The Project will design its pesticide application regime to minimize damage by natural pests and prevent the development of resistance in pests. In addition, pesticides will be handled, stored, applied, and disposed of in accordance with the Food and Agriculture Organization's International Code of Conduct on the Distribution and Use of Pesticides or other good international industry practice.

According to performance standard 3 of International Finance Corporation, the fruit and vegetables project will not use products that fall in World Health Organization Recommended Classification of Pesticides by Hazard Classes Ia (extremely hazardous) and Ib (highly hazardous); or Class II (moderately hazardous).

The project offers efficient method of water utilization and its management will be an essential part. The project will introduce appropriate procedures to regulate water application and prevent overwatering of the irrigation fields thereby avoiding inefficient use of water.

Solid waste disposal is also another factor that can affect soil and the surface waters. The solid waste to be generated by the workforce of the proposed development project should be collected and disposed appropriately. Currently, there is no designated site for solid waste disposal. Unifruit vegetable and fruit farm project will work together concerned stakeholders at different levels to identify and designate a waste disposal site for the solid waste. All solid wastes generated in the living quarters and work areas will be collected and transported to the site for appropriate disposal.

6.3.3 Mitigation measures for impacts on terrestrial fauna and flora

The project activities that will affect the vegetation and the terrestrial habitats will include land clearing and leveling, building access roads and establishment of site facilities. The project will take all necessary measures to control the activities of the project that will affect trees on the farm. In general the project will endeavor its level best to protect the acacia trees in the project footprint.

As per guidelines of International Finance Corporation's performance standard number six, mitigation measures will be developed to address the potential impacts on biodiversity identified in the Social and Environmental Assessment. Mitigation measures designed shall achieve no net loss of biodiversity and favor impact avoidance and prevention over reduction and compensation.

On the project site, there are no critical habitats which includes areas with high biodiversity value including habitat required for the survival of critically endangered species areas having special significance for endemic or restricted-range species; sites that are critical for the survival of migratory species; areas supporting globally significant concentrations or numbers of individuals of congregatory species; areas with unique assemblages of species or which are associated with key evolutionary processes or provide key ecosystem services; and areas having biodiversity of significant social, economic or cultural importance to local communities. There are however, a number of species classified as Least Concern of Vulnerable on the IUCN Red List and efforts will be made to increase habitats through planting trees in appropriate areas throughout the project footprint.

6.3.4 Mitigation measures for socioeconomic impacts

6.3.4.1 Mitigation Measures on Impacts on Households within the Boundary

The households will be relocated by the district administration and appropriate land will be given to them to mitigate the impact occurred. Unifruit will ensure that this is carried

out in compliance with Performance Standard 5 and that a Resettlement Action Plan (RAP) is prepared.

6.3.4.2 Mitigation Measures for Loss of land under various uses

The mitigation measures for loss of grazing land due to land acquisition and infrastructure development are:

- Giving priority for the project affected people for job opportunities available in the project;
- Implementing appropriate technical support package including training and provision of basic social services to ensure that the affected people would adapt to the new farming system.
- The project will assist in providing alternative to the livelihood of the affected community by encouraging farmers to start cattle fattening activities using crop by products for animal feed. In order to encourage the farmers, the project proponent will supply by products to the farmers.

6.3.4.3 Loss of sites of cultural or religious values

The presence of any known culturally or historically important sites at the project site was not indicated by any of the consulted parties (District Authorities). Particularly no officially recognized and registered sites of cultural or religious values were identified by the culture and tourism bureau of the district.

6.3.4.4 Mitigation measures for Environmental health: safe water supply and basic sanitation

The project will provide adequate clean water and basic sanitation to its workforce and their families by developing boreholes.

In line with International Finance Corporation's Performance Standard number four, the proponent has undertaken a process of consultation in a manner that provided the affected communities with opportunities to express their views on project risks, impacts, and mitigation measures.

The project will prevent or minimize the potential for community exposure to water-borne, water based, water-related, vector-borne disease, and other communicable diseases that could result from project activities.

Unifruit vegetables and fruit farm project will provide workers with a safe and healthy work environment, taking into account inherent risks in its particular sector and specific classes of hazards in the project's work areas, including physical, chemical, and biological hazards. Unifruit will take steps to prevent accidents, injury, and disease arising from, associated with, or occurring in the course of work by minimizing, so far as reasonably practicable, the causes of hazards. In a manner consistent with good international industry practice, it will address areas, including: the identification of potential hazards to workers, particularly those that may be life-threatening; provision of preventive and protective measures, including modification, substitution, or elimination of hazardous conditions or substances; training of workers; documentation and reporting of occupational accidents, diseases, and incidents; and emergency prevention, preparedness and response arrangements.

6.3.4.5 Mitigation Measure for Occupational Health and Safety (OHS)

Unifruit will set a corporate minimum work age that complies with national law and Performance Standard 2 and develop a corporate policy against employing, using or benefiting from child labor.

Occupational health and safety (OHS) refers to the range of endeavors aimed at protecting workers from injury or illness associated with exposure to hazards encountered in the workplace or while working. Hazards may arise from materials (including chemical, physical and biological substances and agents), environmental or working conditions, or work processes (including tools, machinery and equipment).

Occupational health and safety practices include the identification of potential hazards and responses including design, testing, choice, substitution, installation, arrangement,

organization, use and maintenance of workplaces, working environment and work processes ongoing training to eliminate or minimize any risks to workers. Unifruit is dedicated to design an OHS policy for its workers.

Performance Standard 4 recognizes that project activities, equipment, and infrastructure often bring benefits to communities including employment, services, and opportunities for economic development. However, projects can also increase the potential for community exposure to risks and impacts arising from equipment accidents, structural failures, and releases of hazardous materials.

Communities may also be affected by impacts on their natural resources, exposure to diseases, and the use of security personnel.

Unifruit will ensure communities are not exposed to any pollutants and that security guards are adequately trained.

While acknowledging the public authorities' role in promoting the health, safety and security of the public, this Performance Standard addresses the promoter's responsibility to avoid or minimize the risks and impacts to community health, safety and security that may arise from project activities.

6.4 Mitigation measure for Pollution from Solid and Liquid waste from packaging plant

Wastewater expected to be generated by the fruit packing plant will be relatively small in amount. This waste water will be dispersed back in the farm land. The sound handling and disposal of solid wastes generated from the production process is another important aspect which is given due consideration. The mitigation measures for sound handling and disposal of the solid wastes involves packing materials production, reuse and safe disposal way. The solid waste will be disposed in the designated area following safe disposal methods.

6.5 Positive Socioeconomic Impacts (Expected Benefits)

The major social-economic impacts of the project are expected to emanate from its overall objectives. Hence, the following are the main positive expected socio economic impacts of the proposed project.

6.5.1 Creation of Job Opportunity

Like other part of the country, the majority of the populations of the project area are falling within the working age category. Fruit and vegetables farm is a labor-intensive activity and therefore, employment opportunities will be created on the farm. In addition during construction and operation phase, the project requires considerable working force from the nearby area and it is expected that the prevailing unemployment will be reduced. The project will employ 35-40 permanent and 800 temporary workers. This is a direct impact but may also have indirect positive impact by creating job opportunity for those who engage in providing services like shops, restaurants and other services.

6.5.2 Contribution to Food security

Over a period of time, the project will offer training, technology transfer to local framers to assist them achieve food security.

7 Environmental Management Plan

Environmental management is concerned with implementation of the measures necessary to minimize or offset adverse impacts and to enhance beneficial impacts. Unless the mitigation and benefit enhancement measures identified in the EIA are fully implemented, the prime function of EIA, which is to provide a basis for shaping the project so that overall environmental performance is enhanced, cannot be achieved.

In order to be effective, environmental management must be fully integrated with the overall project management effort at all levels, which itself should be aimed at providing a high level of quality control, leading to a project which has been properly designed and constructed and functions efficiently throughout its life. Hence, the overall goal of the Environmental Management Plan (EMP) of Unifruit vegetable and fruit farm project is to minimize adverse impacts of the project by implementing and monitoring the proposed mitigation and enhancement measures.

Under this section, the way specific mitigation and enhancement measures implemented and monitored at the pre-construction, construction and operational phases to overcome possible impacts of the project are outlined.

7.1 Pre-Construction Phase

Prior to the construction and installation of irrigation equipments, fruit products packaging plant, etc, environmental management plan should take into considerations the following recommendations:

- Ensuring that all government and concerned agency requirements and procedures related to EIA are complete with,
- Selecting of technologies, equipments and processes that minimizing adverse impacts and enhancing beneficial impacts,

- Preparation of detail designs for the farm layout, which incorporate specific features aimed at minimizing adverse impacts and enhancing beneficial impacts, and
- Preparation of contract documents which contain appropriate clause to allow control of impacts arising from the project implementation.

The implementation of above recommendations will be monitored and managed by the role and participation of key stakeholders. As the promoter and responsible organ of managing and minimizing environmental impacts due to the proposed project, Unifruit will be responsible for handling the recommendations before commencements of the construction. Thus, the company will hire a responsible contractor that will facilitate proper implementation of the project as per design and specifications and promote inter-institutional relationships for the environmental management and other construction activities as well.

The Tigray Region Environmental Protection organ as a regulatory body will ensure participation of affected bodies in the project design/plan and monitor that the project is designed in line with the national and regional environmental laws.

7.2 Construction Phase

During construction phase of the project, environmental management plan should take into account the following recommendations:

- Maintaining valuable acacia trees and shrubs while clearing lands for preparation of land for irrigation and restoration of removed trees and shrubs due to installation of fruit products packaging facilities,
- Top soil removed during building construction will be spread over the farm land.
- Creating awareness on the value of conserving biodiversity in general and plant species in particular among the workers engaged on the construction activity,
- Proper handling wastes generated from construction sites,

- Sprinkling water on fresh construction spoil to reduce dust emission,
- Make use of sands, stones and aggregates from authorized quarry sites,
- Grade disturbed areas and restore landscape.

All wastes generated from the construction activities will be managed properly. Solid wastes will be disposed in the designated area.

The construction activities are the major source of dust emission and air pollution. However, it can be managed by:

- Discarding construction wastes in an appropriate or authorized waste management facilities/land fill sites.
- Preventing the generation of air pollution during the construction period by water sprinkling

Trees that have to be removed for fruit and vegetables production will be substituted with appropriate trees.

Health and risk management should be done to avoid unnecessary impact on human health. First aid service will be provided on site, in case of serious treatment, they will be transported to nearest health facilities or emergency center.

The monitoring of recommended measures implementations during the construction phase of the project will be ensured by establishing monitoring procedures in which the proponent, regulatory body and affected communities play their part. The Environmental health and safety officer, which will be established by the company, will carry out regular internal environmental management and monitoring activities. It is expected that, the Federal and regional states EPAs will conduct follow up on the implementation of the activities against National and Regional environmental laws.

7.3 Operational phase

During operational phase of the project, environmental management plan should take into account the following recommendations:

- Material Data Sheet (MDS) are available for many products to add to the information on the product label about the risks to the environment and how to control them,
- Replacing dusty toxic chemicals products with liquid or granular products of equivalent effect,
- Avoid leaks and drift of spray chemicals during application and preparation,
- All spray operators must wear suitable and intact personal protective equipment and clothing,
- Equip storage facilities for fuel oil, etc with secondary containment bunding to contain spills and leaks; and
- Provide workers safety features such as showers, protective clothing, and spill cleanup kits.

The objectives of the environmental management program at this phase of the project are: protection of the environment from agrochemical and other pollutants, protection of workers from work area health hazard, efficient use of ground water sources, waste management, monitoring of soil nutrient status and improve the environmental performance of the company.

The Environmental and Safety officer, will be responsible for regular conducting of internal environmental management and monitoring activities. He will monitor construction activities of the project against the plan to ensure proper implementation of recommended measures. It is expected that the Federal and regional states EPAs may follow up on the implementation of the activities against National and Regional environmental laws.

Institutional Arrangement

For proper environmental management and monitoring purposes, the arrangement of concerned institutions and key actors, which will have decisive roles to ensure effective and efficient implementation of the monitoring program are essential.

The management of the proponent along with appropriate regulatory authorities would share the responsibility to supervise and coordinate all of the environmental protection measures outlined above, and to monitor the project according to existing environmental laws, regulations, and standards.

The Proponent will employ an environmental and safety officer to organize and supervise environmental protection measures and monitor the impacts of each component of the project. The officer will work under the guidance and supervision of the management of the proponent and in conjunction with the local environmental protection bureaus according to the requirement of the law pertinent to the pollution control, environmental impact assessment, labor and public health.

The environmental and safety officer will be entrusted to take responsibility for implementation of environmental monitoring for the whole project. He will stipulate the monitoring techniques to be used the appropriate standards, and quality control measures. The proponent will compile all the relevant monitoring data and prepare regular monitoring reports.

7.4 Environmental Monitoring Program and Parameters

Environmental monitoring and data collected through it may be used not only as a guide to performance measure, but also as a source of credibility and trustfulness in the relationship with the regulatory authorities. Therefore, conducting monitoring will be of paramount importance. The monitoring targets are:

Effluents: the water leaving the processing facilities should be monitored for potential contaminants.

Soil: Periodical analysis of soils from the fruit and vegetables field should be undertaken to monitor nutrient status.

Workers' safety: Periodic check of the safety of workers is important to prevent on job accidents and employees health hazards

Table 7:1: Plan of the monitoring program.

	Item	Quantity	Unit cost(Birr)	Total cost(Birr)
1	Environmental & safety officer	1	2500/month	30,000
2	Agronomist	1	2500/month	30,000
3	Environmental monitoring costs		2000/month	24,000
4	Reducing dusts during construction		600/month	7200
5	Septic tank for waste water		50,000	50,000
6	Solid waste disposal		50,000 birr	50,000
	Total			191,200

8 Conclusion & Recommendation

8.1 Conclusions

The objective of the government of Ethiopia for the promotion of agriculture sector is to stimulate its rapid development through it as its contribution to the development of the export base and rural development is vital. The Government is constantly on the lookout to identify constraints to the development of the sector and advise on the best course of action to facilitate investment in the sector.

The government of Ethiopia has been actively working to create an investment climate that encourages investors through facilitating long and short term loans.

The private sector development on agriculture has contributed to the above objectives in the following ways:

- Generation of foreign exchange. Ethiopia's export of agricultural products is leading sources of foreign exchange earnings,
- The sector would create employment for thousands of workers, contributing millions in wages to the rural economy.
- Provision of new opportunities for agricultural professionals and experts to develop technical skills and careers in modern agriculture,
- Contribution to the government's objective of widening the tax base,
- Contribution to rural stability through provision of jobs, incomes, public services and amenities to villages surrounding modern agricultural farms.
- Contribution to the development of other commercial activities in areas adjacent to the maize seed production, processing and packaging projects (construction, building blocks, restaurant, farming, etc.).
- Development of local expertise through on-the-job training of personnel,
- Contribution to reducing rural-urban migration.

In view of the above facts, it is clear that the project has clear social and economic benefits and will contribute to the reduction of poverty. About 35-40 permanent and

800 seasonal employees will benefit from the project. Most of the project products will be exported and thus generate foreign exchange revenue, and contributing to promotion of economic development in the country.

The main adverse environmental impacts potentially arise from issues associated with the operation of the farm are minimal. Impacts are related to the use and management of the agrochemicals and occupational health and safety for workers employed with the company. Mitigation measures are available for all of the anticipated environmental impacts and have been included in the project design. The company shall mainstream the environmental management issues in its overall environmental management system.

Generally, the project will have a positive impact on the environment, although there are some temporary adverse impacts during construction and operation phases could occur. On balance, the project has overall beneficial effects. To properly manage those environmental impacts and to tackle unforeseen situations that could occur during the project lifecycle, the company shall develop a comprehensive environmental monitoring program and work on proposed mitigation measures so that recommended mitigation measures are implemented and remain effective.

8.2 Recommendations

- The company should assist the local community by offering employment opportunities.
- The proponent should develop environmental management system at its company level and introduce proper environmental management plan by allocating adequate budget and appropriate experts.