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**COLLEGE OF DEVELOPMENT STUDIES  
ADDIS ABABA UNIVERSITY**



**Legislative Approach to the Management of Invasive Alien Species in Ethiopia:  
the case of *Prosopis juliflora* in Gewane Woreda**

**By  
Wondwossen Sintayehu**

**Thesis Submitted in Partial Fulfillment of the Requirements for the  
Degree of Master of Arts in Environment and Development**

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**ADDIS ABABA UNIVERSITY  
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***Title***

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in Gewane Woreda*

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**Dedicated**

to

My wife Senny & the daughter yet to be born

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## Acronyms

AAU	Addis Ababa University
AIA	Advance Informed Agreement
ANRS	Afar National Regional State
CBD	Convention on Biological Diversity
CSA	Central Statistics Authority
CSE	Conservation Strategy of Ethiopia
EARO	Ethiopian Agricultural Research Organization
FDRE	Federal Democratic Republic of Ethiopia
EIA	Environmental Impact Assessment
EIAR	Ethiopian Institute of Agricultural Research
EPA	Environmental Protection Authority
GEF	Global Environmental Facility
GISP	Global Invasive Species Programme
IAS	Invasive Alien Species
IBC	Institute of Biodiversity Conservation
IPPC	The International Plant Protection Convention
ISPM	International Standards for Phytosanitary Measures
IUCN	The World Conservation Union
LMO	Living Modified Organisms
MEAs	Multilateral Environmental Agreements
MoARD	Ministry of Agriculture and Rural Development
MoWR	Ministry of Water Resources
NBF	National Biosafety Framework
NBSAP	National Biodiversity Strategy and Action Plan
PRA	Pest Risk Analysis
NGO	Non-governmental Organizations
USD	United States Dollars

## Abstract

Ethiopia is one of the hotspots of biodiversity in the world owing to many factors including the unique topography that the country is endowed with. But the number and diversity of this natural heritage is dwindling from time to time. Among the many causes of biodiversity loss is the encroachment by Invasive Alien Species. *Prosopis juliflora* is one of the species that is found to be affecting biodiversity of the country. There are controversies and diverging views on the impacts and potential benefits of *Prosopis*. There are also controversies regarding the possible controlling mechanisms – often ranging from complete eradication to control through utilization. Legal instruments, based on a cost – benefit analysis, are essential towards resolving the apparent confusion in the choice of management techniques. This paper attempts to assess the most pertinent multilateral agreements as well as national laws relevant to the management of Invasive Alien Species. It also tries to analyze gaps in existing legislation.

One of the areas highly infested by *Prosopis* in Ethiopia is Gewane *Woreda* of the Afar National Regional State. A survey into two selected *Kebeles*, *Kebele 01* and *Ourafeta Kebele*, is undertaken to assess the general perception interms of the threats posed by *Prosopis*, the possible benefits and the available management options. Both qualitative and quantitative methodologies were employed to generate information. Semi-structured questionnaires were administered to respondents in the two selected *Kebeles*. Key informant interviews and Focus Group Discussions were held with various groups to resolve identified research questions. The negative impact of *Prosopis* in Gewane *Woreda* is ascertained through the study. But there is reluctance to pick a single controlling mechanism from a list already indentified by stakeholders including eradication, control through land use change, use of chemicals, or biological control. A decision has to be made by *a priori* identification of the cost of adopting one alternative against the other, and backing such decision through legislation for surety in implementation.

## 1. Introduction

### 1.1 Background of the Study

Invasive Alien Species (IAS) are non-native floral or faunal species that easily establish and spread outside their natural distribution range (Zelalem, 2007). IAS are increasingly becoming global threats with manifested local consequences posing the biggest threat to biodiversity (Preisser et al., 2008). A majority of the species are alien in the sense that they are unintentionally introduced through activities such as aid, tourism, trade etc., or are imported deliberately for agricultural, industrial or ornamental purposes. Tracking the pathways and regulating the causes of IAS introduction has thus remained an important element of national legislation despite the existence of numerous international instruments attempting their regulation. To complicate IAS management, their introduction is often government authorized, planned or formally approved. Other means of introduction include unauthorized or illegal activities by way of smuggling across both ecological and political boundaries. Once introduced into an ecosystem, the species have the ability to establish themselves with immense potential to invade and out-compete native varieties and eventually take over the new environment (Senayit et. al, 2004).

The issue of IAS is identified as one of the emerging problems that the country has to grapple with, among others (Senayit et. al, 2004). The problem is alarming in Ethiopia in view of the fact that the country is one of the few biodiversity hotspots in the world. There are a number of initiatives aimed at controlling the threats posed by the problem. Management options often range from eradication and bio-control of existing IAS population to regulation through commercial utilization.

One of the major introduced IAS in Ethiopia is the plant species known as *Prosopis juliflora*. The species is stated to have been deliberately introduced in the 1970s at Goro nursery, Dire Dawa (HDRA, 2005). The plant was supposedly introduced into the Afar region by those working at the state farms in the middle Awash irrigation project during the 1970s and 1980s (HDRA, 2005). Large scale cultivation ensued during the food for work programme undertaken from 1986 to 1988. Apart from this, dwellers of the region

were also planting the shrub as a protective fence around home gardens. Its establishment and expansion is mainly related to its pods being fed by animals and cattle. Germination of the seeds is facilitated in the guts of these animals and gets an opportunity to grow alongside the path of the animals as these defecate along their way (Shiferaw et. al., 2004). The pods and seeds are also carried to long distances by way of irrigation water.

*Prosopis* has invaded most of the *Woredas* in Zone 3 of the Afar National Regional State to which belongs the Gewane District. The most notable challenge introduced by the plant into Gewane and other districts of the Afar region is the formation of heavy thickets that prohibits movement of animals. It forms hiding spots for hyenas resulting in attacks to human beings (FARM Africa, 2006). The sharp thorns are also causing injuries on those that are trying to manage it as well as cattle when they are feeding the thorny leaves. The encroachment of the plant on rangelands have seriously reduced livestock feed resulting in lowered livestock density as well as livestock products (Esther et. al., 2005). The main reason for this is alleged to be the outrageous capacity of the noxious plant to out compete other green plants and herbs that can be utilized as feed for cattle. The plant is also highly aggressive in terms of its intake of water and nutrients. (Ibid).

*Prosopis* is not, however, the only IAS problem that the country is currently faced with. There are a number of species, including among others, *Eichhornia crassipes*, *Lantana camara*, *Parthenium hysterophorous*, *Striga* spp., *Acacia*, *Cuscuta campestris*, *Argemone Mexicana*, *Verbesina encelioides*, etc that are causing risks to biodiversity, ecosystem as well as human health. But according to a preliminary assessment made by the Ethiopian Agricultural Research Institute, *Prosopis* is found to be the number one priority for the country in terms of the magnitude of invasion, the threat it poses to biodiversity as well as its effects on socio-economic and health conditions (EARO, 2002).

This research thus aims to look into the problems so far posed by this priority invasive plant on selected *Kebeles* of the study. It generates information on the management options forwarded and also inspects into laws pertinent to the management of IAS.

## 1.2 Statement of the Problem

Ethiopia is a country known for its wealth of biodiversity and its contribution of such to the rest of the world. The flora and fauna of the country are however dwindling as a result of a number of anthropogenic and natural factors. One of the causes of biodiversity loss<sup>1</sup> anywhere (including Ethiopia) is found to be the encroachment of Invasive Alien Species into various ecosystems. These species advance also into rangelands bringing about shortages in forages and animal feed. Invasion of agricultural lands also has effects on crop outputs with an overall impact on the economy of the country. Despite these, however, there are allegations and proves of merits brought in by IAS invasions.

The Afar region dominated by a pastoralist mode of life is being given assistance by governmental and non-governmental institutions alike to cope with the problem posed by the massive invasion of *Prosopis*. Some organizations like FARM-Africa observed that *Prosopis* has overtaken the vegetation along the banks of the Awash River and hence proposed what is known as 'control through utilization'. The idea is, mainly, to make charcoal out of the aggressive woody plant and crush the pods and seeds to be served as animal feeds. The later is intended to curb the damage caused when whole seeds are eaten and swallowed by animals. As stated above, the seed of the plant gets a nurturing treatment in the stomach of such animals and its germination facilitated as the animals throw their feces along a long range of distance. In spite of such efforts of 'control through utilization' the plant is yet expanding into and encroaching new areas (FARM-Africa, 2006). It is also alleged that the invasive plant species have opened new horizons of usage that brings in novel economic and social objectives.

On the other hand some organizations and experts hold that eradication is the best means of managing alien species as their disadvantages outweigh their benefits. They say that relying on wild species for their benefits is very dangerous. Management actions should hence be geared towards eradication and precluding future entries of the species into the

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<sup>1</sup> Council of Europe, 2004, p. 7. Invasive Alien Species are nowadays considered to be the major causes of global biodiversity loss next to direct habitat destruction. This is one of the justifications forwarded for designing the European Strategy on Invasive Alien Species (2004).

country<sup>2</sup>. It is held that alien species (including *Prosopis* ) that are known for their merits somewhere else can become serious invading weeds when introduced into novel ecosystems without appropriate management (Dubale, 2006). So the controversy in the possible benefits of *Prosopis* and its alleged demerits in terms of economic loss and risks to biodiversity deserves further investigation. This research looks into the impacts of *Prosopis* and how it is perceived by the local communities at Gewane *Woreda*.

The significance of potential threats of IAS has led to the enunciation of a multitude of environmental agreements focusing on IAS internationally. These agreements including the Convention on Biological Diversity, the Ramsar Convention on Wetlands and the International Plant Protection Convention saw the need to put regulatory provisions seeking to control entry and further propagation of IAS. Within the bodies of these agreements and the decisions of their respective governing bodies recommend minimum requirements that ought to be complied with by member countries. Ethiopia has become a party to most of these environmental treaties. This has two implications. Being a party to a treaty will make the agreement to become a part of the body of the laws of the country through the operation of the Constitution. Becoming a party will also implicate the country to further perform minimum tasks according to the mandatory obligations of the Convention. In line with the latter duty, the country is trying to initiate laws pertinent to containment of IAS. Though there are no direct laws regarding the management of IAS in Ethiopia, there are some that have implications. These include laws on pollution control, measures of risk assessment regarding the import, transport, storage and contained use of living modified organisms, rules on quarantine etc.

It is thus important to look into the international agreements of relevance to the management of IAS as well as pertinent policies, strategies and legislations in Ethiopia.

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<sup>2</sup> See the Chapter on Results and Discussions. There is also a project on “Removing Barriers to Invasive Plant Management in Africa” hosted at the EIAR. It is a jointly funded programme by the Ethiopian Government and the Global Environment Facility (GEF) through the United Nations Environment Program (UNEP). It aims at identifying the structural and capacity based obstacles on the appropriate management of IAS in the country with a view to bringing in sustainable solutions to the problem.

National legal framework should be examined for sufficiency in terms of containing the problem of IAS in the country. In order to analyze gaps in legislation it is imperative to assess local perceptions on the actual and potential impact of IAS and the available management techniques proposed or already in place. To this end, Gewane *Woreda* of the Afar National Regional State is considered for a case study to determine local perception on impact and the various, contentious management alternatives. An examination of laws already in force and those that are in the pipeline for adoption, including the draft Regulation to Control *Prosopis* Invasion in the ANRS are also examined for the purpose.

### **1.3 Objectives of the study**

#### **1.3.1 General Objective**

The general objective of the study is to assess the extent of the impact of *Prosopis juliflora*, the management options followed by the different actors, and to determine the sufficiency of existing legal framework in containing the problem of IAS in Ethiopia.

#### **1.3.2 Specific Objectives**

The study seeks to assess:

- The perception of local communities, expert groups on the advantages or disadvantages of *Prosopis juliflora*,
- the impact of *Prosopis juliflora* in selected *Kebele*'s of Gewane *Woreda* and based on findings, determine the need for a law governing IAS in Ethiopia,
- the different management techniques proposed for the management of *Prosopis juliflora* and determine their efficiency,
- the perception of different groups about the various techniques proposed to control *Prosopis juliflora*,
- national legal framework pertinent to IAS and analyze gaps,

### **1.4. Research Questions**

The following are the research questions that are sought to be resolved by this piece of research work.

1. What are the manifested and potential problems associated with the introduction of *Prosopis* in the area?

2. What are the sought management options towards controlling the impacts of *Prosopis juliflora*?
3. How does the public and the different actors view the efficiency of the respective management measures?
4. What legal instruments are available for the management of Invasive Alien Species in Ethiopia?
5. What are the gaps in legislation in view of containing the impacts posed by IAS?

### **1.5. Scope and Limitations of the Study**

The study looks into the kind of impact that Invasive Alien Species have and the different management options that different actors seek to pursue. So the case study is limited to only one species out of the broad category of invasive alien species in Ethiopia. The impact and perception on opted management techniques is studied in Afar region, while the plant is also abundant in other regional states such as Dire Dawa and Somali National Regional State. For reasons of limitation of resources and time, the research was just undertaken in the purposively selected Gewane *Woreda* of the ANRS.

This study managed to research on the impact of *Prosopis juliflora* only on some selected parameters (such as the alleged benefits as feed for cattle, charcoal and energy production, use as shade and wind breakers and such negative impacts on biodiversity, crop and livestock production and becoming hiding spots for predators). Other ecological and broader socio-economic impacts as well as land use changes brought about as a result of the introduction of the plant species are not dealt with under the study. It is important to undertake an assessment of the perception of the local people with a view to devising applicable legal regime on IAS. However, due to time constraints it is found impossible to cover all aspects of the perception of communities. Some issues such as the general perception on introduction, expansion, impacts and benefits as well as views on modalities of containment were considered as the subject of study. Though currently, there are numerous Multilateral Environmental Agreements (MEAs), this study dealt with identifying only those that are very much related to IAS. Study on domestic policies

and laws followed the same pattern, and thus not all areas of environmental legal framework is covered under this piece of study.

### **1.6. Organization of the Thesis**

This thesis comprises five chapters. It begins by giving an introductory background followed by statement of the problem, objectives, significance, scope and limitations of the study. The second chapter reviews literatures related to the problem under investigation. Various publications and internet materials were looked at, including literatures, scholarly articles, Multilateral Environmental Agreements, domestic policies and laws.

In chapter three, a description of the study area and the population is made. The location and physical settings of the study area are also presented. Besides, the Chapter presents the research methodology, which includes the study design, methods of data collection as well as sampling methods and procedures. The modality of data analysis followed to investigate the answers for the research questions is also included in this chapter.

Chapter four discusses results of the research and is divided into three major parts. The first part deals with background characteristics of the study population including demographic characteristics. This is followed by the section dealing with the impacts of *Prosopis* and the perceptions of the dwellers. Opinion of communities as to whether *Prosopis* is useful or harmful to them, as well as their chosen mode of containment is analyzed under this section. The third section discusses legal and institutional issues and the relevance of a legislative approach towards containing problems related to the general issue of IAS in Ethiopia.

The final chapter provides conclusion and recommendations. Appendices and a list of references are attached at the end.

## 2. Literature Review

### 2.1 Invasive Alien Species – Overview

#### 2.1.1 Definition

In order to have a comprehensive understanding of IAS, it is imperative to begin by giving proper definition and expounding on the elements that characterize invasiveness. Terminologies regarding this have evolved through time. There is indeed a broad category of definitions all trying to chart out the essential elements embodied in what entails invasiveness, and when and under what circumstances can a species be referred to as alien to a certain locality.

In spite of differences in definition, there is a consensus that IAS are the greatest global threats to biodiversity, second only to habitat destruction with huge implications on national economy, biodiversity, health of people and animals. Some terms deserve definition for concept clarity and avoidance of possible ambiguity.

**Alien (Species)** – A species is supposed to be alien when it is intentionally or unintentionally introduced in a location, area, or region where it does not occur naturally. Synonymous words are used to describe such encroachment of species outside their natural range. Common usage of terms include “non-indigenous”, “non-native”, “exotic”, “foreign”, “new”, “pest” etc. (Shine, 2000).

According to the Convention on Biological Diversity (CBD), Alien Species are referred to as “species, subspecies or lower taxon, introduced outside its natural past or present distribution, including any part, gametes, seeds, eggs, or, propagules of such species that might survive and subsequently reproduce” (CBD, 1992).

**Invasive** - The term “Invasive” likewise has no generally accepted meaning. The basic element imbedded in invasiveness is however linked to the adverse impact that the species imposes on the receiving environmental media (Shine, 2000). Invasiveness includes “... alien species that escape from human control, go beyond the intended physical boundaries and cause environmental damage” (Shine, 2000).

### 2.1.2 Types of Invasive Species

Not all alien species establish and naturalize themselves to become “invasive” to the ecosystem into which that they are introduced. So care should be taken whenever considering which species are invasive and which are not. Likewise, native species may be invasive, particularly when the ecosystem is disturbed for reasons such as nutrient enrichment (eutrophication) of water bodies, altered flow regimes, changes as a result of alien water weeds (like for instance Water Hyacinth) (CABI, 2007).

As stated in the previous section, the most basic element in understanding impacts of IAS is their invasiveness. But which species are invasive and which are not? What is the parameter for measuring invasiveness? There is no distinct measurement for determining invasiveness. However, it is agreed that every species that has been removed from its natural environment have high propensity to become invasive. There are exacerbating factors to this. For instance species that are known for promiscuity and breed faster have more chance to invade than others. Some species may be highly adaptable in new environments and take advantage of ecological disturbances. Certain species characters and circumstances are identified to be instrumental in predicting invasiveness (CABI, 2007):

- Knowledge that a certain species is invasive elsewhere in the world,
- Widespread distribution and abundance in the native range,
- High adaptability (tolerance) to a variety of environmental conditions,
- Ability to grow and mature rapidly (reach reproductive age quickly),
- High reproductive output (populations built quickly),
- Ability to colonize from a single pregnant female,
- Effective dispersal mechanisms, enabling rapid spread once established,
- Tolerance of various types of soils for invasive plants,
- Aggressive behaviour and competitive ability,
- Association with humans,
- Small size, making both detection and control difficult

Though most of these determinants are scientific in nature, they have immense place in placing appropriate legal and institutional structures for predicting invasions and get advance preparations of containment.

### **2.1.3 The Invasion Cycle**

Put in very simplified way, IAS invade a new horizons by following three important processes. These are:

- Introduction,
- Establishment and reproduction,
- Spread,

Introduction (sometimes referred to as translocation) is the human assisted movement of an organism to an area outside its natural range (CBD, 1992). Introduction of IAS may take various forms and may be intentional or unintentional. The reasons for intentional introduction may be their use as food, ornamental services or social or economic purposes. But some species are introduced accidentally through human activities such as trade, travel, and transport. Whatever routes are taken for introduction, invasive species must be viable and have to survive to reach the destined environment withstanding harsh environmental situations such as excessive temperature, light, salinity, nutrient levels etc. (CABI, 2007)

The species must also persist and reproduce to form a self sustaining population (also known as the “founder population”). This is the process commonly referred to as “establishment”. The next crucial phase in the invasiveness cycle is the explosion phase, which is characterized by multiplication of the species in order to become sufficient for the invasion (Ibid).

### **2.1.4 Causes and Pathways of Invasion**

There a number of causes for introduction of invasive alien species differing significantly on the type of human activities, control of movements, species resilience to novel environments etc. Some introductions are legally backed through government authorizations. Such is the case with the introduction of *Prosopis juliflora* in Ethiopia<sup>3</sup>.

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<sup>3</sup> See the discussion on “Introduction and Establishment” of *Prosopis* under Section 2.2.1

Some are allowed to get in national boundaries for use in contained facilities. But it is probable that these escape from their containment facilities due to many factors. It is also common that the species are introduced across ecological and political borders illegally. This trespass of regulatory measures is often a result of the high monetary values attached to some species in trading activities. Unintentional introduction has been recently exacerbated through the proliferation of global trade, increased and swifter modes of transportation in use and tourism. Unintentional introductions are relatively a huge threat because of their magnitude and “unplanned nature”. (Shine, 2000)

## **2.2 The Prosopis issue in Ethiopia**

### **2.2.1 Introduction and Establishment**

*Prosopis* is one of the most widespread tree species occupying arid and semi- arid zones of the world. Together with *Acacia*, the plant species are estimated to occupy around 3.1 million square kilometers of land (Pasiiecznik, 2001). The initial introduction of *Prosopis* to Ethiopia is at first evidenced in late 1970s at the Goro Nursery in Dire Dawa.

It is supposed that the major reason for importing the species (presumably from India (HDRA, 2005)) was to lessen the harsh environmental conditions in the Afar region. The tree was then planted in the Irrigation sites of the Awash River basin, facilitated by elders in the region who have been attracted by the green leaves of the shrub (Senayit, 2004). The tree species continued to be planted over the years with massive expansion through the programme of Food for Work from 1986 to 1988 (HDRA, 2005). Studies confirm that the plant species is disseminated to a large extent through excreta of cattle that fed on the pods and seeds of the plant (Senayit, 2004). *Prosopis juliflora* is remarkable for its resilience of harsh conditions such as droughts. In prolonged dry periods the plant will take advantage of its capability to withstand pressure and can outwit other competitive native varieties (Zelalem, 2007).

### **2.2.2 Impact of *Prosopis juliflora***

Literatures and studies suggest that there are wide ranging impacts of *Prosopis juliflora*. The most important of these are summarized hereunder.

#### **Impact on Biodiversity**

*Prosopis juliflora* is found out by some studies to have enhanced the incidence of aphids and spider mites by serving as alternative host. It is also seen to harbour rodents which inturn has an effect of reducing diversity and population of grass species (Zelalem, 2007). The disappearance of grass species in the Afar region is the most disappointing phenomena owing to the fact that the pastoral community heavily depended on such resources as animal feed (Senayit, 2004).

Report suggest that the number and diversity of some plant species have decreased as of the introduction of *Prosopis* in the Afar region. Some of the plant species that have gone extinct include *Adayto*, *Angele*, *Hedayto*, *Gerento*, *Weydeeto*, *Girar*, *Welaneba*, *Mederto*, *Sagento*, *Rebreba*, *Adedo*, *Yeebto*, *Keselto*, *Angeleta*, *Mekerto* (Senayit, 2004) and all grass species (Table 4: 13).

### **Impact on Crop Production**

There are some agricultural practices such as production of cotton and tree fruits in Gewne *Woreda*. It is supposed that the prevalence of *Prosopis*, particularly in some of the *Kebeles* (such as *Adbaro Kebele*) of the *Woreda*, is deemed to have significantly curtailed these agricultural practices. Though detailed studies need to be undertaken to demonstrate the effect of *Prosopis* in *Gewane Woreda*, other studies on neighbouring *Woredas* like *Amibara* show the tendency of the plant to overtake farmlands, and occupy field borders, as well as roadsides. And this has increased the cost of production expended for clearing the infested land (Senayit, 2004).

### **Impact on Livestock Production**

There is a general agreement among scientists in the field that *Prosopis* is posing a serious threat of failure on livestock production. The reasons are manifold, the main one being the dwindling of rangeland resources as a result of the aggressive invasion of the plant. The sharp thorns of the trees also pierces the mouths and necks of cattle and creates difficulty while feeding on it. Studies in *Amibara* demonstrates that the neck of cattle, sheep and goats which feed on pods of *Prosopis* for a prolonged period will be twisted, ultimately becoming fatal. It is even alleged that the number of cattle that die of *Prosopis* is larger in magnitude than those dying of drought (Senayit, 2004).

### **Opportunities of use**

Some scientists advocate the fact that there are untapped opportunities availed by *Prosopis* in an area. There are increasing voices to make the best out of the species rather than eradicating it without exploiting the benefits. Some of the alleged opportunities are summarized below.

### **Use as fuel wood**

The woods out of *Prosopis* are heavy and hard making the plant an excellent source of fire which can be used as fuel wood production, for brick furnaces, bakery oven and grill charcoal for household consumption (Zelalem, 2007). Some are however of the opinion that the quality of charcoal produced out of the plant is very poor (Senayit, 2004).

### **Use as a Source of Clean Energy**

Findings hold that modern biomass based technology can be implemented to serve as a source of large scale power generation for countries like Ethiopia (AAU, 2009). As an alternative to the use of plant residues in the solid form, biomass can be converted to gas to produce smokeless outputs that can supply high quality energy particularly in the vicinity of abundant biomass sources. One identified area is the high *Prosopis* infested areas of the Afar National Regional State, namely Zone 3, where in an estimated 50 MW to 100 MW of energy will be produced from the flora resources covering an area of 700,000 ha (Ibid).

### **Use as Animal Feed**

The difficult dry seasons in arid and semi-Arid regions such as Afar can be overcome by providing cattle with the dry pods of *Prosopis juliflora*. When there are no alternatives, use of seed pods is regarded as a good source of animal feed. The pods have a significant amount of protein comparable to that one can get from soybean (Zelalem, 2007).

There are however, counter arguments that the smaller hard seeds are not digestible and will remain in the digestive tracts of animals which can further exacerbate the intensification of invasion through animal defecation. There are suggestions of grinding and turning pods into flour to make them digestible and overcome the problem of intensifying *Prosopis* growth.

## **Use as Shade and Wind Breaker**

*Prosopis* is also used sometimes as the only shade in the arid and semi-arid areas of ANRS. Most *Kebeles* at Gewane *Woreda* take advantage of the bushy thickets of *Prosopis* as shades from the sun and the wind. It also protects houses from failure due to heavy wind.

### **2.3 Management Options and Controversies**

There are some efforts exerted to control the problem of *Prosopis* in Ethiopia and elsewhere in the world. Generally the methods employed are clearing through mechanical means, application of chemicals, firing the trees and biological controls through the use of seed-eating beetles. The world has attempted these methods over the last couple of decades. Some writers (Pasicznic, 2001) have the opinion that it is impossible to eradicate *Prosopis* through these control techniques. Opinions formulated in this line state that large amounts of money were spent in vain to eradicate *Prosopis* in countries like Argentina and USA, and hence suggest “harmonious life” through utilization (Ibid). Among the options suggested by proponents of use are charcoal production, use of parts as feeds for cattle, beverage for alcohol production, timber production, extraction of honey, and manufacture of chip woods. Recent suggestions in Ethiopia hold also that the biomass can be turned into climate friendly gas outputs that can serve as a source of large scale power generation (AAU, 2009).

### **Chemical Control**

Advocates of control through eradication, on the other hand, raise the issue of non-predictability of the character of wild species (such as is the case of *Prosopis* for Ethiopia). Experts in this line of thought have a different view on how to undertake the eradication. For instance, EIAR supports the idea of eliminating the plant species by cutting it 15 to 20 centimeters below ground and applying used motor oil or herbicides (such as Glyphosate) to the stump. This method is reported by some to be effective for managing future propagation of the invasive plant (HDRA, 2005). Again there are views against this method based on the allegation that chemicals have wider negative impacts on the environment and socio-economic conditions of local communities.

## **Mechanical Control**

Clearance by mechanical means is another option in the line of complete eradication. There are attempts at some *Kebeles* in the Afar region to clear invaded plots of land from *Prosopis*. This is mainly based on an assessment of availability of sufficient water for agricultural practices in the area. The pastoralists also practiced eradication techniques by felling trees and uprooting stumps and seedlings. However, this is evidenced to have been very costly (Zelalem, 2007). There are pilot cases in the compounds of Melca Werrer Research Centre, where in plots that were completely covered by *Prosopis* were cleared manually and turned into cultivation of local tree varieties. Personal visit at the sites of the Research Centre, however, demonstrated that there were young seedlings of *Prosopis* sprouting out of the reclaimed land. The reason for this is the relatively higher amount of seeds already deposited in the soil. In densely invaded areas the number of seeds produced per hectare is estimated at 60 million/year (GISP, 2001). (See also the discussion under Section 4.3.1 on Policy Choice between Management Alternatives).

## **Bio-control**

Another option for eradication of *Prosopis* is the application of biological agents that are identified to feed on the seeds of *Prosopis*. Two seed feeding beetles, *Algarobius Prosopis* and *Netumius arizonensi*, were introduced into South Africa, in an effort to cope with the problems caused by *Prosopis* invasion (Ibid). It is reported, however, that the insects were not effective for the competitiveness of cattle in feeding on the pods at much higher speed, and exploration into other forms of bio-control agents are being explored (Ibid).

## 2.4 Assessment of the Legal Framework on IAS Management in Ethiopia

### 2.4.1 Background

A critical analysis of existing laws is a prerequisite for developing a coherent legislation in matters related to protection from and control of alien invasions. There is also a need to back the management of *Prosopis* (as part of the broader realm of invasive alien species) with appropriate legislation. This is because of the fact that pollution resulting from biological invasions is harder to tackle than any other form of pollution for the following reasons (Shine, 2000).

- The range of production and trade activities that depend on or involve alien species,
- The high number of entry points and pathways for introduction,
- Gaps in data on native species,
- Problems of prediction,
- Difficulties related to defining the objects and activities that need regulation by law,
- Lack of objective criteria or methodologies for assessing risk,
- Logistical and legal difficulties in tackling ongoing invasions,
- The value attached to the alien species (including *Prosopis*) by different groups and stakeholders,
- Low political or public awareness

It is, however, not common to find a standalone legislation regarding the management of Invasive Alien Species in countries. The basic reason for this is the origin or type of the IAS itself. The species in question may either be a plant or an animal, which creates duplication and overlap in the mandates of sectoral institutions whose operational jurisdictions are often delineated with separate laws. Some IAS for instance may fall under plant pests meriting regulation under the available phytosanitary legislation while others may not be regulated at all (Manzella et. al., 2007).

In Ethiopia, though there is little or no literature assessing the legal framework related to the management of IAS, it is understood that the pieces of regulations available are fragmented in approach. Patches of provisions are found in legislations related to agriculture, biodiversity, environmental impact assessment, pollution control, health and quarantine laws. This requires thorough assessment and investigation into the existing regulatory framework to come up with the pressing need to regulate invasions and contain already introduced IAS.

It is found important to commence the discussion by outlining the tools enshrined in pertinent international instruments of relevance to alien species. This is because of two reasons. First of all determination of a legal approach of IAS management applicable to any country including Ethiopia, as well as accuracy in implementation of the laws demands harmonization of national laws with international instruments (Manzella et. al, 2007). IAS related international instruments set minimum standards that ought to be followed by member states. It thus follows that an understanding of legal issues pertinent to the management of IAS calls for a need to look at the various international standards embodied within the relevant treaties.

Besides this, treaties adopted by Ethiopia have special place in the general scope and application of laws in the country. That is to say that they become part of the body of laws of the land and can therefore be of direct application by the different agencies as per Article 9 (4) of the Constitution. Hence any national legal assessment of relevance to IAS management will not be complete without analyzing international agreements accepted or ratified by Ethiopia. The discussion under this section is also expected to offer vital input to identify the frame of a future law that is tuned with international concerns that may be adopted by the country to fill identified gaps to ably prevent future introductions as well as tackle IAS already affecting ecosystems. (See recommendation)

#### **2.4.2 International Legal Framework on the Management of IAS**

The main focus of the discussion hereunder is the obligations that the instruments levy on member states as well as the approach followed with in each. Because of the multiplicity of sources of IAS and pathways of introduction, the main focus under this section are the

international agreements related to biodiversity, living modified organisms and international trade. The most pertinent MEAs in this regard include the Convention on Biological Diversity (CBD), the Cartagena Protocol on Biosafety to the CBD, the Ramsar Convention on Wetlands and the WTO agreements.

### **Convention on Biological Diversity**

The Convention on Biological Diversity (CBD) is the first international treaty that took a “holistic, ecosystem-based approach” to the conservation of biological diversity (UNEP, 2006). It is negotiated and adopted at the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992. The objectives of the CBD, as put under Article 1, are the conservation of biological diversity, the sustainable use of biological resources, and the fair and equitable sharing of benefits arising from the use of genetic resources.

The CBD has recognized that one of the causes of biodiversity loss is the invasion of ecosystems by invasive alien species. These species has a tendency to trample with the normal and evolutionary pattern of species divergence thereby endangering the sustenance of indigenous varieties. The CBD, under Article 8 (h), urges member state to prevent the introduction of, control or eradicate those alien species which threaten ecosystems, habitats or species. On the contrary states are bound by the obligation under Article 8(d) to promote the protection of ecosystem, natural habitat and maintenance of viable population of species in natural surroundings. State parties to the Convention are also bound to develop or maintain necessary legislation and/or other regulatory provisions for the protection of threatened species and populations as per Article 8(k). This is a reaction, during the time of the negotiation, to the already manifested needs of country parties like Ethiopia that are affected by introduced invasive species and other environmental hazards. It is also an attempt to show the necessity of backing environmental management through legal tools.

The CBD allows members to take proactive measures whenever development projects are designed that may have adverse effects on ecosystems. Member states are hence expected to develop their own procedures requiring environmental impact assessment of proposed

project that are likely to have significant adverse effect on biological diversity with a view to avoid or minimizing such effects. Article 14 puts that such impact assessments should also be undertaken through consulting the public. Under Article 6, the CBD urges that states need to devise national biodiversity strategies and action plans and integrate the conservation and sustainable use of biological diversity into development plans. According to Article 3, member states are also responsible for containing activities within their boundaries and protecting from damage the environment of other states or areas beyond their national jurisdiction.

All these provisions that are pertinent to IAS management are equally applicable to Ethiopia, it being a party to it. Owing to the transboundary nature (Shine et. al., 2000) of the impacts and management of IAS, there is also a need to align national legal system with bordering countries and the regional community. This calls for revising the available legal mechanisms and weighing sufficiency to deal with the problem. Being highly affected by IAS, *Prosopis* being one, and also owing to the country being prone to further invasions, there is also a need to take coordinated measures to prevent and control the already existing impacts of alien invasive species on biodiversity.

#### **Guiding Principles for the Preservation, Introduction & Mitigation of Impacts of IAS<sup>4</sup>**

These Guidelines were approved by the sixth meeting of the Conference of the Parties of the CBD through its decision VI/23. The purpose of the guiding principles is to assist member countries in the implementation of Article 8 (h) of the CBD on the management of IAS. The instrument contains 15 guiding principles with a hierarchy of objectives to:

- Prevent the entry of potential IAS, both between and within states,
- Prevent the establishment and spread of alien species if entry has already taken place,
- Eradication at the earliest possible stage, and
- Containment and long term control measures, if eradication is not feasible or cost-effective.

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<sup>4</sup> The full name of the CBD guidelines is “Guiding Principles for the Preservation, Introduction & Mitigation of Impacts of Alien Species that Threaten Ecosystems, Habitats or Species”

### **Cartagena Protocol on Biosafety to the CBD**

The Cartagena Protocol on Biosafety, adopted on 29 January 2000, has the objective of ensuring adequate level of protection in the field of safe transfer, handling and use of living modified organisms (LMOs) resulting from modern biotechnology that may have adverse effects on the conservation and sustainable use of biological diversity. As per Article 4, the Protocol applies to the transboundary movement, transit, handling and use of LMOs. State parties are required under Article 2 (2) of the Protocol to ensure that the development, handling, transport, use, transfer and release of any living modified organism is undertaken in a manner that prevents or reduces the risk on biological diversity and that of human health .

The Protocol does not have direct significance regarding the regulation of IAS. But since it is based on the Precautionary principle, it obliges member states to take risk assessment before shipment of genetically modified organisms that may have adverse impact on ecosystems. It also obliges countries to base their import decisions on what is known as an Advance Informed Agreement (AIA) procedure. This enables participation of the public in decision making on issues of importation (or transit) that may harm biodiversity. Another feature of significance in the management of IAS is the Protocol's information exchange platform. Article 20 of the Protocol provides for the establishment of the Biosafety Clearing House Mechanism (BCH) with the aim of facilitating the exchange of scientific, technical, environmental and legal information on and experience on LMOs. Country parties to the Protocol would benefit in this regard to determine whether a particular species (LMO) can be admitted to enter its boundaries or not. It also serves countries to align their respective risk assessment procedures to internationally accepted standards. It is true however that tools like risk assessment procedures only regulate intentionally introduced species. The large bulk of invasive species that have found their way into a country through unintentional pathways will not be detected through these mechanisms.

Ethiopia has ratified the Cartagena Protocol on Biosafety to the CBD on 31 July 2003 through Proclamation No. 362/ 2003. Being a party to this international agreement, the

country has completed preparation of what is known as the National Biosafety Framework (NBF). The NBF is a document consisting of a draft Biosafety Proclamation and a series of Directives for undertaking risk assessment, modalities of storage, transport, packaging, labeling, contained use, procedures on emergency situations etc. related to the safe handling of genetically modified organisms that are results of modern biotechnology. The draft Proclamation provides for the legal framework that deals with the risks associated with the development, use, import, export and release of genetically modified organisms (GMOs) and products thereof. All of these documents are however still drafts and await formal adoption by the decision making body of the government for implementation. Following likely adoption of the draft law and its supporting directives, the intentional introduction and management of IAS of a genetically modified nature will have legal backing and a chance of enforcement through the available mechanisms.

### **The International Plant Protection Convention**

The international plant protection was adopted by the conference of the Food and Agricultural Organization of the United Nations (FAO) at its sixth session in 1951. It provides a framework for international cooperation targeted at preventing introductions and promoting appropriate control measures on issues of pests of plants and plant products. It regulates the spread of IAS within the wider definition of “pests”<sup>5</sup> and deals with phytosanitary measures to be taken at a country level.

These obligations imposed on member states include the designation of a national plant protection organization (NPPO) mandated to carry out phytosanitary activities within the jurisdiction of states. The core obligations of the NPPOs include:

- The inspection of growing plants, areas under cultivation, storage of plant products with the object of reporting pest outbreaks;
- The inspection of consignments of plants and plant products moving in international traffic, to prevent the introduction or spread of pests;
- The issuance of phytosanitary certificates for export consignments to verify compliance with the phytosanitary requirements of the importing country;

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<sup>5</sup> Pests are defined under the IPPC as any species, strain or biotype of plant, animal or pathogenic agent injurious or potentially injurious to plants or plant products.

- The distribution of information regarding regulated pests and their means of prevention and control;
- Research and investigation in the field of plant protection, and issuance of phytosanitary regulations.

The IPPC Secretariat manages a standard-setting programme under which 27 International Standards for Phytosanitary Measures have been approved to date. Though the IPPC was initially targeted towards the protection of plant health from pests, it was later on modified to deal also with the introduction and impact of invasive alien plants.

The IPPC have a wider scope as it covers, the protection of cultivated plants, wild flora, natural and semi-natural habitats as well as ecosystems. In order to resolve alleged overlaps with the CBD and its guidelines on IAS, the secretariat of the two conventions work collaboratively and has in fact determined that the IPPC is essentially an implementation of Article 8(h) of the CBD. It is also agreed that many provisions and standards of the IPPC are directly relevant to, or overlap with, the guiding principles of the CBD on invasive alien species.

### **The Sanitary and Phytosanitary (SPS) Agreement**

The SPS agreement is basically a trade facilitating instrument through the prevention of the use of sanitary and phytosanitary measures as disguised barriers to international trade. The agreement lists out certain activities as Sanitary and Phytosanitary measures. According to Annex A of the agreement these include, among others, measures exerted to: -

- protect animal or plant life or health from risks arising from the entry, establishment or spread of pests, diseases or disease-carrying organisms;
- protect from risks arising from diseases carried by animals, plants or products thereof, or from the entry, establishment or spread of pests; or
- prevent or limit other damage from the entry, establishment or spread of pests.

Binding only on WTO member countries, the SPS agreement encourages member states to use international standards on protection measures. According to Article 2 of the Agreement, measures are to be taken only to the extent necessary to ensure safety to human, animal and plant life, and decisions should be based on scientific evidence. Though not explicit, this agreement is relevant to the management of IAS within the broad category of pests.

### **The Ramsar Convention on Wetlands**

The full designation of this Convention is “Convention on wetlands of International Importance especially as Water Fowl Habitat”. It has assumed the name “Ramsar” because of the place of adoption in Ramsar, Iran in 1971. The Ramsar Convention provides a general framework for international co-operation for the conservation of the ecosystems known as “wetlands”. Defined under Article 1 of the Ramsar Convention, a wetland is:

...an area of marsh, fen, peat land, or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including area of marine water that depth of which at low tide does not exceed six meters.

Some of the ecological functions of wetlands are water storage, flood mitigation, erosion control; ground water recharge and discharge; water purification, retention of nutrients, pollutants, and sediments and stabilization of local climate condition such as rainfall and temperature (<http://www.ramsar.org>). Among the factors that threaten the existence of wetlands, invasion by alien species takes a significant place. This is a major cause of wetland deterioration next to land reclamation and drainage for converting the wetland into some other purposes such as agriculture. (UNEP, 2006)

Wetlands are vulnerable to damage by invasive alien species because of the fact that they host an immense variety of species of microbes, plants, amphibians, reptiles, birds, fish and mammals all of which are closely linked forming a life cycle and complex set of interactions (UNEP, 2006). Loss of one species amongst the interlinked many is

tantamount to the endangerment of an entire ecological web leading to its loss in due course of time (Ibid). The very essence of the Convention lies in this making international protection of wetlands found within national boundaries to be essential for maintaining global and national biodiversity (Ibid).

The Convention does not place any specific obligation on member states to enact laws or protect wetlands found in national boundaries by any other form of administrative action. It, however, compels states to designate at least one wetland in a list of wet lands of international importance together with an expression of government commitment to design and enforce their planning so as to promote conservation and wise use of wetlands. An international mode of protection is offered by the Convention for those wetland resources that are designated under its wetlands of international significance scheme.

Ethiopia is endowed with abundant wetland resources. It has a variety of lakes, swamps and flood plains. However these resources are in continuous jeopardy as there is lack of policy guiding their protection. These ecosystems are getting affected due to, among other factors, pollution from effluents discharged directly into them, siltation as a result of catchment degradation and intensive irrigation activities. (EPA, 2004) The introduction of Invasive Alien Species is the biggest threat to wetland ecosystems. IAS, with their tendency of aggressive intake of nutrients and water, can easily displace other species and hence destabilize the integrity of the ecosystem. *Prosopis*, for instance, with the aid of its long roots can consume too much water from the ground which may greatly affect the banks of rivers, lakes and other forms of wet lands.

Despite the benefit availed by the Ramsar Convention in the form of financial and technical support and despite the wise use scheme that protects national wetland resources through international machineries, Ethiopia is not yet a party.

## **National Policies and Strategies on IAS Management Background**

Ethiopia is suffering from a great range of biodiversity deterioration. The causes are multifarious, IAS being one. The threat posed by invasive species is increasing affecting biodiversity and the economic well-being of local communities. It is also posing risks to agricultural lands and protected areas, aggressively invading pastoral areas, destroying natural pasture, displacing native trees, forming impenetrable thickets, and reducing grazing potential (Mackee, 2007). There are some efforts at the policy and legal level exerted towards controlling entry of IAS into the national boundary. Some measures are also being taken to address already colonized territories. Despite this, however, there is currently no comprehensive policy or law that puts sufficient regulation on the introduction, movement, control and eradication of IAS.

Generally focus on environmental concerns has quite a recent history in Ethiopia. It can safely be said that policies and laws on environment were given attention as of the inclusion in 1995 of some provisions under the fundamental rights section of the Constitution in force. The country then proceeded to adopt a standalone environmental policy in 1997 and subsequently enacted some implementation tools such as laws and guidelines. Some of these instruments address the issue of IAS management though in an indirect manner. Amongst the many environment related legal instruments, only those that are relevant to IAS management are discussed hereunder.

The discussion under this section looks into the available policies and laws regarding the management of invasive alien species in the country. These include the patches of instruments spanning sectoral agencies adopted by the relevant decision making bodies as well as drafts awaiting formal approval.

Major policies are discussed followed by pertinent laws and guidelines issued for their implementation. Particular emphasis is given to assess gaps and comprehensiveness of the legal framework in line with international standards discussed in the previous section.

The direction followed under this section conforms to the hierarchy of objectives under the CBD and the guiding principles adopted under the Sixth COP decision, namely:

1. Prevention from entry of IAS
2. Prevention of establishment
3. Early warning and rapid response
4. Containment and long term control measures

Cross cutting issues such as public participation, education and training, are also dealt with under this section.

### **The FDRE Constitution**

A very significant step in the development of environmental law in Ethiopia is the integration of environmental rights as a subcomponent of Fundamental Rights of citizens within the 1995 FDRE Constitution. All people are entitled to a right to a clean and healthy environment. The government has a corresponding obligation of ensuring that this right is implemented. Economic and social development initiatives are also to be checked for sustainability and possible environmental damage. This includes the rights of communities to be consulted and be given a chance to meaningfully express their views in matters that may affect their livelihood. Another important feature of this Constitution is the place that it has given to Multilateral Environmental Agreements. According to Article 9 (4), all treaties accepted by Ethiopia shall be parts of the body of laws of the country. This will automatically put MEAs pertinent to invasive alien species to form part of Ethiopian laws and are hence of automatic application as if they were parliamentary pronouncements.

These provisions of the supreme law in Ethiopia have direct significance in keeping the country's diverse floral and faunal heritage as well as maintaining the normal functioning of ecosystems. As part of the causes for biodiversity erosion, any deliberate or unintentional introduction by way of food aid, agriculture, trade, tourism etc. of invasive alien species (including *Prosopis juliflora*) should be checked against environmental parameters. Though it cannot be expected to go into details, the constitution has

sufficiently laid the foundations for subsequent rule making regarding the management of IAS in Ethiopia.

### **Conservation Strategy of Ethiopia**

This overarching document is an output of what is known as the project on Conservation Strategy of Ethiopia (CSE). The CSE project was designed with the purpose of determining the state of the natural resource base in Ethiopia as well as to show trends in the utilization and management of such. It had also an objective of formulating a policy and strategy on natural resources, and the development of federal action plans. (CSE, 1997)

The national conservation strategy has set objectives on different environmental issues. Some of the strategies are to enact and enforce legislation for the preservation, conservation and management and sustainable use of genetic and ecosystem resources to provide for the conservation of biological diversity in its widest sense as well as, recognize, identify and control certain animal and plant species that may be pests or vermin and should therefore be kept out of natural ecosystems and protected areas. Enhancing public awareness in the area of biodiversity conservation as part of the broader environmental education strategy; as well as strengthening the link with biodiversity related MEAs is another objective of the CSE. Apart from containing IAS related provisions, the CSE document prepared in 5 volumes is responsible for drawing out the 1997 Environment Policy of Ethiopia.

### **Environment Policy of Ethiopia**

The 1997 Environmental Policy of Ethiopia (EPE) was a step forward in acknowledging the need for environmental sustainability and the sound management and use of natural resource and thereby reconciling the fundamental need of the present and future generations. Derived from the policy and strategy component of the conservation strategy of Ethiopia (CSE), the EPE is designed to direct Environment related activities and programmes being undertaken by the various sectors.

The EPE urges actions for the restriction of exotic species from biodiversity hotspot areas, thereby limiting the spread of some potentially invasive plants. The Policy is strict on possibilities of posing biological pollution as a result of unrestrained activities. It has uplifted the value of legislations on risk assessment when it states under Section 3.3 that "... the importation, exportation and exchange of genetic and species resources is subject to legislation, e.g. to ensure the safeguarding of community and national interests, the fulfilling of international obligations, quarantine, etc." The same section explains the reason stating that "... biological material which is self-regenerative and impossible to control once allowed to get out of control may result in the most insidious and damaging form of pollution which is biological pollution." It thus concludes by establishing that "... the importation and use of biological material including those genetically engineered should be under stringent regulations". Though the country does not have a standalone policy or a specific legislation on invasive alien species, this policy element can be used as a background for future actions.

The possible adverse effect of invasive alien species on biodiversity is also recognized under the "Water Resources Conservation" section of the EPE. The objective of this section is "to ensure that any proposed introduction of exotic species into water ecosystems be subject to detailed ecological studies and environmental impact assessment". This section of the Policy also recognizes that natural ecosystems, particularly wetlands and upstream forests, are fundamental in rendering ecosystem services and hence deserve conservation. As it happens with invasive alien species, despite this policy statement there is no law in place governing conservation and utilization of fisheries resources.

At sight, the policy goals laid down in the EPE seem to reflect the government's commitment to conserve natural resources and protect the environment. Protection from the possible adverse impacts that may arise from the introduction of exotic species is an issue of concern for the Policy. However, it is clear that this commitment has to be substantiated through detailed and enforceable rules. There is still no law regarding importation of biological materials or exotic species. Again the EPE has a mechanism for

its periodic revision<sup>6</sup>. To this may avail a good avenue to include issues of concern in the whole area of IAS management in Ethiopia that were not touched upon through the EPE. This for instance include policy stands regarding pathways of introduction ( such as those through intentional introduction, introduction into containment or unintentional introductions) and the actions that needed to be taken whenever introductions are detected. Nonetheless, no initiative has been taken in that respect after the adoption of the policy as far back as 1997.

### **National Biodiversity Strategy and Action Plan**

This strategy and action plan on biodiversity resources is developed in 2005 through support from the trust fund of the Global Environment Facility. The task is assumed by the Ethiopian government as part of fulfilling the obligation imposed under Article 6 of the Convention on Biological Diversity.

The strategy Document has identified IAS as one of the root causes of biodiversity loss in Ethiopia. According to the document IAS of priority attention to the country include *Parthenium hysterophorus*, *Prosopis juliflora*, *Eichornia crassipes* and *Lantana camara*. *Prosopis* is identified as being a major problem of the semi-arid rangelands of the country. The Strategy reiterates the standpoint of the EPE when stating that extreme care should be given during selection of species for introduction into ecosystems. Such introduction should minimize impacts on native species and shall be a choice only if absolutely necessary. It also underlines the need to restore native biodiversity whenever is found necessary.

Failure to manage the expansion of exotic invasive species such as *Prosopis juliflora* in some ecosystems (such as the *Acacia - Comiphora* Woodland Ecosystem and the Desert and Semi-desert Scrubland Ecosystem) as a major threatening factor to biodiversity is explicitly acknowledged in this document.

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<sup>6</sup> Under Section 5.3 of the EPE, there is a provision for revisiting policy implementation and appraisal by ensuring participation at the community level.

The NBSAP lists down specific action plans that ought to be taken over a period of 1 to 15 years. Among these actions, two are pertinent to the management of IAS in protected area systems. The first is the need to revisit existing trans-boundary wild life agreements between neighboring countries for the establishment of peace parks as one mode of protecting wild life, IAS and benefit sharing. The other action is the need to conduct a “...major five year review of the effectiveness of protected areas management and revise the protected areas network management plan including control of invasive alien species.” (IBC, 2005) In both pieces of actions there is an explicit reference made to IAS as relevant to the wider goal of protected area management in the country.

### **2.4.3 Regulatory Framework on IAS**

As stated above, there is no standalone law on protecting entry, infestation, proliferation and control of IAS in Ethiopia. However there are laws of significance to these species at both federal and regional levels. The most pertinent ones are discussed hereunder.

#### **Plant Quarantine Regulation**

The governing law regarding plant quarantine in Ethiopia is the Council of Ministers Regulations No. 4/1992. This law conferred the general mandate concerning plant health to the Ministry of Agriculture and Rural Development. These mandates include prevention of the spread of plant pests and regulation of the movement of plants, plant products or other articles into or from a specified area. The law also levies an obligation to restrict the importation of certain plants and plant products by requiring import permits and phytosanitary certificates duly issued by the plant protection authorities of exporting countries. A number of plants listed within the law are restricted or prohibited from entering in to the Ethiopian territory. The main task of the MoARD in this regard is to check whether or not all imported or exportable plants and articles are liable to be infested or infected with plant pests. Whenever a certain article is found infected or infested with a plant pest it is treated, re-exported or disposed of in any other manner that the inspector in question sees fit. The regulations also provide for the declaration of quarantine areas and the adoption of subsequent control measures

## **Environment Related Laws**

The Environmental Organs Establishment Proclamation (Proclamation No. 295/2002) re-established and thereby expanded the mandates of the Environmental Protection Authority (EPA), and decentralized the original central structure of environmental management in Ethiopia. Consequently, there is the federal environmental institution that is accountable directly to the Prime Minister, as well as regional environmental nodes that operate within all administrative regions of the country. This is to ensure that all the zones of the country perform concerted actions and coordinate environmental activities, avoid duplication of efforts and improve the dissemination of environmental information. Apart from this, it is stipulated within the law that every sectoral ministry or agency should establish its own environmental unit to see to it that environmental standards and laws of the country are complied with at any time during the course of undertaking sector specific activities. This is expected to ensure coordination among sectoral ministries and agencies on environmental matters. An important aspect of this law to the protection of biodiversity from dangers such as invasion by IAS is the reference under Article 15 of the fact that regions can implement federal standards or their own no less stringent standards. This helps in harmonizing laws focusing on the management of IAS that bypass administrative boundaries. It also gives room for trans-regional cooperation in tackling with problems of IAS management.

Unregulated social and economic development endeavours are possible to inflict environmental harm that could reverse good intentions of development. In this regard, the Pollution Control Proclamation (Proclamation No. 300/ 2002) is enacted with a view to eliminating, or otherwise mitigating, pollution as an undesirable consequence of social and economic activities. This law basically deals with conditions of pollution created as a result of the release of pollutants from development activities and establishments such as industrial facilities. Despite this, however, the law tends to encompass also pollution resulting from biogenic substances. Under the definition part of the law, the term "pollution" is defined as a condition which is hazardous to human health or welfare of living things and created by altering ... the biological or other part

of the environment. Seen in light of this background the law seems to regulate biological entities such as IAS as part of the substances that may likely be responsible to cause pollution.

Another important law in this regard is the Environmental Impact Assessment (EIA) Proclamation No. 299/2002. This law is meant to serve as a proactive tool designed to bring about thoughtful development by predicting and mitigating the adverse environmental impacts that a proposed project is likely to cause as a result of its design, location, construction, operation, modification and cessation. This law came into force on the 3<sup>rd</sup> day of December 2002 with a view to ensuring that assessment and consideration of the environmental impacts of projects and public documents are made prior to their approval, providing effective means of harmonizing and integrating environmental, economic, social and cultural considerations and aspirations into the decision-making process in a manner that promotes sustainable development. The law has put in place the procedures to be followed in order to go through the impact assessment requirements.

So anybody wishing to engage in transactions involving the importation of biological materials or any other form of transaction involving life forms must first undergo the EIA process. This serves to anticipate impacts on ecosystems and urges the project proponent to design management plans before anything disastrous happens.

### **Draft law on Biosafety**

As Ethiopia is party to both the Convention on Biological Diversity and its Cartagena Protocol, it is expected to devise a National Biosafety Framework. In an attempt to implement this obligation the country undertook the Biosafety Project which ended in the development of what is known as the National Biosafety Framework (NBF) with assistance from the UNEP/GEF. The result of this endeavour was the drafting of a number of documents including a Biosafety Proclamation that provided for the legal framework that deals with the risks emanating from transactions in Genetically Modified Organisms (GMOs) and products thereof, and in making informed decisions on the issue of biosafety.

A GMO under the draft law is any biological entity in which the genetic material or its expression including plants, animals and microorganisms (viruses, bacteria, fungi, cell cultures, all vector systems including plasmids, viruses, transposons, artificial chromosomes). Any research and development, import, export, transit, handling, contained use, transport, placing on the market, use as a pharmaceutical for humans or animals, use as food, feed or for processing of any genetically modified organism shall pass through a compulsory procedure of notification and approval. The law also encompasses an expanded section on liability and redress for damages resulting from transactions in GMOs.

Penal sanctions are imposed on violations of mandatory provisions of related to a GMO transaction. A person convicted of violating this law is additionally prohibited in the future from engaging in any transaction of genetically modified organisms or products thereof. Such a prohibition applies to any governmental or non-governmental entity. It is also stated in one of the provisions that where the offence is committed by a legal person, and where the court feels that a custodial sentence ought to be imposed, the executive officer in charge shall be liable to imprisonment.

### **Draft Bio-control Regulation**

This is a legal instrument that was drafted in 2004 under the auspices of the then Crop Protection Department of the Ministry of Agriculture and Rural Development. Written in the Amharic language, the draft law defined a list of key terminologies that provides information to users and those others that would likely be implicated at the time of soliciting permits of importation or of local use. Biological control, for instance, is the act of combating pests through utilization of biological entities. Consequently biological control agents are those life forms capable of self regenerating that are natural enemies, competitors of antagonists to certain species and can be used as pesticides. The law includes living modified organisms that are products of modern biotechnology within the general frame of biological control methods. “Biological pesticides” are defined under the draft law to be life forms but are those that cause diseases, and are formulated in the

same manner as chemical based pesticides. No definition of “invasive alien species” or “invasiveness” is given under the draft law. This is attributable to the visible concern of the law to further plant protection from pests and providing procedures for allowing or declining import permits to importers. It also relates to the inclination and mandate of the Crop Protection Department of the MoARD in ensuring plant health through protection from pests

The law provides for the prohibition of any form of import of biological control agents without securing permits from the MoARD. Importation of these items for the purpose of undertaking research or for use as pesticides is allowed only on the basis of permit preceded by a Pest Risk Analysis (PRA). Intentional release of biological control agents beyond their natural range is also prohibited and should be based on the permit system of the MoARD. However a separate procedure that is concomitant to this law is not yet developed by the Ministry.

Another important aspect of the prohibitory provision of the draft law is the limitation imposed on the importation of living modified organisms that are products of modern biotechnology. It is prohibited to import these living modified organisms for any purpose into Ethiopia. The law is stringent in this regard. There is no exception whatsoever even for imports based on a permit system. It simply prohibits importation of LMOs.

A technical advisory committee comprising different sectoral agencies (including Environmental Protection Authority, Ministries of Health, Agriculture and Rural Development, Science and Technology), Addis Ababa Universities and two scientists is sought to be established under the law. This body is vested with the task of advising the Ministry on matters related to taking decisions on import and intentional release into the environment of biological control agents. It is also expected to research on applicable rules and procedures that would help to further elaborate the law.

## **Draft Regulation to Control *Prosopis* Invasion**

This is a law drafted by the Afar National Regional State. The draft has been tabled before the Council of ANRS since 2007 and is still awaiting preliminary discussion on the need to adopt a law and then decide on its contents. At a distant glance, it can be said that this law has direct relevance to the management of IAS, with particular focus on *Prosopis* control in the Afar region.

The objective of the law as explained under Article 3 of the draft is to control the expansion and eventually do away with *Prosopis* in the ANRS by way of utilizing already existing population. So the law is part of the scheme to develop an enabling environment for implementing this basic purpose.

Detailed actions are outlined for the purpose of controlling expansion of *Prosopis*. These include:

1. Uprooting new seedlings of *Prosopis* through public collaboration,
2. prepare cattle feeds through gathering and milling the pods of *Prosopis* and mixing it with other feedstock plants,
3. cutting *Prosopis* plantations and use it as a source of biomass fuel, or as a raw material for charcoal production,
4. when using *Prosopis*, cutting it 15 cms below the ground level to avoid coppicing,
5. foster researches on biological control agents that feed on *Prosopis* or are natural enemies to the IAS,
6. Designating areas for charcoal production, as land that is used for this purpose will lose its natural fertility and nutrient content,
7. Avoid outbreaks of accidental fire during charcoal production,
8. Devise strategies to creating awareness in neighboring regions to avoid expansion of the IAS into these regions.

The law tried to regulate aspects of responsibility of *Prosopis* eradication in instances of its existence on farmlands or communal grazing lands. Accordingly a *Prosopis* tree found on a farmland has to be taken care of or uprooted by the owner of the farm.

Communally owned water canals shall also be tended by the users and the trees within these has to be eradicated jointly. Local communities are also required to do the eradication of *Prosopis* grown at the respective homesteads and in pedestrian corridors. Grazing lands invaded by *Prosopis* have to be reclaimed through the collaboration of members of the community. The law has devised a coordination scheme to be established at the *Woreda* and *Kebele* levels. Separate committees at both levels formed for the purpose, among other things, of controlling and preventing further invasions are to be composed of Pastoralist Agriculture and Rural Development Office, Office for Registration of Associations, elders from the community and the private sector.

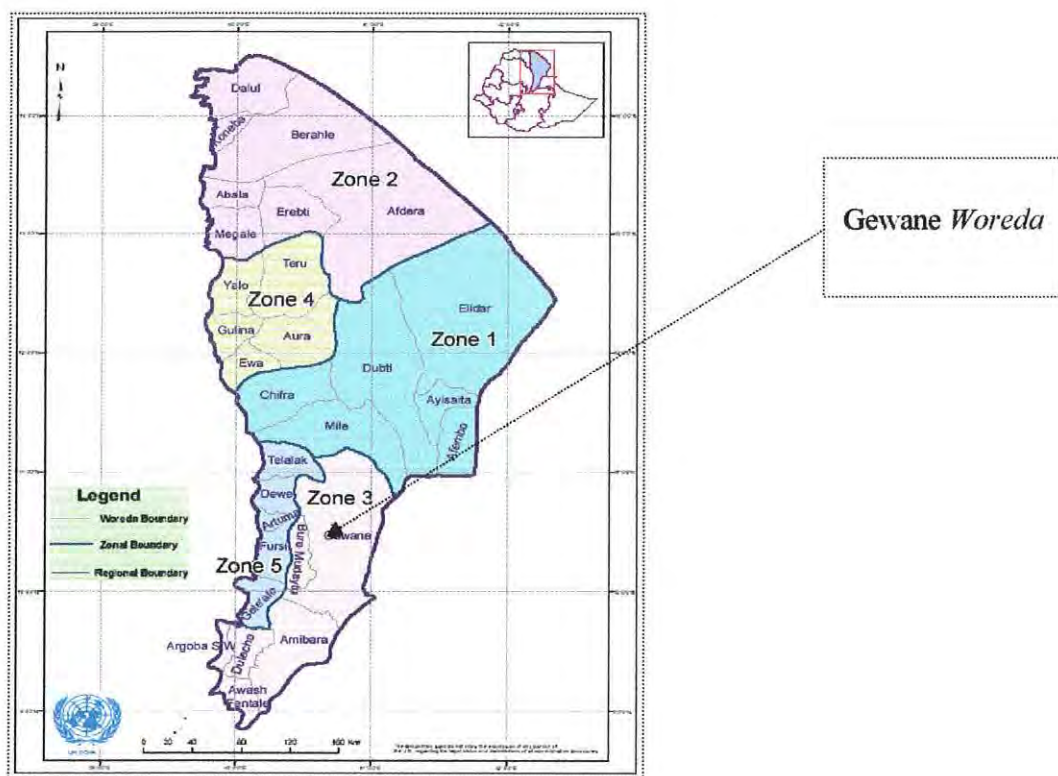
Permits are required before engaging into the business of charcoal production. For instance, the *Kebele* has to issue a movement document that accompanies every single load of charcoal made from *Prosopis*. A permit for selling the item shall also be secured from the *Kebele* administration. The *Kebele* administration has to check that the person or association who wishes to engage in the business has undertaken the task without violating standards and that the charcoal production did not involve cutting of indigenous trees. The law also encompasses penal provisions that include punishment by fines and imprisonment of those violating the provisions of the law.

### 3. Methodology of the Study

#### 3.1 Description of the Study Area

The study was conducted in Afar National regional state which is located in the northeast part of Ethiopia. Geographically ANRS is located between  $39^{\circ} 34'$  and  $42^{\circ} 28'$  East Longitude and  $8^{\circ} 49'$  and  $14^{\circ} 30'$  North Latitude. As per the revised Constitution of the ANRS (proclamation No. 14/2002), the region shares boundary with four national regional states (Tigray in the Northwest, Amhara in the Southwest, Oromiya in the South and Somalia in the Southeast). The region also enjoys two international boundaries, namely Djibouti in the East and Eritrea in the Northeast. Afar National Regional State has a total of 1,411,092 population out of which 786,338 are male while 624, 338 are female (<http://www.csa.gov.et>)

**Figure 3.1 Map of ANRS showing the research area**



Source: <http://www.ocha-eth.org/Maps/downloadables/AFAR.pdf>

The selected area from the ANRS is Gewane *Woreda*. It is one of the two *Woredas* that is highly affected because of invasion by *Prosopis juliflora* (Dubale, 2006). The *Woreda* is situated at Zone 3 of the Afar National Regional State. It is located in Middle Awash Basin, at a distance of around 390 Kms North East of Ethiopia. It has an altitude of 740 m with a mean minimum temperature of 25 °C and maximum temperature of 42 °C. The mean annual rainfall of the area is 564.2 mm. The *Woreda* has a total population of 31,313 people in its two administrative subdivisions. Gewane Town (*Kebele* 01) supports 5,982 of this total population while the rest live in the 9 *Kebeles* of what is known as Gewane Rural. Gewane Town and one of the 9 *Kebeles* from Gewane Rural, Ourafeta were selected for the survey under this study.

**Table 3.1 Population of Gewane *Woreda* by Sex**

<b>Gewane <i>Woreda</i></b>	<b>Total 31,313</b>	<b>Male 17,167</b>	<b>Female 14,146</b>
<b>Gewane Town</b>	5,982	3,121	2,861
<b>Gewane Rural</b>	25,331	14,046	11,285
Adeyimabure	1,466	778	688
Gebeyabora	4,786	2,641	2,145
Geleladora	1,596	887	709
Yigile	1,791	1,020	771
Ourafeta	4,009	2,266	1,743
Bira Eforo	4,395	2,441	1,954
Meteka	2,403	1,359	1,044
Bida	2,496	1,369	1,127
Adibaro	2,389	1,285	1,104

**Source: CSA, 2007** (<http://www.csa.gov.et>)

Gewane *Woreda* represents an area that consists of acacia bush land and grazing land. The *Woreda* is characterized by pastoralist farming systems with an extensive area of communal rangelands. Amongst the animals reared by the pastoralists are included cattle, camel, goats and sheep with livestock primarily kept for their dairy and meat products. (Dubale, 2006) Some dwellers also get recruited as daily labourers at the state and private farms and support their livelihood through sale of charcoal (Tibabu, 1997 cited in Dubale, 2006).

The *Woreda* is highly invaded by *Prosopis*, and because of this several plant species that are indigenous to the place have already gone extinct or are threatened with extinction. Several animal species have also migrated to other areas since they were unable to move around freely because of the heavy thicket formed by the bushy invasive plant. The heavy thickets have also become hiding spots for wild animals that allegedly created obstacles to free movement of animals and human beings.

### **3.2 Method of Data Collection and Analysis**

#### **3.2.1 Research Strategy**

A combination of methodologies was used to collect relevant data in resolving the formulated research questions. Both quantitative and qualitative data collection and data analysis were employed to generate adequate information. Focus has been made on information gathering at individual, group and institutional levels. The study made use of both primary and secondary data. This is to enable verification of data generated at one level by the other.

#### **3.2.2 Sampling Techniques and Procedures**

Multi-stage sampling technique is employed for the research. *Prosopis* is purposively selected for it is the number one priority for Ethiopia. Afar National Regional State (ANRS) is selected as a study target areas as it is one of the regions that is most affected by *Prosopis*. Zone 3 of ANRS is the most affected with the invasion of the plant species and is hence selected as a specific area for the study. *Gewane Woreda* is again selected to be the focus area as it is comparably one of the two *Woredas* in the Zone that is highly affected by the invasion. (Dubale, 2006)

*Gewane Woreda* has two clusters of administrative divisions. These are a small town and 9 rural *Kebeles*. *Prosopis* is found at different stages of invasion and establishment in each *Kebele*. For instance in *Gewane Rural*, *Geleladora* and *Ourafeta* are highly infested. Therefore stratification was made between *Gewane Town* and *Gewane Rural* where the former is automatically considered for administering the structured questionnaires. This is because it has only one *Kebele* (i.e. *Kebele 01*) with in its administrative jurisdiction.

From among the 9 *Kebeles* within Gewane Rural, Ourafeta *Kebele* is selected owing to its accessibility and the relatively high infestation by *Prosopis*. To ensure strength of data, respondents from each stratum were made to be composed of people from different gender and age groups.

Apart from this, informal discussions were held with community leaders. Data was also collected from other stakeholders such as investors engaged in cotton plantation, governmental organizations, non-governmental organizations (such as FARM-Africa), and ordinary town dwellers. Secondary data was collected from different published and unpublished sources available from governmental, non-governmental as well as international organizations. These data were gathered through direct visits of short-listed organizations as well as information available on the internet. A questionnaire was administered to gather data from different respondent categories regarding environmental impacts caused by *Prosopis*.

The policy and legal assessment part of the study was basically based on review of available literature. Relevant legal texts and pertinent legislations such as laws on biodiversity, animal and plant health, quarantine, agriculture, commerce, environmental pollution control, environmental impact assessment etc. were examined. The legal framework pertinent to the prevention from entry as well as controlling and eradication of IAS were identified and analyzed followed by analysis of gaps. Appropriate recommendations were drawn out with a view to sealing identified gaps. The draft legislation on the control of *Prosopis* within the Afar National Regional State was also examined as part of the body of available laws on the issue in Ethiopia.

### **3.2.3 Sample Size**

There was an assumption by the researcher to get household lists at the sample *Kebeles*. However, physical presence at the research site proved that there was no list at Ourafeta *Kebele*, while there was one at Gewane Town. It was therefore decided to select respondents randomly by identifying the first contact household through tossing a pencil. The decision of not following the available list at Gewane Town was reached to keep uniformity in the use of methodology at the two target *Kebeles*.

From among the many techniques in sample size determination, the methodology devised by Carvalho (1984), as cited by Mahlet (2008) was used. The method puts the sample size to be selected at a low, medium and high threshold according to the population size of the target area. The modalities of selection are presented below.

**Table 3.2 Sample Size Determination**

<i>Population Size</i>	<i>Sample Size</i>		
	<b>Low</b>	<b>Medium</b>	<b>High</b>
51-90	5	13	20
91-50	8	20	32
151-280	13	32	50
281-500	20	50	80
501-1200	32	80	125
1201-3200	50	125	200
3201-10000	80	200	315
10001-35000	125	315	500
35001-150000	200	500	800

**Source: Carvalho as cited by Mahlet 2008**

The population of Gewane is 31,313 according to the 2007 Census. Taking low sample size, the number of respondents will become 125. This number is proportionately apportioned to the population of the two selected *Kebeles*. Thus 21 respondents from Gewane Town (*Kebele* 01) and 105 respondents from Ourafeta were contacted for the survey. Much care was taken during filling out the questionnaire. Because of this all the questionnaires were filled out appropriately and are found to be valid for the purpose of the research analysis.

### **3.2.4 Primary Data Collection**

The primary data collection utilized both quantitative and qualitative data in order to formulate the basis for the study. Quantitative data were collected by surveys through structured questionnaires, while the qualitative was generated from Key Informant Interviews, Focus Group Discussions and Personal observations.

**Survey** – an interview schedule was prepared to collect information from randomly selected respondents in the two selected *Kebeles* (Gewane Town and Ourafeta).

**Key Informants Interview** – a checklist was prepared in advance to guide the questions for gathering information in an indepth interview. The Selection of group members was carried out in collaboration with FARM Africa, the Pastoral Agriculture and Rural Development Office in Gewane as well as the Ethiopian Institute of Agricultural Research.

**Focus Group Discussions** - Three Focus Group Discussions were undertaken, two in each of the sample *Kebeles* and one with an expert group at Melca Werer Research Institute. Selected dwellers from the various social and economic strata of Ourafeta *Kebele* and Gewane Town comprised the first two Focus Group Discussions. The Focus Group Discussion held at the Melca Werer Research Institute seized the opportunity availed as a result of the national celebration on the International Day of Biodiversity held on 21 May, 2009. The theme of the day this year was “Protection from Invasive Alien Species”. 7 Experts from government institutions, NGOs and research institutions formed this group and key issues of management were raised that became inputs for most of the analysis on the topic.

**Personal Observation** - To complement the other modes of data collection information was also collected through personal observation by going directly to the areas infested with the IAS.

### **3.2.5 Secondary Data Collection**

The components of secondary data includes a review of relevant literature of both published and unpublished materials, books, journals, official reports, maps and satellite images. Written materials pertinent to the research were collected from the publications of both governmental and non-governmental entities. Documents were collected and analyzed by visiting the short listed government offices and NGO partners as well as by referring to the official websites of the respective institutions. Outputs of the Werer Research Institute, the libraries of FARM-Africa and the Ethiopian Institute of Agricultural Research were also consulted. Reliable internet resources were widely referred to. These have been instrumental to establish background information on the

ecological changes brought about by the introduction of *Prosopis* over the years. It also laid the basis for determining the availability of an appropriate legal system for regulating entry and containing already established IAS in the country.

Pertinent multilateral agreements on IAS to which Ethiopia is a party were reviewed to determine the minimum standards that they set for containing problems of IAS and compare it with the national system. Consecutively, national policies and legal instruments in force were reviewed including those on environment, biodiversity, water, forestry, biosafety, EIA, pollution control, quarantine etc. were looked at. Draft laws such as the Afar Regulation to Provide for the Control of *Prosopis* in the Afar National Regional State and the draft Proclamation on the Importation of Bio-Control Agents being devised under the auspices of the Ministry of Agriculture and Rural Development.

### **3.2.6 Data Analysis**

Data was analyzed by making use of qualitative description and statistics. The questionnaires designed for undertaking the surveys were properly coded for electronic analysis. The collected data were reviewed for possible errors in enumeration including missing data. Following the cleaning and editing of the responses in the questionnaire, the data were entered into a computer using the soft-ware known as Statistical Package for Social Scientists (SPSS). The tabulation of the data and the relationship among variables were determined using the same program.

Furthermore information generated through focus group discussions and key informants were systematically summarized to corroborate the data generated from research questionnaires. Triangulation of results is then made during analysis to verify evidences. Field observation made to look into distribution range, impact and management techniques opted by households and governmental and non-governmental agencies is verified against the checklist prepared in advance of the field mission. The rest of the information generated from open- ended questions, key informant interviews, and focus group discussions that cannot be put into numericals is described qualitatively.

## 4. Results and Discussion

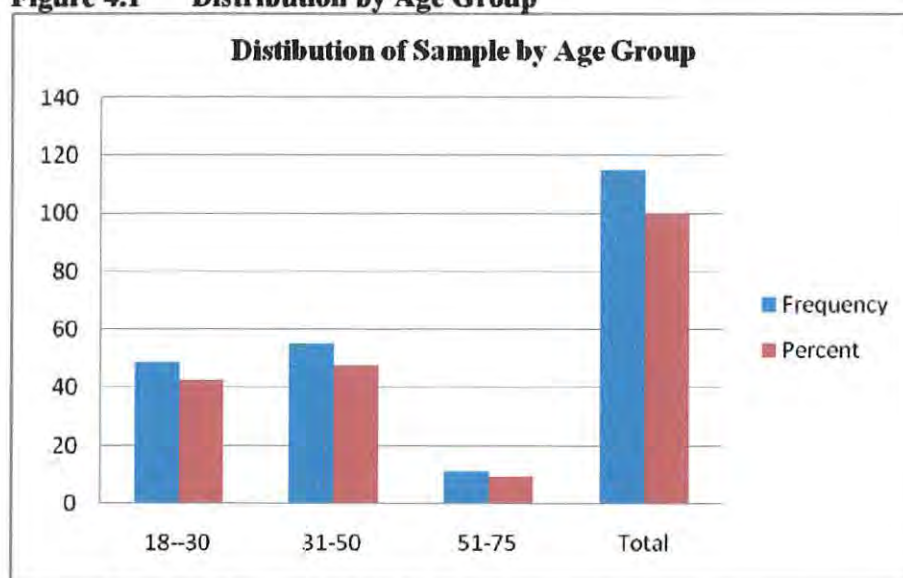
### 4.1 Demographic Characteristics of the Respondents

#### Age and Sex of Respondents

During the survey, an attempt was made to balance the gender distribution of the respondents. It turned out, however, that most of the respondents happen to be of the male gender. The number of women respondents is 27. This constitutes more than one fifth (21.6 %) of the total respondents. The increase in the number of men conforms to the relatively larger number of male population in Gewane as was ascertained during the 2007 National Census (See Table 3.1 above)

Figure 4.1 depicts the age category of individual respondents to which the semi-structured questionnaires were administered. The youngest age from among the respondents was 18 years while the oldest was 75. The most frequent age group was the one between the age category of 31-50 while the age group between 51 – 75 was the least frequent.

**Figure 4.1 Distribution by Age Group**



Source: Survey Data 2009

### Marital and Educational Status

The largest proportion (83.6%) of the respondents were married. Out of the total number of respondents that replied to the query on marital status (i.e. 122), 10 were single, 9 divorced and 1 widowed. On the question of the educational levels of the respondents, it is to be noted that most (77.4%) are illiterate who cannot write and read. Only one person out of a total of 122 that responded to this question was above a secondary level education.

**Table 4.1 Marital and Educational Status of the Respondents**

<b>Marital Status</b>	<b>Frequency</b>	<b>Percent</b>
Single	10	8.2
Married	102	83.6
Divorced	9	7.4
Widowed	1	0.8
<b>Total</b>	<b>122</b>	<b>100.0</b>
<b>Educational Status</b>	<b>Frequency</b>	<b>Percent</b>
Illiterate	95	77.2
Literate	7	5.7
Elementary school	14	11.4
Secondary school	6	4.9
Above secondary school	1	.8
<b>Total</b>	<b>123</b>	<b>100.0</b>

**Source: Survey Data 2009**

### Occupation and Income

The major means of livelihood in Afar National Regional State is transhumance pastoralism (Dubale, 2006). This holds true for the two sample *Kebeles* under this study. Though a mixture of town and rural *Kebele* were considered for the study, it was found that most of the respondents are pastoralists (51.7 %) (Table 4.2). The next most frequent mode of livelihood is farming (15.3%). The presence of state farms in the *Woreda* and the recent tendency in the interest of investors to engage in cotton plantation accounts for this fact. These state and private owned farms are also sources of income for some inhabitants through recruitment as daily labourers. This category accounts for 5.1 % of the respondents. Some respondents (9.3 %) mix agricultural activities with cattle rearing where most of the respondents follow a pastoralist mode of life.

The income of almost half of the respondents ranges between 101 and 300 Birr per month. Those earning less than 100 Birr per month are also significantly large (14.4 %). Only around 12 % of the respondents earn more than 501 Birr per month. This indicates that most of the people are living below the less than 1 USD per day threshold, and hence below poverty line according to the classification of the United Nations.

**Table 4.2 Distribution of Respondents by Occupation and Income**

Current Occupation		Income per month					Total
		Less than 100 Birr	101 -300 Birr	300 – 500 Birr	501-1,000 Birr	above 1,000 Birr	
Farmer	Total in %	1.7%	2.5%	3.4%	1.7%	5.9%	15.3%
Daily Laborer	Total in %	-	3.4%	-	.8%	.8%	5.1%
Trader	Total in %	-	.8%	-	1.7%	.8%	3.4%
Government employee	Total in %	-	2.5%	1.7%	3.4%	.8%	8.5%
Pastoralist	Total in %	11.9%	33.1%	4.2%	-	2.5%	51.7%
Other	Total in %	.8%	2.5%	2.5%	.8%	-	6.8%
Farmer & Pastoralist (mixed)	Total in %	-	4.2%	1.7%	1.7%	1.7%	9.3%
Total	Total in %	14.4%	49.2%	13.6%	10.2%	12.7%	100.0%

**Source: Survey Data, 2009**

Most of the residents of the two sample *Kebeles* depend on livestock rearing as a source of household income (Table 4.3). 68.3 % of the respondents are either owners of cattle such as camels and goats or are recruited by cattle owners as goat and camel herders. Farming is another mode of subsistence practiced by others. More than 15 of the respondents were farmers. Still some of the respondents (9.8%) mix the two trades as a source of income. An insignificant number of residents (1.6%) own trading businesses working in these premises and mix the activity with livestock rearing. This is particularly because of the urbanization process ensued particularly at Gewane Town. These people

are involved in owning or service giving activities inside restaurants, veterinary clinics, stationeries, drug vending shops, kiosks, etc.

**Table 4.3 Household Income**

<b>What is your source of income?</b>		
	Frequency	Percent
Livestock	84	68.3
Farming	19	15.4
Trade	6	4.9
Livestock & farming (mixed)	12	9.8
Livestock & trading activities (mixed)	2	1.6
No Response	3	2.4
<b>Total</b>	126	100.0

**Source: Survey Data, 2009**

#### **4.2 Community Perceptions on Advantages and Disadvantages of *Prosopis***

There are some controversies among the community regarding the alleged advantages and threats posed as a result of the introduction of *Prosopis juliflora* in Gewane Woreda. This is reflected in the responses of interviewees to which is presented a set of pertinent questions.

##### **Community Experience on *Prosopis***

Some of the respondents know the species for a relatively longer period. About 22.6% know it for a period of more than 20 years (Table 4.4). A number of factors are however determinant on their perception. Some NGOs, (FARM Africa for instance) have for some time been working in the sample areas focusing on ways of managing *Prosopis*. Government agencies and private investors engaged in farming are also transforming land for agricultural purposes and are on the way of tackling the problem of *Prosopis* invasion. It is expected therefore that these activities would have an impact in shaping the level of awareness of the community on the issue. Subsequent discussions should be seen in light of these underlying facts.

**Table 4.4 Community Knowledge of *Prosopis* in the Sample Areas**

<b>For how long have you Known <i>Prosopis</i> in your Kebele?</b>		
	Frequency	Percent
During the last 10 years	23	18.5
Between 11 - 20 years Ago	73	58.9
20 years ago	28	22.6
No Response	2	1.6
<b>Total</b>	<b>126</b>	<b>100.0</b>

**Source: Survey Data, 2009**

#### **Community Perception about the Impact of *Prosopis***

About 37 of the respondents view that *Prosopis* has a potential threat. The majority (74) believe that the plant species have both advantages and disadvantages, while 13 are not sure yet to label the plant as having a positive or negative impact. It is to be noted also that none of the respondents responded to the question in the affirmative only. So the community inclines towards considering *Prosopis* as a potentially harmful plant surpassing its alleged benefits.

**Table 4.5 Community Perception about the Impact of *Prosopis***

<b>How do you see the impact of <i>Prosopis</i> in your Kebele?</b>		
	Frequency	Percent
Negative	37	29.8
Both positive & negative	74	59.7
Not sure	13	10.5
Positive	-	-
No Response	2	1.6
<b>Total</b>	<b>126</b>	<b>100.0</b>

**Source: Survey Data, 2009**

Most of the respondents, about 68.8 %, listed out the problems attached to the invasion to be loss of grazing lands, shrinking of arable lands because of aggressive overtaking of land by *Prosopis*, damage to livestock and human beings by the thorns of the plant as well as blockage of roads and water ways. According to a Key informant interview, road blockage is not a significant problem in the sample areas as there are some activities towards changing bushy areas into cropland. The problem is magnified in some *Kebeles* such as Adibaro where road access is completely curtailed by the infestation.

A Focus Group Discussion has also identified that formation of heavy thickets, particularly at Ourafeta *Kebele*, created a favourable harboring spot for wild animals such as hyenas, lions and snakes. There were reports of attacks on human beings and camels as a result of this.

**Table 4.6 Assessment on the Negative Impacts of *Prosopis juliflora***

<b>What are the disadvantages of <i>Prosopis</i>? ( if any )</b>		
	Frequency	Percent
Loss of grazing land and feedstock for livestock	31	24.8
Reduction of arable land	3	2.4
Damage to livestock as a result of its thorns	2	1.6
Blocking roads	3	2.4
A combination of all	86	68.8
No Response	1	0.8
<b>Total</b>	<b>126</b>	<b>100.0</b>

**Source: Survey Data, 2009**

On the other hand about 55 % of the respondents stated that the invasion has enabled them to use the wood for fencing houses, while another significant number of respondents (35.9 %) are of the opinion that the plant is useful for making charcoals. Converting *Prosopis* into charcoal making in the sample areas was extensively practiced through the initiatives of the NGO - FARM Africa.

**Table 4.7 Assessment on the Positive Implications of *Prosopis juliflora***

<b>What are the advantages of <i>Prosopis</i>?</b>		
	Frequency	Percent
Use of pods as livestock feed	7	6.8
Use of wood for charcoal making	37	35.9
Use of wood as construction material /local furniture/	1	1.0
Fencing houses	57	55.3
Use for livestock feed & as charcoal making	1	1.0
<b>Total</b>	<b>103</b>	<b>100.0</b>

**Source: Survey Data, 2009**

In some countries, people are making use of the invasive plant for construction purposes and furniture manufacturing. In USA and Argentina for instance, *Prosopis* is utilized as construction posts, for making furniture and flooring (Pasicznik, 2004). This does not seem to be the case in the sample areas, possibly because the technology has not yet been brought to the *Kebeles*. It may also be because of the species variety difference as it is straight branches that are demanded particularly for fence posts and poles in construction (Ibid). According to a key informant, the species variety in the *Woreda* does not have straight branches and is hence not demanded for construction purposes.

### Perception about the effects on livestock

There is a general perception among the respondents that livestock numbers are dwindling in their communities during the last 10 years. From a total of 125 people who responded to a question about the change in the number of livestock, 118 feel that the number is decreasing, 4 perceive that it is increasing and 3 respondents don't see any change in the numbers or do not know about it. Since an overwhelming majority (94.4 %) of the respondents in the sample areas respond in the negative, they were further requested to state the reasons for the decrease in the number of livestock. As indicated under Table 4:9, the major cause of the decrease in livestock number in the two sample areas is the decline in grazing land. Though the factors are interrelated, most respondents state that it is the loss of grazing areas and shortage of feedstock that is killing their livestock more than the cattle disease and drought (2.4%), or shrinking of water points (1.6%).

**Table 4.8 Assessment of Perception on change in livestock numbers**

<b>What do you feel about the change in the size of livestock over the past 10 years?</b>		
	Frequency	Percent
It is increasing	4	3.2
It is declining	118	94.4
No change	2	1.6
I do not know	1	.8
No Response	1	.8
Total	125	100.0

**Source: Survey Data, 2009**

Reports suggest that drought recurs within an average of 10 years interval in Gewane *Woreda*. But this scenario is reversed in recent times and drought recurrence is becoming every year. (Farm-Africa, 2009) This is currently exacerbating problems of cattle disease including those with zoonotic nature (Ibid). From the responses, it seems that the invasion of *Prosopis* have overridden all the other possible causes. According to a key informant interview, the reason for attaching all grazing problems with *Prosopis* is because of the massive coverage of the invasion, and the lower capability of the respondents to analyze other parameters such as drought and disease that could fit in or add up to exacerbating the problem of the invasion. The key informant further stated that the invasion is enhanced when ecosystems are disturbed through unexpected happenings such as drought and disease outbreaks.

According to the respondents, decline in grazing land is caused mainly as a result of the encroachment of the fields by *Prosopis* (Tables 4.9 and 4.10). This is a consensus by those who have responded to this particular question.

**Table 4.9 Reasons for the Decline in Livestock Number**

<b>If you feel that the size of livestock is declining, what do you think is the reason for it?</b>		
	Frequency	Percent
Decline in Grazing Land	121	96.0
Drought and Disease	3	2.4
Shrinking of water sources (such as Awash river)	2	1.6
Total	126	100.0

**Source: Survey Data, 2009**

A key informant stated that all the grass species that used to be feeds for cattle are already wiped out in most *Kebeles* of the *Woreda* by the aggressive encroachment of the invasive plant. A recent finding also corroborates this statement.

**Table 4.10 Causes for the Decline in Grazing Land**

<b>If the answer to the above question is decline in grazing land what is the cause?</b>		
	<b>Frequency</b>	<b>Percent</b>
Encroachment by <i>Prosopis</i>	109	93.2
Encroachment by <i>Prosopis</i> coupled with other factors (such as drought, water shortage,	8	6.8
<b>Total</b>	<b>117</b>	<b>100.0</b>

**Source: Survey Data, 2009**

Reports show that at least 31 grass species out of a total of 32 have been completely displaced by *Prosopis* in Oura feta *Kebele* alone (FARM – Africa, 2009).

Respondents were asked if they have evidenced the expansion of *Prosopis* over the past 10 years (Table 4.12). There is only one respondent that felt the invasive plant is not occupying new territories. About 122 respondents out of a total 125 are sure that the plant has been expanding, overtaking lands that were never invaded by it. It is therefore conclusive to say that the invasion of land by *Prosopis* has been aggressively high.

According to key informants *Prosopis* was introduced in Gewane *Woreda* at a farm called Meteka in Beida *Kebele* in the 1970s. It was later on reproduced into Gewane Town (*Kebele* 01), Geleladura and Ourafeta *Kebele*, largely as a result of the authoritative orders of *Kebeles* during the Derg Regime. The communities, for fear of authorities and the resultant exclusion from getting their quotas of household items such as sugar and salt, refrained from cutting the trees and contributed to its uninterrupted expansion.

**Table 4. 11 Assessment of Perception on expansion of *Prosopis***

<b>Do you feel that <i>Prosopis</i> is expanding in your Kebele in the past 10 years?</b>		
	Frequency	Percent
Yes, <i>Prosopis</i> is expanding	122	97.6
No, <i>Prosopis</i> is not expanding	1	.8
I do not know	2	1.6
No Response	1	.8
<b>Total</b>	126	100.0

<b>Is the expansion harmful or beneficial to the community?</b>		
	Frequency	Percent
The expansion is harmful	124	99.2
The expansion is beneficial	0	0
I do not know	1	.8
No Response	1	.8
<b>Total</b>	126	100.0

**Source: Survey Data, 2009**

Since expansion of the plant species was sufficiently ascertained, respondents were requested if they see the invasion beneficial or harmful to them. Only a single respondent has an undecided position while all the rest were unanimous in stating that it is harmful. The reasons forwarded in support of this response are the ensued socio-economic and ecological problems associated with invasion of arable and grazing lands, blockage of roadways, water points, injury to cattle mouth because of the thorns of the tree shrubs, formation of dense thickets that harbor beasts and wild animals etc.

### **Comparison of Damages and Benefits of *Prosopis***

The reaction of respondents varies on the question of perception about benefits of *Prosopis* as a source of feed for livestock. The same is true to the question on the potential injury caused on cattle while feeding. As depicted under Table 4:13 below, there is no one that lacked experiential know-how on the fact that the sharp thorns of *Prosopis* is injurious to cattle. All of the respondents (except two) have experiences regarding incidents related to injury caused to cattle as a result of invasion by *Prosopis*. Though *Prosopis* causes this actual and potential damages to cattle, on the contrary, a vast majority of respondents (105 out of 125 respondents) believe that the plant is beneficial as its pods are good source of cattle feed. The communities tend to consider the plant as a viable source of animal feed in the arid and semi-arid areas. The question also determines the type of management option that the communities would go for.

But, contrary to the perception on the positive aspects of *Prosopis*, respondents seem to opt for eradication as a viable solution. The various attempts by government and non-governmental offices in turning the plant into use (by pounding or boiling pods to be used as animal feedstock) does not seem to have convinced the communities to live with the invasive plant. As depicted under Table 4:14, more than 92% of the total respondents that responded to this question do not believe that their source of feed (pods and seeds of *Prosopis*) would be in jeopardy if it is somehow eradicated from the respective *Kebeles*.

**Table 4: 12 Comparison of Damages and Benefits of *Prosopis***

<b>Have you evidenced any injury caused by <i>Prosopis</i> on livestock (such as injury by the thorns of <i>Prosopis</i> while feeding)?</b>		
	Frequency	Percent
Yes	123	98.4
No	0	0
I do not know	2	1.6
No Response	1	.8
Total	126	100.0
<b>Do you feel that the pods of <i>Prosopis</i> is important as feed for livestock?</b>		
	Frequency	Percent
Yes	105	84.0
No	20	16.0
No Response	1	.8
Total	126	100.0
<b>Do you believe that the pods of <i>Prosopis</i> consumed by livestock to be one of the pathways for the spread of <i>Prosopis</i> in your community?</b>		
	Frequency	Percent
Yes	124	99.2
No	1	.8
No Response	1	.8
Total	126	100.0

**Source: Survey Data, 2009**

A similar question has, however, a slightly different response. Some respondents believe that the use of *Prosopis* for charcoal making (coupled with the use of the pods as a source of cattle feed) is beneficial to them. These people hence perceive that the management option that ought to be followed should be control through utilization. But comparably, the respondents that favour complete eradication out dominates those seeking control through utilization even when charcoal making was an added benefit (See Table 4:15)

### 4.3 Legal and Institutional Issue

#### 4.3.1 Management Options

##### Eradication Vs. Utilization

The choice of management alternatives ranges from complete eradication to utilization of the different parts of the plant species. Community views are also divergent. Separate questions administered to the same respondents generated differing views. For instance, only 5 % of respondents feel that complete eradication would impact them (See Table 4:14).

**Table 4:13 Perception on Eradication of *Prosopis***

<b>Do you believe that eradicating <i>Prosopis</i> will be harmful to your community b/c of its impact on the pods as a source of livestock feedstock?</b>		
	Frequency	Percent
Yes, it will be harmful	6	4.9
No, it is not harmful	114	92.7
I do not know	3	2.4
No Response	3	2.4
Total	126	100.0

**Source: Survey Data, 2009**

Yet again, around 34% of the respondents see the need for making use of the available population of the tree species (Table 4: 15). This is a contrasting perspective compared to the assessment of perception to the previous question (Table 4: 14) that saw the need to eradicate *Prosopis* altogether. This confusion in response indicates the apparent lack or insufficiency of information to guide communities to viable, sustainable and cost effective modes of management. During Focus Group Discussions with the communities and the expert groups, none of the informants were able to state on any form of cost–benefit analysis made to determine the efficiency and cost effectiveness of one controlling technique relative to the other. It is therefore in the absence of complete information that the communities and experts were suggesting two extreme measures of management – complete eradication to utilization. Absence of a cost–benefit analysis into the many management options leaves a big gap for decision makers and researchers alike

in taking an informed stand. In view of this background it is premature to resort to a viable and information based management option that is environmentally sound and economically feasible.

**Table 4:14 Perception on Utilization of *Prosopis***

<b>Do you believe that it is better to utilize <i>Prosopis</i> (for instance as a source of feedstock or as a means of getting income through charcoal making rather than eradicating it all along?)</b>		
	Frequency	Percent
Yes I believe so	42	33.9
No, I don't	82	66.1
No Response	2	1.6
Total	126	100.0

Source: Survey Data, 2009

### **Control through Land Use Change**

Key informants working at the Pastoral Agriculture and Development Office in Gewane *Woreda* are of the view that it is impossible to eradicate *Prosopis* altogether. This is because of a number of factors, including – the drought resistant nature of the seeds, the huge amount of seed production per tree, the edible nature of the pods by cattle, thereby facilitating germination and the relatively high coppicing rate. However the informants further state that land turned into farmland (through clearing *Prosopis*) have a better advantage in terms of the continuous tilling process and attention given to the plot. New sprouts or coppices will be taken care of whenever they show up. But this is not an absolute remedy since the soil, serving as a large seed bank, will present readily available seeds that germinate in successive years. The same informants stated that it is impossible to make individual tree cutting in some areas. *Kebeles* such as Adbaro are totally overtaken by thick woody invasions to the extent that access roads were completely blocked. In these areas it is impossible to do individual cutting of trees.

According to key informants at the Pastoral Agriculture and Development Office in Gewane *Woreda*, a recommendation on the use of techniques should be assessed according to the specific peculiarity of locality or the particular geographic situation of the *Kebele* in question. That is to say recommendations should be on a case by case basis

and blanket type applications should be avoided as much as possible. In some *Kebeles* turning land into cultivable farmland is a good option because it avails the opportunity to uproot individual trees from the plot. But this can only be applicable to areas with relative availability of water for farming activities. For instance, one of the sample areas, Ourafeta *Kebele* has a relative proximity to the Awash River. There are cotton farms and plots of land allotted for growing maize. According to informants engaged as investors on cotton plantations in Ourafeta *Kebele*, this temporary intervention that brought about a change in the land use will offer a continuous attention to the cotton or maize plantation field. This helps in spotting new *Prosopis* shoots and will give an early warning to avoid them before they grow. But this is found by experts at the MoARD to be only temporary as the soil acts as a seed bank and *Prosopis* seeds will remain in the soil for more than 10 years. So it is impossible to fetch a permanent solution through turning land into cultivation.

Studies indicate (Dubale, 2006) that the same intervention were effective in some *Kebeles* in Gewane *Woreda*. For instance, at Geleladura *Kebele* of the *Woreda*, most of the invaded areas were changed to farmlands due to better access for irrigation water. This was coupled with the formation of cooperatives that were able to attract a big number of charcoal manufacturers that enhanced the availability of cultivable land. (Ibid)

## **Eradication through the application of Chemicals**

The other complication is the selection in the use of chemicals that may have adverse impacts on the environment. According to informants from the Environmental Impact Assessment Service of the Environmental Protection Authority, the herbicide Glyphosate is not selective of targets and completely cleanses land onto which it was applied. Despite its impact on the environment, the technique is effective (HDRA, 2005), in controlling the expansion of the invasive plant species. But again, informants are wary about the complication of its application. Experts at EIAR suggest that the tree should be cut at 15 to 20 centimeters below ground for the application of the chemical. But given the intensity of the invasion, nearly in all *Kebeles* of Gewane *Woreda*, the method is rendered inapplicable by informants at the Environmental Protection Authority.

## **Biological Control**

Key informants from the EIAR have stated that they are considering to import biological controlling agents from another country. Two seed feeding beetles, *Algarobius Prosopis* and *Netumius arizonensi*, are already identified that has proven to have been effective in South Africa. Informants from the MoARD affirmed that a Pest Risk Analysis is undertaken before the importation of any biological agent, to ascertain that the particular species do not change its host. This analysis is undertaken on a case by case basis through the “Biological Control Review Committee”. The Committee is hosted under the EIAR, and sends its recommendations after going through the necessary procedures. The Procedures are fairly standard drawn from the rules set by the IPPC. The particular instrument in this regard is the International Standards for Phytosanitary Measures No. 11 (ISPM No. 11) dealing with Pest Risk Analysis for Quarantine Pests and its Supplement on “Analysis of Environmental Risks”. This Supplement is particularly important in the works of the Ministry as it applies to plants that are thought to be weeds and are feared to have impact on biodiversity. It also applies to species that may have been allowed at a certain time but is feared to be invasive if it is let into other ecosystems. This is

particularly important to Ethiopia, in view of the country's diverse agro-ecologies and the possibility that one species in a region may be invasive to another.

According to the informants at the MoARD, the specific recommendations of the Biological Control Review Committee will eventually become inputs for two sets of lists currently being developed to complete the draft Bio-Control Regulation. These are the Prohibitive list for quarantine pests and the Permissive list enlisting all allowable biological materials into Ethiopia. The latter will be a constant reference to make decisions on allowing or disallowing imports whenever import permits are produced by individuals and companies in the country.

In the absence of the aforementioned lists, the MoARD is left with the PRAs included with in ISPM No. 11. But, Key informants at the EPA are wary about caution in undertaking the analysis. Biological agents escaping the analysis will cause great, and often irrecoverable damage. According to these informants controlling IAS through biological controlling agents should in fact be a last resort measure. This is because of the risk involved in damaging the rich biological heritage of the country.

### **Assessment of sufficiency of legislation**

The most pertinent law so far identified regarding the management of IAS is the one drafted by the ANRS for the regulation of *Prosopis* in the region. This law is the first of its kind in dealing with the issue of IAS in Ethiopia. It is unique also in view of the fact that it focuses on a single species of IAS. The management opted for by the law, however, does not seem to gain consensus by all concerned. The law generally advocates the view that already existing *Prosopis* trees should be controlled through utilization. Key informants from the Ethiopian Institute of Agricultural Research (EIAR) are however contending otherwise. The position held by the Institute is to eradicate the tree species rather than entertaining any mode of usage. This is because of the fact that allowing charcoal production from *Prosopis* will give lee way towards cutting the existing population of indigenous trees. In Gewane *Woreda* there are riverine forests of *Acacia*.

Transect walk has demonstrated that in some *Kebeles* like Ourafeta, this forest is dense. During a Focus Group Discussion with the community, it was pointed out that some of this forest has been the subject of destruction after observing monetary benefits on the part of those producing charcoal from *Prosopis*. According to the same FGD, it was alleged that the charcoal producers tend to cut, though illegally, the Acacia as this produces quality charcoal that fetches premium market price than the one produced from *Prosopis*.

Informants from FARM – Africa have stated that this problem can easily be avoided through the use of special sacks with appropriate labeling for charcoal produced from *Prosopis*. The NGO is also advocating that charcoal producers form cooperatives and have their own rules of procedure. On the other hand, it is being alleged from the EIAR that these actions will not stop the cutting of indigenous tree species. One major reason forwarded during discussions is the issue of difficulty in ascertaining what goes into the sack prepared for packing charcoal only out of *Prosopis*. That is to say, people will not be precluded from producing charcoal from Acacia and using the same packing material without being spotted. Even in the presence of cooperatives, lack of monitoring capacity by independent bodies loosens any guarantee to protect destruction of other species. Apart from this, the other basic reason for not favouring the law is because it encourages reliance on wild species. According to experts from EIAR, alien species do not have the character of domesticated varieties. Backing their utilization through enforceable instruments may give a wrong sign and induce reluctance in taking stringent measures.

Instead of the management provisions of the draft law, the recommendation forwarded by EIAR is total eradication - mechanically, through chemical usage or the introduction of an appropriate bio-controlling agent. It is learnt from discussions with key informants, however, that no cost-benefit analysis was made into these options. It is therefore difficult to include any of the techniques in a law applicable to the region regarding the control of *Prosopis*. A rapid assessment into the techniques should therefore be made to make decisions on the direction that regulatory frameworks would follow. It should however be noted that not every environmental goods and services can be monetized. But

pertinent valuation techniques can be had to integrate ecological values into economic decision-making (Dessalegne, 2007).

The draft biosafety law has no direct reference to aspects of IAS management and control. However it is important given the fact that GMOs are highly invasive (Herrera, 2007). This law thus needs to be presented to the decision making organs of the government and pass through formal adoption processes. After enactment, the law would serve as part of the framework regulating IAS in the absence of a standalone law.

The quarantine law (Regulation No. 4/ 1992) is an important step in regulating intentionally imported IAS. Even if it is not specialized and focused only on IAS, the Plant Quarantine law plays a major role availing preventive means to avoid entry of a disease causing organism of a plant or animal nature. It also has a major place in identifying and excluding from entry, microorganisms that are capable of affecting ecosystems within Ethiopian boundaries.

A serious gap in the quarantine legislation is the fact that invasive species of highest priority are missing from both the prohibitive and restrictive lists. *Prosopis juliflora* is for instance a major biological material that should have been regulated and stopped from entry at the outset. The plant species has been identified to be the number one priority of IAS in Ethiopia. But it is not included in either of the lists. Part of the explanation for this is the fact that the list has never been updated since its issuance in 1992. The dynamism in terms of invasion and expansion of IAS has been immense since the adoption of this law. Despite this, however, the law was never amended to encompass developments in the horizon of invasions. Again, the first step in legislative amendment is to update the lists.

A wide array of IAS is brought into the country unintentionally through activities such as tourism, transport, trade etc. Key informants from the Ministry of Agriculture and Rural Development state that one of the priority invasive species in Ethiopia, *Water hyacinth*, was brought into the country as an ornamental flower. It is an individual impressed by the

beautiful flower that brought it inside the country. *Parthenium*, another of the invasive plants, sneaked into Ethiopian territory through food aid, undetected. Apparently, there is no system of law in Ethiopia that regulates invasive alien species that are imported in such accidental pathways. This leaves a big gap in regulatory control of alien species in the country.

### **Harmonization of Standards and Inter-agency Collaboration**

Harmonization of standards and actions related to the management of IAS should be taken across regional states and even beyond national boundaries. This is because of the fact that IAS do not limit themselves within only one geographic area that it found itself in at one particular moment in time. A government should therefore harmonize its standards and action plans within as well as outside its borders.

There is a valid ground for standardizing control measures within the country. Enacting laws for the conservation and utilization of natural resources is, according to Article 51(6) of the FDRE Constitution, the responsibility of the federal government. Regional states have the power to administer their resources in accordance with federal laws (Article 52, FDRE Constitution). This fact is also corroborated by the provision under Article 15 (2) of the Proclamation No. 295/ 2002, stating that regional governments shall issue standards no less stringent than those under the federal government. More pertinent to the ANRS, Article 11 of Proclamation No.30/ 2007 of the ANRS that established the executive organs of the region affirms that every bureau of the region has the obligation to enforce federal laws. These provisions of the law are sufficient justification for the need to ensure domestic harmonization of standards and laws on the conservation of natural resources – to which belongs the issue of IAS management.

According to a Focus Group Discussion undertaken between experts of regulatory institutions, it was found that there are attempts of harmonizing standards for the movement of biological materials within Eastern and Southern African region (to which Ethiopia belongs). So far harmonization is made through unifying application formats for those requesting permits for importing biological materials from another country within

or outside the sub-region. So the same rule applies based on IPPC and OIE requirements for anybody who intends to bring in the biological material into the country within the territories of these Eastern and Southern African countries.

The other two areas of integration of standards that Ethiopia worked on with these neighboring countries is through the application of uniform Pest Risk Analysis (PRA) procedures and uniformity in bio-pesticide formulation procedures. These are important steps for two reasons. It enhances compliance to internationally set standards (such as those set by IPPC, OIE etc.). It also helps to halt the free movement of IAS that managed to sneak into the boundaries of one country sharing a border with others.

The Focus Group Discussion also pointed out that even though there is this level of harmonization between the countries, movement of the biological material is allowed only after a pre-trial is proved to be with no impact at the destination country. The reason for this is the disparity within countries in terms of temperature, agro-ecology, climate etc. even within short distances. This is also a very important consideration that would curb incidences of invasion by IAS that managed to go through the filtering process of science (such as PRAs). These existing practices of harmonizing working procedures and standards in east and southern Africa should be made part of future enactments on IAS. This is to say that possible IAS laws that may be adopted in the future should build on current practices and experiences.

## 5. Conclusion and Recommendations

### 5.1 Conclusion

There are controversies between those that see *Prosopis* as an advantage and advocate for tapping the apparent benefits and those that perceive it as an already established threat and seek its eradication. The latter argue that *Prosopis* is a threat to biodiversity, crop and livestock production as well as the socio-economic well being of the communities. This contentious area is not yet resolved through any form of cost-benefit analysis that charts out all the management options together with their pros and cons. Complete eradication, control through land use change, eradication through the use of chemicals, and biological control are among the notable alternatives identified. As it is stated above, however, the full cost of adopting one alternative against the other is not yet worked out.

Based on the findings of the study, in Gewane *Woreda*, the negative impacts of *Prosopis* are clearly observed. The management of this already established invasive plant demands backing through legal instruments. Though there is already a draft law to control the invasion of *Prosopis* Invasion in the ANRS, it is not yet approved by the Regional Council. There is wariness on some stakeholders that hold the view that adopting such a law will give lee way for those that illegally cut local tree species for charcoal production.

The legal coverage of the management of IAS in general is currently very scanty. The available legal schemes are to be found scattered in the plant protection, health, environmental pollution control, environmental impact assessment, biosafety and animal health laws. Still some of these laws (such as the biosafety Proclamation and the bio-control Regulation) are in a draft form lacking any force of implementation. The laws are also enacted with sectoral mandates complicating implementation in the context of the apparent absence of inter-agency cooperation in Ethiopia.

The research has indicated that there are MEAs that can lay the basis for the development of a law on IAS in Ethiopia. These include the CBD, Cartagena Protocol on Biosafety to

the CBD, the SPS Agreement, the IPPC, the OIE and the Ramsar Convention on Wetlands.

An MEA that is particularly pertinent to IAS is the “Guiding Principles for the Preservation, Introduction & Mitigation of Impacts of Alien Species that Threaten Ecosystems, Habitats or Species” It lays Principles and a hierarchy of objectives that are particularly important to determine priority actions when reviewing existing laws or crafting a new IAS legislation in Ethiopia. However it should be noted that these instruments are mere guidelines and do not have a force of law. Member states like Ethiopia abide to it only voluntarily. But as stated above, the principles enshrined offer good reference points for actions targeted at backing the management of IAS with appropriate legal instruments. Ramsar Convention being one of the treaties that offer a good management of wetland resources is not yet adopted by Ethiopia.

The country lacks a species list that categorizes IAS and forbids their entry from the outset. The only available piece of law in this regard is the Council of Ministers Regulation No.4/ 1992 that puts forward a list of plant pests slated for quarantining at ports of entry. This law in itself is never updated and lacks the inclusion of important invasive plant species in the order of *Prosopis juliflora*. Though this plant species is already introduced and has established itself to the point of creating big difficulty of containment, the law has missed its inclusion in the said list. It is also true that the law do not include animal pests or faunal invasives.

Existing laws do not cover pathways of unintentional introduction through tourism, transport, trade, food aid etc. Study findings however, have proved the introduction of *Water Hyacinth* and *Parthenium* through these access routes. Another gap in legislation is also regarding the definition of IAS. There is no law that has defined what IAS are.

## 5.2 Recommendations

The following recommendations should be considered in order to back IAS management with legislations.

- A cost-benefit analysis should be made on all available management options forwarded towards controlling *Prosopis* in ANRS. This should be done before the draft Regulation to Control *Prosopis* Invasion in the ANRS, gets adopted by the regional government. The output of further study in this line will provide the basis for decision makers to embark on a viable and cost-effective management technique that is backed by law.
- Prevention of IAS both at the national level and within the sub-region by way of promulgating explicit regulation is an effective way of combating threats posed by invasions. It is also environmentally desirable than post introduction measures. Priority should be given to the prevention of entry of IAS both into and across regional states. Like the case of *Prosopis* invasion in Afar National Regional State, if entry has already taken place, action should be under taken to prevent the establishment and its wide spread. The same rule should follow for any IAS. The preferred solution would then be eradication at the earliest possible stage. In the event that eradication is not feasible or is not cost effective, containment and long term control measure should be the next step to be followed. Community support, built through all rounded and successive consultation, should be an integral part of the eradication process.
- Boarder control and quarantine measures of IAS should heavily rely on risk assessment. The risk assessment should cover aspects of socio-economic and ecological threats as well as potential pathways of entry. Existing appropriate governmental agencies or authorities both at the federal, regional and *Woreda* levels should be strengthened and broadened as necessary. Training of staff of regulatory bodies in Ethiopia should be an activity that is done regularly. In this regard, particular emphasis should be given to the establishment of early detection systems.

- Trans-regional cooperation within the country is another important aspect. This is in view of the fact that IAS invasion do not respect political or regional boundaries as amply demonstrated through the rapid expansion of *Prosopis* across regional states in Ethiopia. Harmonization of standards across regional states and within the sub-region (Eastern and Southern Africa) should be strengthened.
- In order to avoid duplication of efforts and mandate conflicts across sectors, existing legislations should be reviewed. Draft laws of relevance to IAS such as the Biosafety Proclamation and the Bio-control Regulation should be adopted as soon as possible. In order to protect the vast wetland resources of the country, a step should also be taken towards acceding to the Ramsar Convention on Wetlands.
- As existing legal frameworks either have scanty provisions pertinent to the management and control of IAS or only have sectoral inclinations, it is advisable to have a comprehensive (standalone) law.

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Draft Biosafety Proclamation

Draft Regulation to Control *Prosopis* Invasion

## Annex I

### List of Key Informants

1. Mohammed Mahmud, Head, Natural Resource and Environmental Protection Sector, Afar National Regional State.
2. Mellesse Haile, Plant Quarantine Expert, Ministry of Agriculture and Rural Development
3. Yakumi Negash, Owner of Cotton Plantation in Ourafeta *Kebele*, Gewane *Woreda*, ANRS
4. Hussein Ibrahim, Head, Pastoral Agriculture and Development Office, Gewane *Woreda*, ANRS
5. Gizaw Demissie, Livestock Resource Team Leader, Pastoral Agriculture and Development Office, Gewane *Woreda*, ANRS
6. Teshome Kebede, Natural Resource Team Leader, Pastoral Agriculture and Development Office, Gewane *Woreda*, ANRS
7. Abekir Ali, Chairman, Ourafeta *Kebele*, Gewane, ANRS
8. Rezene Fessehaie, National Project Coordinator, UNEP/GEF- Funded Project on Removing Barriers to Invasive Plants Management in Africa - Ethiopia
9. Berhanu Gebremedhin, Expert at the Animal and Plant Health Regulatory Directorate, MoARD
10. Dubale Admassu, Researcher, US/ AID
11. Ababu Anagie, Head of Ecosystem Department, Environmental Protection Authority
12. Shimellis Fekadu, Head of Planning Department, Environmental Protection Authority
13. Abraham H/ Melekot, Expert, Environmental Impact Assessment, Environmental Protection Authority

## Annex II

### **Questionnaires on the Management of *Prosopis juliflora* in Gewane Woreda**

The purpose of the research is to understand the perception of the local communities in Gewane *Woreda* about the introduction, impacts and possible means of containment of *Prosopis*, the management options in controlling the problem and their views on legal and institutional arrangements of combating Invasive Alien Species (IAS).

Therefore, I kindly request the respondent to fill this questionnaire.

Note that:

- All your responses will be held confidential.
- Your name will not be written on this form and will never be used in connection with any other information you may tell me.
- You are free to withdraw from participation at any time.
- You are at liberty to ask any question regarding the questionnaire or the subject matter contained within it.
- You have the right to obtain information about the findings of the research and about how findings are to be employed after the research is completed.

Your genuine participation by responding patiently to the questionnaire is highly appreciated. Thank you in advance for giving up your time to participate in filling out this questionnaire.

**Part I: Background Information**

1	<b>Date</b>	
2	Name of data collector	
3	Name of supervisor	
4	Name of respondent	
5	Sex	1. Male      2. Female
6	Age	
7	<i>Kebele</i>	
8	Marital Status	1. Single      4. Widowed 2. Married    5. Separated 3. Divorced   6. Polygamous
9	Place of Birth	1. Current place of residence 2. Other place (specify) Region ____ Zone ____ <i>Woreda</i> ____
10	Educational status	1. Illiterate                      2. Literate 3. Elementary school      4. Secondary school 5. Above secondary school 6. Other(specify) _____
11	Current occupation	1. Farmer      2. Daily laborer 3. Trader      4. Government employee 5. Crafts men 6. Others (specify)-----
12	<b>Income/ month</b>	1. less than 100 ETB 2. 101 Birr to 300 Birr 3. 301 Birr to 500 Birr 4. 501 Birr to 1,000 Birr 5. Above 1,000 Birr

**Part II: Questions on Problems associated with the introduction of *Prosopis* and management options**

1. For how long have you known *Prosopis* in your *Kebele*?
  - a. In the last 10 years
  - b. In the last 11-20 years
  - c. 20 years ago
2. How do you label the impact of *Prosopis* in your *Kebele*?
  - a. Negative
  - b. Positive
  - c. Both positive and negative
  - d. Not sure
3. What are the negative impacts of *Prosopis*? (if any)
  - a. Loss of grazing land and feedstock for livestock
  - b. Constriction of arable land
  - c. Damage to livestock as a result of thorns
  - d. Blocking roads
  - e. Blocking waterways and water availability
  - f. Any other (Please specify)
4. What are the benefits of *Prosopis*? (if any)
  - a. Use as source of food for livestock
  - b. Use as source of charcoal making
  - c. Use as wind break
  - d. Use as sheds from the sun
  - e. Use as source of construction material /local furniture/
  - f. Fencing houses
  - g. Any other (Please specify)
5. What is your source of income?
  - a. Livestock
  - b. Farming
  - c. Trade
  - d. Any other (Please specify)
6. What do you feel about the change in the size of livestock over the past 10 years?
  - a. It is increasing
  - b. It is declining
  - c. No change
  - d. I do not know
7. If you feel that the size of livestock is declining, what do you think is the reason for it?
  - a. Decline in grazing land
  - b. Drought
  - c. Disease
  - d. Any other (Please specify)
8. If the answer to the above question is (a) (i.e. decline in grazing land), what is the cause?
  - a. Encroachment by *Prosopis*

- b. Drought
  - c. Any other (Please specify)
9. Do you feel that *Prosopis* is expanding in your *Kebele* in the past 10 years?
- a. Yes
  - b. No
  - c. I do not know
10. If "Yes", do you think that the expansion is harmful or is it beneficial to the community?
- a. Harmful
  - b. Beneficial
  - c. I do not know
11. Please explain the reasons for your answer to question No.10.
12. Have you evidenced any injury caused by *Prosopis* on livestock (such as injury by the thorns of *Prosopis* while feeding)?
- a. Yes
  - b. No
  - c. I do not know
13. Do you feel that the pods of *Prosopis* is important as feed for livestock?
- a. Yes
  - b. No
  - c. I do not know
14. Do you believe that the pods of *Prosopis* consumed by livestock to be one of the pathways for the spread of *Prosopis* in your community?
- a. Yes
  - b. No
  - c. I do not know
15. Do you believe that eradicating *Prosopis* will be harmful to your community because of its impact on the pods as a source of livestock feedstock?
- a. Yes
  - b. No
  - c. I do not know
16. Do you believe that it is better to utilize *Prosopis* ( for instance as a source of feedstock or as a means of getting income through charcoal making) rather than eradicating it all along?
- a. Yes
  - b. No
  - c. I do not know

**Part III: Questions on Legal and Institutional arrangements as well as the awareness level of the community.**

17. Do you know that there is a law in the Afar regional state that governs the management of *Prosopis* (or the entire body of IAS)?
  - a. Yes
  - b. No
18. Are you familiar with the management options envisaged with in the law? Please Explain.
19. Do you believe that the management options with in the law are sufficient to control/ halt the spread of *Prosopis*?
  - a. Yes
  - b. No
  - c. I do not know
20. Do you believe that there is an institution responsible for implementing the law?
  - a. Yes
  - b. No
  - c. I do not know
21. Is this law currently in force?
  - a. Yes
  - b. No
  - c. The law is suspended
  - d. I do not know
22. Which institution do you think is appropriate in the Afar region to manage *Prosopis* or any other IAS?
  - a. Bureau of Agriculture
  - b. Bureau of Disaster Prevention
  - c. Bureau of Land Administration & Environmental Protection
  - d. Bureau of Agriculture
  - e. Afar Agricultural Research Institute
  - f. I do not know
23. Which part of administration do you think is appropriate in Gewane *Woreda* to manage *Prosopis* or any other IAS?
  - a. Office of Food Security
  - b. Bureau of Agriculture
  - c. Bureau of Disaster Prevention
  - d. Bureau of Land Administration & Environmental Protection
  - e. I do not know
24. Do you believe that there is an effective structure in your *Kebele* to control the spread of *Prosopis* or other IAS?
  - a. Yes
  - b. No
  - c. I do not know
25. Which part of the *Kebele* administration do you think is engaged in the management of *Prosopis* or any other IAS in your *Kebele*?
  - a. Food Security Desk

- b. Agriculture Desk
  - c. Disaster Prevention Desk
  - d. Land Administration Desk
  - e. I do not know
26. What weaknesses do you observe at the *Kebele* level regarding the management of *Prosopis* (or the entire body of IAS)?
- a. Lack of Awareness
  - b. Loose coordination with neighboring *Kebeles* and the *Woreda*
  - c. Lack of Finances
  - d. Insufficient number of Experts
  - e. Any other (Please Explain)
  - f. I do not know
27. Is there coordination between your *Kebele* and non-governmental organizations (NGOs) operating in the *Woreda* regarding the management of *Prosopis*?
- a. Yes
  - b. No
  - c. I do not know
28. Please mention the NGOs that are actively engaged in *Prosopis* management in your *Kebele*. Explain the level of assistance by these NGOs and the level of coordination with the *Kebele* administration?
29. What are the management options advocated by these NGOs?
- a. Complete eradication
  - b. Control through utilization such as charcoal making, pod crushing for animal feed etc.)
  - c. Any other (Please Explain)
  - d. I do not know
30. Do you believe that the management option forwarded by the NGO(s) is important for your community?
- a. Yes
  - b. No
  - c. I do not know
31. Do you believe that your *Kebele* is susceptible to invasion by other forms of IAS?
- a. Yes
  - b. No
  - c. I do not know
32. If the answer to the above question is Yes, what is the reason for the vulnerability of the *Kebele* for future invasion?
- a. Loose control system
  - b. Porous border with neighboring *Kebeles* (ex:- existence of intensive cross *Kebele* trade)
  - c. Lack of appropriate early warning system
  - d. Lack of appropriate institutions for early detection and control,
  - e. I do not know

#### **Part IV: Checklist for Key Informant Interviews and Focus Group Discussions**

1. Has any cost-benefit analysis been made to estimate the impact of *Prosopis* at any *Kebele* or in the *Woreda*?
2. Has any cost-benefit analysis been made to estimate the cost of managing *Prosopis* in the entire *Woreda* of Gewane or any *Kebele*?
3. Is there an early warning system employed to alert authorities of the introduction of new IAS?
4. Which institution is mandated to manage IAS in Gewane *Woreda*?
5. Is there any inter-agency collaboration when disasters such as new invasions surface within the region? How does the institutional coordination look like between pertinent agencies in the *Woreda*?
6. Is there collaboration between the concerned agencies in Gewane *Woreda* and the appropriate regional offices?
7. Is there any line of coordination between the *Woreda* or the regional administration with the pertinent federal offices? Is there a channel for accessing support from the federal government?
8. Is there any law or regulation that governs the management of *Prosopis* or the broader aspect of IAS in Gewane *Woreda*? What are its contents? How effective is this law?
9. Does the law encourage “complete eradication of *Prosopis*” or the option of “Control through Utilization”?
10. Is there a mechanism of weighing the efficiency of the law at the *Woreda* level?
11. Which NGOs are active in the management of *Prosopis* in the area? How can you determine their effectiveness?
12. Do you agree with the Management Options forwarded by these NGOs?
13. Do you make cost – benefit analysis before policy decisions are made on one of the management options?

**Annex III**  
**Draft Regulation to Control *Prosopis* Invasion**  
**in the ANRS**

በአፋር ብሄራዊ ክልላዊ መንግስት  
በአርብቶ አደር ግብርናና ገጠር ልማት ቦርድ



የፕሮሶፒስን ዛፍ ስርጭት ለመቆጣጠርና ለመከላከል  
የተዘጋጀ ረቂቅ ደንብ

ጥር 1999  
ሠመራ

**የአፋር ብሄራዊ ክልላዊ መንግስት ክልል ውስጥ በስፋት እየተዛመተ የሚገኘውን የፕሮሶፒንድ ማህበራዊ ልማት ለመቆጣጠርና ለመከላከል የወጣ ደንብ**

**መግቢያ፣**

ፕሮሶፒንድ በአካባቢው አጠራር ደርጊት ላይ የተሰኘ መጠኑ እሾሃማ ተክል ሲሆን በክልሉ ውስጥ ባሉት በተወሰኑ ወረዳዎች በከፍተኛ ፍጥነት በመዛመት የግጠሽና የ ርሻ መሬቶችን፣ የወሃ ካናሎችና መጠጫ ቦታዎች ፣ መተላለፊያ መንገዶችንና የመኖሪያ አካባቢዎችን በመውረር በህብረተሰቡና በብዝሃ ህይወቱ ላይ ከፍተኛ ጉዳት በማድረስ ላይ ይገኛል። በተጨማሪም ተክሉ ሾሃማ ከመሆኑ የተነሳ በሰዎችና በ ንስሳቶች ላይ ከፍተኛ የሆነ የአካል ጉዳት ያደረሰ አርብቶ አደሩን በማፈናቀል ላይ የሚገኝ ሲሆን የዛፋን/ዕጽዋቱን መዛመት በመቆጣጠር፣ ጥቅም ላይ በማዋል በመቀነስ ብሎም ማስወገድ እንዲቻል ደንብ አውጥቶ ስራ ላይ ማዋል አስፈልጓል። ስለሆነም የአፋር ብሄራዊ ክልላዊ መስተዳድር ም/ቤት በተሻሻለው የ1994 ህገ መንግስት አንቀጽ 56 ንዑስ ቁጥር 5 መሰረት በተሰጠው ስልጣን የሚከተለውን ደንብ አውጥቷል።

**ክፍል አንድ  
አንቀጽ 1**

**አጭር ርዕስ**

- 1. ይህ ደንብ በክልሉ ያለውን የፕሮሶፒንድ ወረራ ለመቆጣጠርና ለመከላከል የወጣ ደንብ ተብሎ ሊጠቀስ ይችላል።

**አንቀጽ 2**

**ትርጓሜ**

- 1. **የፕሮሶፒንድ ማለት፦**  
በቤትና በዱር እንስሳት እንዲሁም በወንዞች ፍሰትና በመሳሰሉት በተለያዩ ቦታ በመዛመት በእጽዋት ሀብትና በእንስሳት እንዲሁም በማህበረሰቡ ላይ ከፍተኛ ችግር በማድረስ ላይ የሚገኝ መጠኑ የሆነ እሾሃማ ማህበራዊ ልማት ሲሆን በተለምዶ አጠራር ደርጊት ላይ ተብሎ የሚጠራ ነው።
- 2. **በፕሮሶፒንድ የተወረረ መሬት ማለት፦**  
በፕሮሶፒንድ ተክል ወይም ማህበራዊ ልማት የተሸፈነ የግጠሽ መሬት፣ የእርሻ ቦታ፣ የመተላለፊያ መንገዶችንና የመስኖ ቦቶች እንዲሁም የመኖሪያ ቦታዎች ማለት ነው።

3. **ተጠቃሚ አካል ማለት፦**  
በፕሮሶፒን ወይም የእርሻ መሬታቸው የተሸፈነባቸው አርብቶ አደሮች፣ ወይም ጎሳ/ጎሳዎች ማለት ነው። በተጨማሪም በፕሮሶፒን የተወረረን መሬት በኮንሴሽን መልክ ለመጠቀም ከሚመለከተው አካል ጋር የሚዋዋል ህጋዊ አካል ማለት ነው።

4. **ኮንሴሽን ማለት፦**  
የፕሮሶፒን ተክል የሚገኝበትን መሬት ለተወሰነ ወራት ወይም አመት በኪራይ መልክ በመያዝ የሚጠቀም ድርጅት፣ ማህበር ወይም ባለሀብት ጋር የሚደረግ የአጠቃቀም ስምምነት ነው።

5. **አስፈጻሚ አካል ማለት፦**  
ለጥቅም መዋል የሚገባውን በፕሮሶፒን የተሸፈነ መሬት አግባብ ባለው መልኩ ጥቅም ላይ እንዲውልና ወረራውን ለመቆጣጠር ብለውም በዘላቂነት ለማስወገድ የሚደረግን ተግባር እንዲያስተባብር በክልሉ መንግስት ውክልና የተሰጠው አካል ነው።

6. **የፕሮሶፒን ውጤት ማዘዋወሪያ ፈቃድ ማለት፦**  
የፕሮሶፒን ውጤቶችን ከተመረቱበት ቦታ በሀገር ውስጥ ገበያዎች ወይም ወደውጪ ሀገር ገበያ አዘዋውሮ ለመሸጥ የሚሰጥ የምርቱን መነሻና መድረሻ የሚገልጽና ለአንድ ጊዜ አገልግሎት ብቻ የሚውል ፍቃድ ነው።

7. በዚህ ደንብ መሰረት እንዳይቆረጡ የተከለከሉ ሌሎች ዛፎች የተፈጥሮ ደን፣ ሰው ሰራሽ ደን፣ የመንግስት ደንና ጥብቅ ደን ናቸው።

ሀ/ **የተፈጥሮ ደን ማለት፦**  
በተፈጥሮ በቅለው የሚገኙ ቁጥቋጦዎችና ሌሎች የእንጨት ፀባይ ያላቸው ዛፎችና እጽዋቶች ናቸው።

ለ/ **ሰው ሰራሽ ደን ማለት፦**  
ለተለያዩ ጠቀሜታ እንዲውል በግለሰብ፣ በወል፣ በማህበር፣ በመንግስትና መንግስታዊ ባልሆኑ ድርጅቶች የለማ ከፕሮሶፒን ውጪ የሆነ ደን ማለት ነው።

ሐ/ **የመንግስት ደን ማለት፦**  
በፌደራል ወይም በክልል መንግስት ባለቤትነት ስር የሚተዳደር ወይም ሊተዳደር የሚችል ማናቸውም ጥብቅ ወይም ምርት ሰጪ ደን ነው።

መ/ **ጥብቅ ደን ማለት፦**  
ለተፋሰስና አካባቢ እንክብካቤ ፣ ለጄኔቲክ ሀብትና ለብዝሃ ህይወት ጥበቃ ፣ እንዲሁም ለምርምርና ተዛማጅ አገልግሎቶች እንዲውል ከሰውና ከእንስሳት ንክኪ ነፃ በሆነ ሁኔታ እንዲጠበቅና እንዲለማ ጥብቅ ደን ተብሎ የተሰየመ ወይም ሊሰየም የሚችል ደን ማለት ነው።

8. **የወል የግጦሽ መሬት ማለት፦**  
በአንድ አካባቢ የሚኖሩ የሀብረተሰብ ክፍሎች ፣ የጎሳ አባላት ወይም ጎሳዎች በጋራ የሚጠቀሙት የተፈጥሮ የግጦሽ ሀብት ነው።

9. **የኒዮን ማለት፦**  
 በተመሳሳይ ስራ ላይ የተቋቋሙ መስረታዊ ሁለገብ የህብረት ስራ ማህበራት በተናጠል ሊወጡት የማይችሉትን ተግባራት አቅማቸውን በማጠናከር መስራት እንዲችሉ በአንድ መዋቅር ስር የሚደራጁበት ሁለተኛ ደረጃ የማህበራት ህብረት ነው።

**አንቀፅ 3**

**ዓላማ**

በአፋር ክልል በስፋት በመካመት በግጦሽ መሬቱ፣ በብዝሃ ህይወት፣ በእንስሳትና በአርብቶ አደሩ ህይወት ላይ ከፍተኛ ጉዳት እያደረሰ ያለውን የፕሮሶፒን ተክል ጥቅም ላይ በማዋል ለመቆጣጠር በዘለቄታውም ለማስወገድ እንዲቻል ነው። ይህንኑ ዓላማ ተግባራዊ ለማድረግ የችግሩ ባለቤት የሆነውን ህብረተሰብ፣ የመንግስት አካላትን መንግስታዊ ያልሆኑ ድርጅቶችንና የግል ባለሀብቶችን በማስተባበር ዝርዝር ተግባራትን ለማቀድ ለማክናወን ለመቆጣጠር የሚያስችል ምቹ የስራ ሁኔታ ለመፍጠር ነው።

**ክፍል ሁለት**

**አንቀፅ 4**

**የፕሮሶፒን ስርጭት መቆጣጠሪያ ስልቶች**

1. አዲስ የሚበቅሉ ችግኞችን ህብረተሰቡን በማሳተፍ መንቀልና ማስወገድ።
2. የፕሮሶፒን ፍሬ በእንስሳት ተበልቶ ስርጭቱ እንዳይስፋፋና በእንስሳቱ ላይ የሚያደርሰውን የጤና ችግር ለመቀነስ ፍሬውን በመልቀም ተፈጭቶ ከሌሎች የመኖ እጽዋቶች ጋር በመቀላቀል ለመኖነት እንዲውል ማድረግ።
3. ተክሉ ፍሬ ማፍራት ደረጃ ከመድረሱ በፊት ቆርጦ ለማገዶ፣ ለከሰል ምርትና ለተለያዩ አገልግሎቶች እንዲውል ማድረግ።
4. የፕሮሶፒንን ተክል ተቆርጦ ጥቅም ላይ በሚውልበት ጊዜ ተመልሶ እንዳያቆጠ ቁጥ ሊበቅል የሚችለውን የስር ክፍል ቢያንስ 15 ሴ.ሜ. ወደመሬት ዝቅ ብሎ አብሮ መቁረጥ።
5. ጥናት ላይ በመደገፍ ፍሬውን በመመገብና ፣ በማውደም ወይም በማምከን መካመቱን ሊቀንሱ የሚችሉ ነፍሳትም ሆነ ሌሎች ዘዴዎችን በመሞከር ጥቅም ላይ ማዋል።
6. የፕሮሶፒን እንጨት የከሰለበት ወይም የተቃጠለበት ቦታ ስለሚራቁት የማክሰያና የማቃጠያ ቦታ ውስን እንዲሆን ማድረግ።
7. የፕሮሶፒንን እንጨት ለከሰልነት ጥቅም ላይ በሚውልበት ጊዜ ሰደድ እሳት ተነስቶ ጉዳት እንዳያደርስ አስፈላጊው ጥንቃቄ መደረግ አለበት።

8. ፕሮሶፐር ልምድ ያልገባቸው አጎራባች ወረዳዎች ተክሎ ሊያደርስ ስለሚችልው ጉዳት ለህብረተሰቡ በማስገንዘብ ጥብቅ ቁጥጥር እንዲያደርጉ ስልት መዘርጋት /ለምሳሌ፣ በእንስሳት ዝውውር ወቅት አስፈላጊውን ጥንቃቄ ማድረግ ፣ የሚታዩ ችግኞችን ህብረተሰቡን በማሳተፍ በመንቀል ማጥፋት/

**አንቀጽ 5**

**በእርሻ መሬት ላይ በቅሎ የሚገኝ የፕሮሶፐር ተክል**

1. ለ ርሻ አገልግሎት በሚውል መሬት ላይ በቅሎ የሚገኘውን የፕሮሶፐር ዛፍ መቀረጥና ጉቶውን ነቅሎ ለከሰልና ለማገዶ ወይም ለሌሎች ጠቀሜታዎች ንዲውል ማድረግ።
2. መሬቱን በዘላቂነት ለ ርሻ ለመጠቀም በየጊዜው የሚበቅሉትን ችግኞች የ ርሻ የመሬቱ ባለቤት መንቀል አለበት።
3. በእርሻ መሬቶች አካባቢ በጋራ የሚጠቀሙባቸው ካናሎች ላይ በቅለው የሚገኙትን የፕሮሶፐር ተክሎች ተጠቃሚዎቹ በመተባበር በመቀረጥና ከነጉቶው ነቅለው ማጥፋት አለባቸው።

**አንቀጽ 6**

**በወል የግጦሽ መሬቶች ላይ በቅሎ የሚገኝ የፕሮሶፐር ተክል**

1. ለግጦሽ አገልግሎት የሚውል መሬት ላይ በቅሎ የሚገኘውን የፕሮሶፐር ተክል በመቀረጥና ጉቶውን በመንቀል ለከሰልና ለማገዶ ወይም ለሌሎች ጠቀሜታዎች አገልግሎት ንዲውል ማድረግና መቆጣጠር ለዘላቂነቱም ለግጦሽ አገልግሎት ማዋል።
2. የግጦሽ መሬቱን የሚጠቀሙ የህብረተሰቡ አካላት በማሳተፍ በጎሳና ቀበሌ አመራሮች አስተባባሪነት በየጊዜው የሚበቅሉትን ችግኞች በመንቀል በዘላቂነት የግጦሽ መሬቱን ጥቅም ላይ ማዋል።
3. የመቆጣጠርና መከላከል ስራውን የሚያስተባብሩት በየደረጃው የሚቋቋሙት የወረዳው ምክር ቤትና የቀበሌው መስተዳድር የሚመሩት ኮሚቴዎች ሲሆኑ የአርብቶ አደር ግብርናና ገጠር ልማት ጽ/ቤት፣ የማህበራት ማደራጃ ፣ የጎሳው አመራሮች ህብረተሰቡ በመተባበር ማህበራትንና የግል ባለሀብትን በማሳተፍ ዝርዝር የአሰራር ስልቶችንና ተግባራትን በመንደፍ ስራውን በስፋትና በፍጥነት መስራት አለባቸው።

**አንቀጽ 7**

በመኖሪያ አካባቢዎችና በመተላለፊያ መንገዶች ላይ በቅሎ የሚገኝ የፕሮሶፐር ዛፍ

1. በመኖሪያ አካባቢና መተላለፊያ መንገዶች ላይ በቅሎ የሚገኘውን የፕሮሶፐርስ ተክሎችንና አዳዲስ ችግኞችን ነዋሪዎች በተናጥልም ሆነ በጋራ በጎሳውና በቀበሌው አመራር በመታገዝ መንቀልና ማጥፋት ይኖርባቸዋል።

**ክፍል ሶስት**  
**አንቀፅ 8**  
**ሀጋዊ የማክሰልና የዝውውር ፍቃድ**

**የማክሰል ፍቃድ**

1. በፕሮሶፐርስ የተወረሩ ወረዳዎችና ቀበሌያት ሁሉ ከዚህ ቀጥሎ የተዘረዘሩት አባላት የሚኖሩት የፕሮሶፐርስ ቁጥጥርና መከላከል ኮሚቴ ይቋቋማል፤

- ሀ/ በወረዳ ደረጃ የሚቋቋመው ኮሚቴ፤  
 የወረዳው አስተዳዳሪ..... ሰብሳቢ  
 አ/ግ/ገ/ልማት ጽ/ቤ ሃላፊ ..... አባል  
 አ/ግ/ገ/ልማት ጽ/ቤ የደን ባለሙያ..... ፀሃፊና አባል  
 ማህ/ማ/ማ/ ዴስክ ..... አባል  
 እማካሪ ሽማግሌዎች ..... አባል  
 ፖሊስ ጽ/ቤት ..... አባል

- ለ/ በቀበሌ ደረጃ የሚቋቋመው ኮሚቴ፤  
 የቀበሌው ሊቀመንበር ..... ሰብሳቢ  
 የጎሳ ተወካዮች ..... አባል  
 የልማት ሰራተኛ ..... አባልና ፀሃፊ  
 የሴቶች ተወካይ ..... አባል  
 የመንግስት ደን ዘበኞች ..... አባል /ባለ-በት/  
 የሃይማኖት ተወካዮች ..... አባል እንዲሁም እንደአስፈላጊነቱ ሌሎችንም ይጨምራል።

2. በፕሮሶፐርስ የተሸፈነው መሬት እንዲፀዳ ከመወሰኑ በፊት መሬቱ ለምን አገልግሎት እንደሚውል በወረዳው ባለሙያዎች ድጋፍ እቅድ ተዘጋጅቶለት ለቀጣይ ስራ ሁኔታዎችን የቀበሌው ኮሚቴ ያመቻቻል።
3. በተዘጋጀው እቅድ መሰረት የአካባቢው ነዋሪ በማህበርም ሆነ በግል በለሀብት በመታገዝ የቁጥጥር ስርአቱን በመጠበቅ የፕሮሶፐርስን ተክል ለከሰልም ሆነ ለማገደነትና ለሌሎችም አማራጭ አገልግሎቶች መጠቀም ይችላል።
4. የቁጥጥር ስርአቱ እንደተጠበቀ ሆኖ ጎሳው እንዲሁም መስተዳድሩ ከፈቀደለት ማህበራት ወይም የግል ባለሀብት ከአካባቢው ውጪ በሌላው ጎሳ መሬት ላይ ብቅሎ የሚገኘውን የፕሮሶፐርስ ተክል ለተለያዩ አገልግሎቶች ጥቅም ላይ ማዋል ይችላል።

**የዝውውር ፍቃድ**

- 5. በቀበሌው የሚቋቋመው ኮሚቴ በየቀበሌው የሚካሄደውን የቁጥጥር ስራ ዋና ሃላፊ በመሆን የተመነጠሩ ቦታዎች ላይ ጉቶው በአግባቡ መነቀሉን ፣ ለከሰል ያልደረሱ የፕሮሶፐርሽን ዛፎችንና ችግኞች መነቀላቸውን ፣ አገር በቀል ዛፎች አለመቆረጣቸውን ፣ የጸዳው መሬት በተዘጋጀው እቅድ መሰረት ለተባለለት አላማ እንዲውል ሁኔታዎች መመቻቸታቸውን አረጋግጦ የመሸጥ ፍቃድ ይሰጣል።
- 6. እውቅና ያለው ማህበር ወይም ባለሀብት የገዛውን ወይም ያመረተውን የፕሮሶፐርሽን ውጤት ብዛቱ ተገልጾ የቀበሌው ኮሚቴ የሰጠውን የሽያጭ ፈቃድ በመያዝ ጉዳዩ ለሚመለከተው የወረዳ ምክር ቤት ለሚመራው ኮሚቴ የዝውውር ፍቃድ ጥያቄ ያቀርባል።
- 7. የይለፍ ወረቀቱን ውክልና የተሰጠው የወረዳው ምክር ቤት የሚመራው ኮሚቴ የቀረበለትን መረጃ በመመርኮዝ የፕሮሶፐርሽን ውጤት መጠንና ከፕሮሶፐርሽን የተመረተ መሆኑን ገልጾ ለአንድ ጊዜ ብቻ የሚያገለግል ፍቃድ ይሰጣል።

**አንቀፅ 9**  
**የይለፍ ወረቀቱ ይዘት**

**የይለፍ ወረቀቱ የሚከተሉትን መረጃዎች ያካትታል**

- 1. የክልሉን አርማ ይይዛል፤
- 2. የፕሮሶፐርሽን ውጤት አይነት ፣ ብዛትና የተመረተበትን ቦታ ይገልጻል፤
- 3. የማሕበሩን ወይም የነጋዴውን ስም ይገልጻል፤
- 4. የመጠቀሚያ ጊዜውን የሚገልጽ ይዘት ይኖረዋል፤
- 5. የተሸከርካሪውን ስሌዳ ቁጥርና የአሸከርካሪውን ሙሉ ስምና ሌሎች አስፈላጊ መረጃዎችን ያካትታል።

**ክፍል አራት**  
**አንቀፅ 10**  
**የገበያ ማስፋፋት ስራዎች**

- 1. በፕሮሶፐርሽን ውጤቶች ንግድ ስራ የተሰማሩትን ማህበራት በዩኒየን በማደራጀት ምርቱን ለተጠቃሚዎች በቀጥታ በማድረስ / ለምሳሌ ጊዜያዊ የማከማቻ መጋዘን ማዘጋጀት/ አምራቾቹ ከምርቱ ይበልጥ ተጠቃሚ እንዲሆኑ ማድረግ።
- 2. በዩኒየኑ አማካይነት ወደማዕከላዊ ገበያዎች የሚቀርበውን የፕሮሶፐርሽን ውጤት ምርት በመቆጣጠር የዋጋ ውድቀትን በመከላከል አምራቾችን ይበልጥ ተጠቃሚ ማድረግ።
- 3. የውጪ ሀገር ገበያን ጨምሮ አማራጭ ገበያዎችን በማፈላለግ ለማህበራቱ መረጃ መስጠት።

4. በዩኒየኑ አማካኝነት ለፕሮሶፐር ውጤት አገልግሎት ብቻ የሚውል ልዩ አርማ ያለው የማቅረቢያ ጅንያ ፣ ካርቶንና የመሳሰሉትን በማዘጋጀት ለህጋዊ ማህበራትና የግል ባለሀብቶች በሚያቀርቡት ማስረጃ መሰረት በመስጠት አገልግሎት ላይ እንዲውል ያደርጋል።
5. የተሻሻለ ማክሶያ በመጠቀም ጥራት ያለው ከሰል ንዲመረት ማድረግና ማስተዋወቅ።

**አንቀፅ 11**

**ገቢና ክፍያ**

1. ሕብረት ስራ ማህበራትን በተመለከተ የገቢ ክፍፍል በጠቅላላ ጉባዔው በጸደቀው መተዳደሪያ ደንብ መሰረት የገቢ ክፍፍል ይሰራል።
2. ተመርቶ ለሽያጭ ከቀረበው የፕሮሶፐር ውጤት ላይ በአካባቢው ዋጋ ተመን የሽያጩ 5% ተሰልቶ ለመንግስት የሮያሊቲ ክፍያ የይለፍ ፍቃድ በሚሰጥበት ጊዜ ይፈፅማል።

**ክፍል አምስት**

**አንቀፅ 12**

**ሕገወጥ ሥራዎችና የሚያስከትሉት ቅጣት**

1. የፕሮሶፐሩን ተክል ለተለያዩ ውጤቶች በሚቆረጥበት ወቅት ጉብኝትን ቢያንስ ከስሩ 15 ሢ.ሜ ወደ ች ጠልቆ አለመቁረጥ፤
  - ሀ. የገንዘብ ቅጣት ብር 2000 እስከ 5000 ማስከፈል፤
  - ለ. በእጅ ያለውን የፕሮሶፐር ውጤት መውረስ፤
  - ሐ. ከስራ ውጪ ማድረግ፤
2. የፕሮሶፐሩን ቅርንጫፍ / ሾህ/ ሳያስወግዱ መተው፤
  - ሀ. የጽሁፍ ማስጠንቀቂያ መስጠት፤
  - ለ. የገንዘብ ቅጣት ብር 1000 እስከ 2000 መቅጣት፤
3. ነባር /ሀገር በቀል/ ዛፎችን መቁረጥ ወይም ማስቆረጥ፤
  - ሀ. በእጅ ያለውን የደን ውጤት መውረስና 2000 እስከ 5000 ብር መቅጣት፤
  - ለ. በእጅ ያለውን የደን ውጤት መውረስና ከስራ ውጪ ማድረግ፤
4. ያለፈቃድ ከሰል ማክሰል፤
  - ሀ. በእጅ ያለውን የደን ውጤት መውረስና ለህግ ማቅረብ፤
5. ሕጋዊ ያልሆኑ የፈቃድ ወረቀቶችን መጠቀም ወይም ያለፍቃድ ማንጓዝ፤

ሀ. በእጅ ያለውን የፕሮሶፐር ውጤት መውረስና ለህግ ማቅረብ፤

6. መሬቱ ከፕሮሶፐር ዛፍ ከፀዳ በኋላ በዘላቂነት ለልማት አለማዋል፤

ሀ. የጽሁፍ ማስጠንቀቂያ መስጠት፤

ለ. የጸዳው መሬት ለታቀደው አላማ እስከሚውል የስራ ፍቃድ አለመስጠት

ሐ. ከጥቅም ተካፋይነት በማገድ ከስራ ውጪ ማድረግ፤

7. ለከሰልነት ያልደረሱ የፕሮሶፐር ችግኞችን አለመቁረጥ ወይም አለመንቀል፤

ሀ. የጽሁፍ ማስጠንቀቂያ መስጠት፤

ለ. የገንዘብ ቅጣት ብር 1000 እስከ 2000 ማሰቀጣት፤

ሐ. ከጥቅም ተካፋይነት ማገድ፤

8. የመንግስት ሰራተኞች በማክሰል ስራ ላይ መሰማራት፤

ሀ. በእጅ ያለውን የፕሮሶፐር ውጤት መውረስና ለህግ ማቅረብ፤

9. በፕሮሶፐር ውጤቶች ማምረትና አዘዋውሮ መሸጥ ስራ ላይ የተሰማሩ ማህበራት የግል ባለሃብቶች የተክሉን መዛመት ለመቀነስ የሚያግዙ ፍሬውን የማስለቀም፤ መፍጨትና ማምከን ስራ ላይ አለመሳተፍ፤

ሀ. የጽሁፍ ማስጠንቀቂያ መስጠት፤

ለ. የገንዘብ ቅጣት ብር 1000 እስከ 2000 መቅጣት፤

ሐ. ከጥቅም ተካፋይነት ማገድ፤

10. ከህገወጥ አምራሾች የፕሮሶፐር ውጤት ገዝቶ ማከማቸትና ለማንጓዝ የይለፍ ፍቃድ መጠየቅ፤

ሀ. በእጅ ያለውን የፕሮሶፐር ውጤት መውረስና 1000 እስከ 2000 ብር መቅጣት፤

ለ. በእጅ ያለውን የፕሮሶፐር ውጤት መውረስና 2000 እስከ 5000 ብር መቅጣት፤

ሐ. በእጅ ያለውን የፕሮሶፐር ውጤት መውረስና ከስራ ውጪ ማድረግ፤

11. የሀገር በቀል ዛፎችን ከሰል ገዝቶ ወይም አክሲዮ ለገበያ ለማቅረብ መሞከር፤

ሀ. በእጅ ያለውን የደን ውጤት መውረስ ለህግ በማቅረብ ከስራ ውጪ ማድረግ፤

**ክፍል ስድስት**

**አንቀፅ 13**

ዋና ዋና የቁጥጥር አካላት የመንግስትና ሕዝባዊ ተቋማት ተግባርና ላፊነት

1/ የክልል አርብቶአደር ግብርናና ገጠር ልማት ቢሮ ተግባርና ላፊነት

- ሀ. የፕሮሶፐርስን ወረራ መከላከልና መቆጣጠርን አስመልክቶ በክልሉ ምክር ቤት ይህ ደንብ ፀድቆ እንዲወጣ ፣ ስራ ላይ ንዲውል አስፈላጊም ሲሆን እንዲሻሻል ያደርጋል።
- ለ. ሕጋዊነት ያላቸው ሰነዶችን በማሳተም በስራ ላይ ንዲውል ለሚመለከቱ ቸው አካላት ያሰራጫል አፈፃፀሙንም ይከተላል።
- ሐ. የማምረት ፈቃድ ለሚፈልጉ ማንኛውም ማህበራትና ባለሀብቶች ደንቡን ተከትሎ በወረዳ በኩል መቅረብ የሚገባው የድጋፍ ደብዳቤና መረጃ ተሟልቶ ሲቀርብ ፈቃድ እንዲሰጣቸው ያደርጋል በተሰጠው ፈቃድ መሰረትም በስራ ላይ መዋሉን ይከተላል።
- መ. በፕሮሶፐርስ መከላከልና ቁጥጥር ዙሪያ የምርምር ውጤቶች አዳዲስ አሰራሮች በኤክስቴንሽን ንዲካተቱና ንዲስፋፉ አስፈላጊውን ጥረት ያደርጋል።
- ሠ. በፕሮሶፐርስ መከላከልና ቁጥጥር ዙሪያ ለወረዳዎች አስፈላጊውን የሙያ ድጋፍ ይሰጣል በስራው የተሰማሩ መንግስታዊ ያልሆኑ ድርጅቶችን ተቀናጅተው እንዲሰሩ ያስተባብራል።

2/ የወረዳው መስተዳድር ምክር ቤት

- ሀ. ከወረዳው አርብቶ አደር ግብርናና ገጠር ልማት ጽ/ ቤት ጋር በመተባበር የቁጥጥርና የመከላከል ኮሚቴዎችን በወረዳ ደረጃ እንዲሁም በፕሮሶፐርስ በተወረሩ ቀበሌያት ያቋቁማል ስራውንም በበላይነት ይመራል ያስተባብራል።
- ለ. የወረዳውን ቁጥጥር ኮሚቴ በመምራት የይለፍ ፍቃድ አሰጣጡን በበላይነት ይቆጣጠራል።
- ሐ. የፕሮሶፐርስን ወረራ ለመቆጣጠርና ለመከላከል እንዲቻል በቀበሌው የሚቋቋመው ኮሚቴ ጋር በመቀናጀት ለግጦሽ ለእርሻ ሊውሉ የሚችሉ መሬቶችን በመለየት የአጠቃቀም እቅድ እንዲዘጋጅ ድጋፍ ይሰጣል።
- መ. በቁጥጥርና መከላከል ስራ ላይ የሚፈጠሩ ችግሮች ከቀበሌው ኮሚቴ ሲቀርብለት በደንቡና በመመሪያው መሰረት አስተዳደራዊ እርምጃዎችን ይወስዳል።
- ሠ. የወረዳውን የፕሮሶፐርስ ቁጥጥር ኮሚቴ በመምራት ቢያንስ በወር አንድ ጊዜ በመስክ በመገኘት የቁጥጥሩና መከላከሉን ስራ በዚህ ደንብ መሰረት መሰራቱን፣ የፀዳው መሬት ለታለመለት አላማ መዋሉን ማረጋገጥ አለባቸው። በዚህ ደንብ መሰረት ተግባራዊ ላላደረጉ ማህበራት ወይም የግል ባለሀብቶች ፍቃድ መስጠቱን ያቋርጣል።

3/ ወረዳ አርብቶ አደር ግብርናና ገጠር ልማት ጽ/ ቤት

- ሀ. ከወረዳው መስተዳድር ጋር በመተባበር የፕሮሶፐርስን ወረራ ለመቆጣጠርና ለመከላከል እንዲቻል በተወረሩ ቀበሌያት ሁሉ ኮሚቴዎችን ለማቋቋም ድጋፍ ይሰጣል ፣ ለግጦሽ ለእርሻ ሊውሉ የሚችሉ መሬቶችንም በመለየት የአጠቃቀም እቅድ ያዘጋጃል።
- ለ. በቀበሌው በሚዘጋጀው የቁጥጥርና የመከላከል እቅድ በመመራት በስራው ለመሰማራት ለሚፈልጉ ማህበራት ወይም የግል ባለሀብቶች የስራ ክልላቸውን በግልፅ በማሳወቅ የስራ ፈቃድ በክልል አ/ግ/ገ/ል ቢሮ በኩል እንዲሰጣቸው ድጋፍ ይሰጣል።
- ሐ. ፈቃድ የተሰጣቸው ማህበራት ወይም የግል ባለሀብቶች ለፕሮሶፐርስ ቁጥጥርና መከላከል የወጣውን ደንብ አክብረው መስራታቸውን ይከታተላል ሪፖርትም ያቀርባል።
- መ. ሀገር በቀል ዛፎችና እጽዋቶች አለመቆረጣቸውን ይቆጣጠራል ሪፖርትም ያደርጋል።
- ሠ. የይለፍ ፍቃድ በሚጠየቅበት ጊዜ ከቀበሌው ቁጥጥር ኮሚቴ መቅረብ ያለባቸው መረጃዎች ተሟልተው መቅረባቸውን አረጋግጦ በወረዳው ኮሚቴ ውሳኔ መሰረት የይለፍ ፍቃድ ይሰጣል፣ የተሰጠው ፍቃድ በህገወጥ መንገድ ስራ ላይ አለመዋሉን ይከታተላል።
- ረ. ከቀበሌው ቁጥጥር ኮሚቴ በሚቀርብለት ሪፖርት በመመርኮዝ የወርና ፍብ አመት አፈፃፀም ሪፖርት ለክልል አርብቶ አደር ግብርናና ገጠር ልማት ቢሮ ያቀርባል።

4/ ቀበሌ መስተዳድር ጽ/ቤት

- ሀ. በወረዳው የሚቋቋመው ኮሚቴና ባለሙያዎች በመታገዝ የፕሮሶፐርስ ቁጥጥርና መከላከል እቅድ ለቀበሌው ያዘጋጃል።
- ለ. በቀበሌው የሚቋቋመውን የቁጥጥርና መከላከል ኮሚቴ በበላይነት ይመራል።
- ሐ. ለቀበሌው የተዘጋጀውን የቁጥጥርና መከላከል ስራ ተግባራዊ እንዲሆን ሀብረተሰቡን ይቀሰቅሳል ያስተባብራል።
- መ. ለቁጥጥር ስራው ለመሰማራት ከማህበራትና ባለሀብቶች ጥያቄ ሲቀርብ በተዘጋጀው እቅድ መሰረት ቀጣይ ስራዎች ላይ ስምምነት በመፍጠር ፍቃድ እንዲያገኙ ለወረዳው አርብቶ አደር ግብርናና ገጠር ልማት ጽ/ቤት ድጋፍ ይሰጣል።
- ሠ. በቁጥጥርና መከላከል ስራው ላይ የተሰማሩትን ማህበራት፣ የግል ባለሀብቶች በደንቡ መሰረት የቁጥጥር ስራውን ማካሄዳቸውን ይቆጣጠራል፣ በየወፍ ለወረዳው ኮሚቴ ሪፖርት ያደርጋል።

ረ. አገር በቀል ዛፎች አለመቆረጣቸውን ይከታተላል ተቆርጠው ሲገኙ በደንቡ መሰረት አስፈላጊው እርምጃ እንዲወሰድ ለወረዳው ኮሚቴና ጽ/ቤት ሪፖርት ያደርጋል።

ይህ ደንብ በነጋሪት ጋዜጣ ታትሞ ከወጣበት ቀን ጀምሮ የፀና የሆናል።

ጥር ወር 1999ዓ/ም

አቶ እስግኤል አሊሴሮ

የአ/ብ/ክ/መ/ም/ ቤት ርእሰ መስተዳድር

ሠመራ

# Annex IV

## Draft Bio – Control Regulation

### የሚኒስትሮች ምክር ቤት ደንብ ቁጥር -----/199-----

ሥነ-ሕይወታዊ የተባይ መከላከያዎችን ወደ ሀገር ውስጥ ስለማስገባት የወጣ ደንብ የሚኒስትሮች ምክር ቤት የኢትዮጵያ ፌዴራላዊ ዲሞክራሲያዊ ሪፐብሊክ አስፈጻሚ አካላትን ሥልጣንና ተግባር ለመወሰን በወጣው አዋጅ ቁጥር 4/1987 አንቀጽ 5 መሠረት የሚከተለውን ደንብ አውጥቷል።

#### 1. አጭር ርዕስ

ይህ ደንብ ሥነ-ሕይወታዊ የተባይ መከላከያዎችን ወደ ሀገር ውስጥ ስለማስገባት የወጣ የሚኒስትሮች ምክር ቤት ደንብ ቁጥር-----/ 199----- ተብሎ ሊጠቀስ ይችላል።

#### 2. ትርጓሜ

የቃሉ አገባብ ሌላ ትርጉም የሚያሰጠው ካለሆነ በስተቀር በዚህ ደንብ ውስጥ

1. "ሥነ-ሕይወታዊ የተባይ መከላከል" ማለት ሕይወት ያላቸው የተፈጥሮ ጠላቶችን፣ ተፃራሪዎች ወይም ተፎካካሪዎችንና አንዲሁም ሌሎች በራሳቸው መባዛት የሚችሉ ሕይወት ያላቸውን ነገሮች በመጠቀም ላይ የተመሠረተ የተባይ መከላከል ዘዴ ነው።
2. "ሥነ-ሕይወታዊ የተባይ መከላከያዎች" ማለት ለተባይ መከላከል አገልግሎት የሚውሉ የተፈጥሮ ጠላት፣ ተፃራሪ፣ ወይም ተፎካካሪ ንዲሁም ሌሎች በራሳቸው መባዛት የሚችሉ ሕይወት ያላቸው ነገሮች ነው።
3. "ሥነ-ሕይወታዊ ፀረ-ተባይ" ማለት በአብዛኛው በሽ አምጪ ህዋሳትን የሚመለከት ሲሆን ከኬሚካላዊ ፀረ-ተባዮች ጋር ተመሳሳይ በሆነ መንገድ የሚዘጋጅና ጥቅም ላይ የሚውል ሥነ-ሕይወ ዊ የተባይ መከላከያ።
4. "ባዮ ይኝ" ማለት አንድ ዓይነት ከትውልድ ወደ ትውልድ ተወራሽ የሆኑ ነገር ግን የተለያዩ ግብረ-አካላዊ ባሕሪያት ያላቸው ግልፍጥረቶች ስብስብ ነው።
5. "ሥርዓተ-ምህዳር ማለት" ፖለቲካዊ ድንበር የማይገደበውና ንደ አንድ የ ወቀ ምህጻረ ክፍል መስተጋብር ያላቸው ውስብስብ ሕይወት ያላቸው ነገሮች ስብስብና አካባቢያቸው ነው።
6. "በዘረመል ምህንድስና የተለወጡ ሕይወታዊ ነገሮች" ማለት ውላጆቻቸውን፣ ቅሬቶቻቸውን ወይም ውጤ ቶቻቸውን ጨምሮ በዘረመል ምህንድስና የተለወጡ ሕይወታዊ ነገሮች ናቸው።

7. "ወደ ሀገር ውስጥ ማስገቢያ ፈቃድ" ማለት ሥነ-ሕይወት ዋና የተባይ መከላከያን ወደ ሀገር ውስጥ ለማስገባት የሚያገለግል ሕጋዊ ሰነድ ነው።
8. "ከጉምሩክ የማስለቀቂያ ፈቃድ" ማለት ሥነ-ሕይወት ዋና የተባይ መከላከያን ከጉምሩክ ለማስለቀቅ የሚያገለግል ሕጋዊ ሰነድ ነው።
9. "ማስገባት" ማለት የሥነ-ሕይወት ዋና የተባይ መከላከያን ቀድሞ ወዳልነበረበት ሥርዓተ-ምሕዳር መልቀቅ ነው።
10. "ሚኒስቴር" ና "ሚኒስትር" ማለት ንደቅደም ተከተሉ የግብርና ሚኒስቴርና ሚኒስትር ነው።
11. "የተፈጥሮ ጠላት" ማለት በሌላ ሕይወት ያለው አካል ላይ የሚኖር ፖራሲቶይድ፣ ጥገኛ፣ የሚባላ፣ ፅፁ-በል ጋጥሙብዙ ና በሽ አምጭ ህዋስ ሆኖ/ የተጠቀውን/ የተበይውን ቁጥር ሊገድብ የሚችል ሕይወት ያለው ነገር ነው።
12. "ጥገኛ" ማለት በሌላ ሕይወት ያለው ነገር ላይ ወይም ውስጥ በመኖር ምግብ የሚሻማ ሕይወት ያለው ነገር ነው።
13. "ፖራሲቶይድ" ማለት በ ንጭጭ ደረጃ ብቻ ጥገኛ የሆነና የዕድገት ሂደቱ ተጠቅሞ የሚገድልና የዕድገት ደረጃውን ከጨረሰ በ ላ ራሱን ችሎ የሚኖር ነፍሳት ነው።
14. "በሽ አምጭ ህዋስ" ማለት የበሽ መንስኤ የሆኑ ንደ ቫይረስ፣ ባክቴሪያ፣ ሻጋ ፣ ኘሮቶዝዋ ና የመሳሰሉት ናቸው።
15. "ሰው" ማለት ማንኛውም የተፈጥሮ ሰው ወይም በሕግ የሰውነት መብት የተሰጠው አካል ነው።
16. "ተባይ" ማለት ማንኛውም በዕዕዋት፣ በ ንስሳትና ውጤቶቻቸው ላይ ጉዳት የሚያደርስ የዕዕዋት፣ የ ንስሳት ወይም የበሽ አምጭ ህዋስ ዝርያ ጉትቻነቅ ወይም ባዮ ይኝ ነው።
17. "የሚባላ" ማለት ሌሎች አንስሳትን የሚባላ የተፈጥሮ ጠላት ነው።
18. "ተባይ ንስሳ" ማለት በሚባላ ንስሳ ለምግብነት የሚውል ንስሳ ነው።
19. "ኪራንቲን" ማለት በዕዕዋት ጤንነት ደንብ መሠረት ሥነ-ሕይወት ዋና መከላከያዎችን ለ ይ ና ለምርምር ወይም ለተጨማሪ ቁጥጥር ና/ወይም መኩራ ሕጋዊ በሆነ መንገድ አግልሎ ማቆየት ነው።
20. "መልቀቅ" ማለት ሕይወት ያለውን ነገር ሆነ ብሎ በአካባቢ ውስጥ ንዲገባ ማድረግ ነው።
21. "ምርምር" ማለት ሥነ-ሕይወት ዋና የተባይ መከላከያዎችን በተመለከተ አዲስ ውኃ ንና ቴክኒኮችን ለማግኘትና ተግባራዊ ለማድረግ የ ለመ ሳይንሳዊ ጥናት ነው።

- 22. "ዝርያ" ማለት የተቀራረበ ዝምድና ያላቸው ስብስብ ሆነው በአንድ ምድብ የሚገኙና በጂነስ ውስጥ ከሌላው ክፍል ሊለዩበት የሚያስችል ባሕር ያላቸው ናቸው።
- 23. "ጉትቻነቅ" ማለት የጋራ ቀደምት የዘር ሐረግ ያላቸው ተብለው የሚገመቱ የባዮ ይፖች ስብስብ ሲሆን ብዙውን ጊዜ ከሌሎች ጉትቻነቆች በቅርፅ የማይለዩ ነገር ግን በሥነ-ግብረ-አካል የሚለዩ ናቸው።

**3. ክልከላ**

- 1/ ማንኛውም ሰው ከሚኒስቴሩ የጽሑፍ ፈቃድ ሳይገኝ ሥነ-ሕይወ ዊ የተባይ መከላከያዎችን ለምርምርም ሆነ ለተባይ መከላከል ተግባር ወደሀገር ውስጥ ንዲሁም ቀድሞ ወዳልነበሩበት ሥርዓተ-ምህዳር ውስጥ ማስገባትና በአካባቢ ውስጥ መልቀቅ አይችልም።
- 2/ በዚህ ደንብ ውስጥ በአንቀጽ 6 ንዑስ አንቀጽ 5 ሥር በወጡት መመሪያዎች መሠረት ያል ሸጉና መለያ የሌላቸው ሥነ-ሕይወ ዊ የተባይ መከላከያዎችን ወደ ሀገር ውስጥ ማስገባት አይቻልም።
- 3/ ማንኛውም ሰው በዘረመል ምህንድስና የተለወጡ ሕይወ ዊ ነገሮችን ለምርምር ና/ወይም ለሥነ-ሕይወ ዊ የተባይ መከላከል አገልግሎት ወደ ሀገር ውስጥ ማስገባት ወይም በአካባቢ ውስጥ መልቀቅ አይችልም።

**4. አስፈጻሚ አካልን ስለመሰየም**

ሥነ-ሕይወ ዊ የተባይ መከላከያዎችን ወደ ሀገር ውስጥ ንዲሁም ቀድሞ ወዳልነበሩበት ሥርዓተ-ምህዳር የማስገባትና በአካባቢ ውስጥ ሆነ ብሎ የመልቀቅ ፈቃድ የመስጠትና የመቆጣጠር ስልጣን የግብርና ሚኒስቴር ነው።

**5. የሚኒስቴሩ ስልጣንና ላፊነት**

- 1/ በደንቡ መሠረት ንዲፈፀም ያበረ ል፣ የማስፈጸማያ ድንጋጌዎችንም ያወጣል።
- 2/ በአስመጪው ወይም በአመልካቹ ስለተባዩና ወደ ሀገር ውስጥ ንዲገባ ስለ ጨው የተባዩ ሥነ-ሕይወ ዊ መከላከያ የሚቀርቡ ዶሴዎችን በመመርመር ሥነ-ሕይወ ዊ መከላከያው ሊያስከትል የሚችለው ጉዳት ከሚሰጠው ጥቅም አንጻር ዝቅተኛ ሆኖ ሲገኝ ከጉዳቱ ክብደት ጋር የተገናዘበ አግባብ ያለው ወደ ሀገር ውስጥ ለማስገባት፣ አግልሎ ለማቆየት ና በአካባቢ ውስጥ ለመልቀቅ የሚያስችሉ ሁኔ ዎችን ያመቻቻል፣ አስፈላጊ ሆኖ ሲገኝም ሚኒስቴሩ ተጨማሪ መረጃዎች ንዲቀርቡ የመጠየቅ ስልጣን አለው።
- 3/ በአመልካቹ መሟላት የሚገባቸውን ሁኔ ዎች የያዘ ወደ ሀገር ውስጥ ማስገቢያ ና ከጉምሩክ ማስለቀቂያ ፈቃድ ይሰጣል።
- 4/ የ ያንዳንዱ ሥነ-ሕይወ ዊ የተባይ መከላከያ ወደ ሀገር ውስጥ ንዲሁም ቀድሞ ወዳልነበረበት ሥርዓተ-ምህዳር ማስገባትን፣ ሆነ ብሎ

በአካባቢ ውስጥ መልቀቅንና የሚያስገኘው ውጤት በሚመለከት መረጃ ይይዛል፤ ንዳስፈላጊነቱም የመረጃው የባለቤትነት መብት ንደተጠበቀ ሆኖ መረጃውን ለተጠቃሚ ዝግጁ ያደርጋል።

5/ አስፈላጊ ሆኖ ሲገኝ ወደ ሀገር ውስጥ የሚገቡ ሥነ-ሕይወ ዊ የተባይ መከላከያዎች በሀገር ውስጥ ባለ ወይም በሶስተኛ ሀገር የ ወቀ የኳራንቲን ጣቢያ በተደረገ ይ ና ምርመራ የኳራንቲን መመዘኛዎችን ያሟሉ መሆናቸውን ያረጋግጣል።

6/ ስልጣን ባለው አካል የተረጋገጠ ለማገናዘቢያና ለምርመር ተግባር የሚውል መከላከል የሚፈለገው ተባይና ወደሀገር ውስጥ የገባው የተባይ ሥነ-ሕይወ ዊ መከላከያ ናሙናዎች መቀመጣቸውን ያረጋግጣል።

7/ ጉዳዩ ከሚመለከ ቸው አካላት ጋር አግባብና ቀጣይነት ያለው ግንኙነት በመፍጠር የምክር አገልግሎት ይሰጣል።

8/ ሥነ-ሕይወ ዊ የተባይ መከላከያዎችን የሚያከፋፍሉ የሀገር ውስጥ ድርጅቶች፣ ተጠቃሚዎችና ሌሎች ጉዳዩ የሚመለከ ቸው አካላት ስለ ሥነ-ሕይወ ዊ የተባይ መከላከያዎች ትክክለኛ አጠቃቀም አስፈላጊው ዕውቀትና መረጃ ንዲኖራቸው ያደርጋል።

9/ ሥነ-ሕይወ ዊ የተባይ መከላከያዎችን ወደ ሀገር ውስጥ የማስገባትና በአካባቢ ውስጥ የመልቀቅ መርሃ-ግብር በሚካሄድበት ወቅት የሥነ-ሕይወ ዊ የተባይ መከላከያዎች ዓይነት፣ የመጀመሪያ መገኛ ሀገር/ቦ ፣ የተለቀቁት ቁጥር/ ብዛት፣ የተለቀቁበት ቦ ፣ ቀን፣ ናሙናዎቹ የሚገኙበት ቦ ና ንዲሁም ውጤቶቻቸውን ለመገመገም የሚረዱ ሌሎች መረጃዎችና መከላከያዎቹ ከዚህ በፊት በተደጋጋሚ ስለመለቀቃቸው የሚገለጹ አግባብ ያለው መረጃ መያዙንና መቀመጡን ያረጋግጣል።

10/ የሚለቀቀው ሥነ-ሕይወ ዊ የተባይ መከላከያ የ ለመውን ተባይ የመከላከያ ብቃትና ከ ለመለት ውጭ በሌሎች ሕይወት ያላቸው ነገሮችና በአካባቢ ላይ ሊያደርስ የሚችለውን ተፅዕኖ ለመገምገም ንዲያስችል ጥብቅ የሆነ የሥነ-ሕይወ ዊ የተባይ መከላከያ በአካባቢ ውስጥ የመልቀቅ የቁጥጥር ስልት በሥራ ላይ ያውላል።

11/ ችግሮች በሚከሰቱበት ወቅት ምዝገባውን ይሰርዛብ፣ መወሰድ የሚችሉ የማስተካከያ ርምጃዎች ካሉ ለመውሰድ ሁኔ ዎች ያመቻቸል፣ ስለ ችግሮች መከሰትም የሚመለከ ቸው አካላት በሙሉ ንዲያውቁት ያደርጋል።

12/ ምንጫቸው ኢትዮጵያ ውስጥ የሆኑ ሥነ-ሕይወ ዊ የተባይ መከላከያዎች ወደ ሀገር ውስጥ የሚገቡ ሥነ-ሕይወ ዊ የተባይ መከላከያዎች ነዲያሟሏቸው ከተረዘረሩት መስፈርቶች ውስጥ አግባብ ያላቸውን መስፈርቶች ብቻ ማሟላ ቸውን ያረጋግጣል።

13/ በሀገር ውስጥ የሚገኙ የ ለመውን ተባይ ሥነ-ሕይወ ዊ መከላከያዎች በሙሉ በመሰብሰብ በሰነድ መልክ ያስቀምጣል።

6/ የአመልካቾች ግዴ

ሥነ-ሕይወ ዊ የተባይ መከላከያዎችን ለማንኛውም አገልግሎት ወደ ሀገር ውስጥ ማስገባት የሚፈልግ አስመጫ ወይም አመልካች የሚከተሉትን ሁኔታዎች ማሟላት ይኖርበ ል።

- 1/ ለመከላከል ስለ ለመው ተባይ ዓይነት፣ ሥነ-ሕይወት፣ ስርጭት፣ ጉዳት የማድረስ አቅም፣ በኢትዮጵያና ከኢትዮጵያ ውጭ ስለሚገኙ የተባዩ የተፈጥሮ ጠላቶችና ስለሌሎችም መረጃ ያቀርባል።
- 2/ ስለ ጨው ሥነ-ሕይወ ዊ የተባይ መከላከያ ትክክለኛ ምንነት፣ የመጀመሪያ መገኛ ሀገር፣ ስርጭት፣ ሥነ-ሕይወት፣ የተፈጥሮ ጠላቶች /ካሉ/ የ ለመለትን ተባይ ብቻ የሚያጠቃ ስለመሆኑና ንዲሁም በሥነ-ሕይወ ዊ የተባይ መከላከያ መርሃ ግብርነት አገልግሎት ላይ በዋለባቸው ሌሎች ቦ ዎች ስለሚሰጠው ጥቅምና ስለሌሎችም ጠቃሚ የሆኑ መረጃዎች ያቀርባል።
- 3/ የ ጨው ሥነ-ሕይወ ዊ የተባይ መከላከያ በሰውና በ ንስሳት ጤናና በሌሎች ከ ለመው ውጭ በሆኑ ሕይወት ያላቸው ነገሮችና በአካባቢ ላይ ስለሚያደርሰው ተጽዕኖና ንዲሁም ሥነ-ሕይወ ዊ መከላከያው ጎጂ ባህርያትን ሲያሳይ መወሰድ ስለሚገባቸው አፋጣኝ የማስተካከያ ርምጃዎች በቂ መረጃ ያቀርባል።
- 4/ ሥነ-ሕይወ ዊ የተባይ መከላከያ ተጠቃሚዎች በበቂ ሁኔ መሰልጠናቸውን ያረጋግጣል።
- 5/ ወደ ሀገር ውስጥ የሚገቡ ሥነ-ሕይወ ዊ የተባይ መከላከያዎችን መለያ፣ ማሸጊያና ማስተዋወቅን በሚመለከት በደንብ መሠረት በሚወጡ መመሪያዎች ዝርዝር መስፈርቶች አኳኋን መሆኑን ለማረጋገጥ አስፈላጊ ርምጃዎችን በሙሉ ይወስዳል።
- 6/ ሥነ-ሕይወ ዊ የተባይ መከላከያዎች በሚገቡበት ጣቢያ ላይ የሚሠሩ ላፊዎች ዝግጁ ሆነው ንዲጠብቁና መጓተት ንዳይኖር ለማድረግ የተላከው ሥነ-ሕይወ ዊ የተባይ መከላከያ የሚገባበትን ጣቢያ ከተሟላ ዝርዝር ጋር ለተቀባዩ በቅድሚያ ያስ ወቃል።
- 7/ የ ለመውን ተባይ መከላከል የሚችሉ የሀገር ውስጥ ሥነ-ሕይወ ዊ የተባይ መከላከያዎች በሀገር ውስጥ ስለአለመኖራቸው በቂ መረጃ ያቀርባል።
- 8/ አስመጪው ወይም አመልካቹ ሥነ-ሕይወ ዊ የተባይ መከላከያው በሌሎች ሀገሮችም ሆነ በሀገር ውስጥ ስኬ ማ ስላልሆነባቸው አጋጣሚዎችና ስለድክመቶቹ መረጃ ያቀርባል።

7. የሀገር ውስጥ ሥነ-ሕይወ ዊ የተባይ መከላከያዎች ጥቅም ላይ የሚውሉበት ሁኔ

የሥነ-ሕይወት ዊ የተባይ መከላከያዎችን ወደ ሀገር ውስጥ ለማስገባትና በአካባቢ ውስጥ ለመልቀቅ ተፈጻሚ የሚሆኑ አግባብ ያላቸው የዚህ ደንብ አንቀጾች በሙሉ የሀገር ውስጥ ሥነ-ሕይወት ዊ የተባይ መከላከያዎች ላይም ተፈጻሚ ይሆናሉ።

**8. የቴክኒክ አማካሪ ኮሚቴ ስለማቋቋም**

- 1/ የሥነ-ሕይወት ዊ የተባይ መከላከያዎች የቴክኒክ አማካሪ ኮሚቴ /ከዚህ በኋላ "ኮሚቴ" የተባለ የሚጠራ/ በዚህ ደንብ ተቋቁሟል።
- 2/ የኮሚቴው አባላት  
 ኮሚቴው የሚከተሉት አባላት ይኖሩ ል።  
 ሀ. በሚኒስትሩ የሚመደብ ላፊ ..... ሰብሳቢ  
 ለ. የሚኒስቴሩ የሥነ-ሕይወት ዊ የተባይ መከላከል ላፊ ..... አባልና ፀ ፊ  
 ሐ. የጤና ጥበቃ ሚኒስቴር ተወካይ .....አባል  
 መ. የኢትዮጵያ ግብርና ምርመር ድርጅት ተወካይ ..... አባል  
 ሠ. የአካባቢ ጥበቃ ባለሥልጣን ተወካይ ..... አባል  
 ረ/ የኢትዮጵያ ጥራትና ደረጃዎች ምደባ ባለሥልጣን..... አባል  
 ሰ/ የሳይንስና ቴክኖሎጂ ኮሚሽን ተወካይ ..... አባል  
 ሸ/ የሕይወት ዊ ሀብት ጥበቃና ምርምር ኢንስቲትዩት..... አባል  
 ቀ/ የአዲስ አበባ ዩኒቨርሲቲ ተወካይ ..... አባል  
 በ/ በሚኒስቴሩ የተመረጡ ሁለት ዋቂ ሳይንቲስቶች..... አባል  
 ተ/ ሌሎች ንዳስፈላጊነቱ ..... አባል

3/ ኮሚቴው ንደአስፈላጊነቱ ንዑስ ኮሚቴዎች ይኖሩ ል..... አባል

4/ የኮሚቴው ላፊነት

**ኮሚቴው**

- ሀ/ የሥነ-ሕይወት ዊ የተባይ መከላከያዎች የደህንነት፣ የጥራትና የፍቱንነት ሁኔታዎች መሟላቸውን ያረጋግጣል፣ መወሰድ ስለሚገባው ርምጃም ሚኒስትሩን ያማክራል።
- ለ/ ሥነ-ሕይወት ዊ የተባይ መከላከያዎችን ወደ ሀገር ውስጥ ማስገባትንና ለአካባቢ ውስጥ መልቀቅን በሚመለከት በፖሊሲ ጉዳዮች ላይ ሚኒስቴሩን ያማክራል።

ሐ/ ሥነ-ሕይወ ዊ የተባይ መከላከያዎችን ወደሀገር ውስጥና ቀድሞ ወዳልነበሩበት ሥርዓተ-ምህዳር ማስገባትንና በአካባቢ ውስጥ መልቀቅን በሚመለከት አግባብ ያለው ሕግ ያጠና ማሻሻያ ያቀርባል።

መ/ የዚህን ደንብ ድንጋጌዎች ለማስፈጸም የሚረዱ መመሪያዎች ያቀርባል።

**9. ስለክፍያ**

በዚህ ደንብ መሠረት ሚኒስቴሩ ለሚሰጣቸው አገልግሎቶች የሚደረገው ክፍያ ሚኒስትሩ በሚያወጣው መመሪያ የሚወሰን ይሆናል።

**10. ጥፋትና ቅጣት**

በወንጀለኛ መቅጫ ሕግ አንቀጾች መሠረት ከዚህ የበለጠ የሚያስቀጣ ካልሆነ በስተቀር በዚህ ክፍል የተደነገጉት ቅጣቶች ተፈጻሚ ይሆናሉ።

1/ በዘረመል ምህንድስና የተለወጡ ሕይወ ዊ ነገሮችን በሚመለከት የሚፈጸም ጥፋት

ሀ/ አንድ ሰው በዘረመል ምህንድስና የተለወጡ ሕይወ ዊ ነገሮችን ለምርምርም ሆነ ለተባይ መከላከል አገልግሎት ወደ ሀገር ውስጥ ንዲገቡ ያደረገ ወይም በአካባቢ ውስጥ የለቀቀ ጥፋት ንደሠራ ይቆጠራል።

ለ/ በዚህ አንቀጽ ንዑስ አንቀጽ "1/ሀ" ሥር የተመለከቱትን ጥፋቶች የፈጸመ የተፈጥሮ ሰው ተክስሶ ጥፋተኛ ሆኖ ሲገኝ ከሁለት መቶ አምሳላ ሺህ ብር በማይበልጥ የገንዘብ መቀጮ ወይም ከ5 ስከ 10 ዓመት በሚደርስ ሥራት ወይም በሁለቱም ይቀጣል፤ በሕግ የሰውነት መብት የተሰጠው አካል የሆነ ነደሆነ ከአንድ ሚሊዮን ብር በማይበልጥ የገንዘብ መቀጮ ይቀጣል፤ የዚሁ አካል የሥራ ላፊም ከስድስት ዓመት በማይበልጥ ሥራት ወይም ሃምሳ ሺህ ብር በማይበልጥ የገንዘብ መቀጮ ወይም በሁለቱም ይቀጣል።

2/ ፈቃድ ሳይገኝ ሥነ-ሕይወ ዊ የተባይ መከላከያዎችን ወደ ሀገር ውስጥ በማስገባት የሚፈጸም ጥፋት

ሀ/ አንድ ሰው ከሚኒስቴሩ የጽሑፍ ፈቃድ ሳያገኝ ሥነ-ሕይወ ዊ የተባይ መከላከያዎችን ለምርምርም ሆነ ለተባይ መከላከል አገልግሎት ወደ ሀገር ውስጥ ንዲገቡ ያደረገ ወይም በአካባቢ ውስጥ የለቀቀ ጥፋት ንደሰራ ይቆጠራል።

ለ/ በዚህ አንቀጽ ንዑስ አንቀጽ "2/ሀ" ሥር የተመለከቱትን ጥፋቶች የፈጸመ የተፈጥሮ ሰው ተክስሶ ጥፋተኛ ሆኖ ሲገኝ ከሁለት መቶ ሺህ ብር በማይበልጥ የገንዘብ መቀጮ ወይም ከ4 ስከ 8 ዓመት በሚደርስ ሥራት ወይም በሁለቱም ይቀጣል፤ በሕግ የሰውነት መብት የተሰጠው አካል የሆነ ነደሆነ ከስምንት መቶ ሺህ ብር በማይበልጥ የገንዘብ መቀጮ ይቀጣል፤ የዚሁ አካል የሥራ ላፊም ከ5 ዓመት በማይበልጥ ሥራት ወይም ከአርባ ሺህ ብር በማይበልጥ የገንዘብ መቀጮ ወይም በሁለቱም ይቀጣል።

3/ ፈቃድ ሳይገኝ ለምርምር የገቡ ሥነ-ሕይወ ዊ የተባይ መከላከያዎችን ለተባይ መከላከል አገልግሎት በማዋል የሚፈጸም ጥፋት

ሀ/ አንድ ሰው ከሚኒስቴሩ የጽሑፍ ፈቃድ ሳያገኝ ለምርምር ተግባር የገቡ ሥነ-ሕይወ ዊ የተባይ መከላከያዎችን ለተባይ መከላከል አገልግሎት በአካባቢ ውስጥ ንዲገቡ ያደረገ ወይም የለቀቀ ጥፋት ንደሠራ ይቆጠራል።

ለ/ በዚህ አንቀጽ ንዑስ አንቀጽ "3/ሀ" ሥር የተመለከቱትን ጥፋቶች የፈጸመ የተፈጥሮ ሰው ተከስሶ ጥፋተኛ ሆኖ ሲገኝ ከሁለት መቶ ሺህ ብር በማይበልጥ የገንዘብ መቀጮ ወይም ከ4 ስክ 8 ዓመት በሚደርስ ሥራት ወይም በሁለቱም ይቀጣል፤ በሕግ የሰውነት መብት የተሰጠው አካል የሆነ ንደሆነ ከስምንት መቶ ሺህ ብር በማይበልጥ የገንዘብ መቀጮ ይቀጣል፤ የዚህ አካል የሥራ ላፊም ከ5 ዓመት በማይበልጥ ሥራት ወይም ከአርባ ሺህ ብር በማይበልጥ የገንዘብ መቀጮ ወይም በሁለቱም ይቀጣል።

4/ ፈቃድ ሳይገኝ ሥነ-ሕይወ ዊ የባይ መከላከያዎችን ቀድሞ ወዳልነበሩበት ንዲገቡ በማድረግ የሚፈጸም ጥፋት

ሀ/ አንድ ሰው ከሚኒስቴሩ የጽሑፍ ፈቃድ ሳያገኝ የሀገር ውስጥ ሥነ-ሕይወ ዊ የተባይ መከላከያዎችን ለምርምር ሆነ ለተባይ መከላከል አገልግሎት ቀድሞ ወዳልነበሩበት ሥርዓተ-ምህዳር ውስጥ ንዲገቡ ያደረገ ጥፋት ንደሠራ ይቆጠራል።

ለ/ በዚህ አንቀጽ ንዑስ አንቀጽ "4/ሀ" ሥር የተመለከቱትን ጥፋቶች የፈጸመ የተፈጥሮ ሰው ተከስሶ ጥፋተኛ ሆኖ ሲገኝ ከሀምሳ ሺህ ብር በማይበልጥ የገንዘብ መቀጮ ወይም ከ2 ስክ 4 ዓመት በሚደርስ ሥራት ወይም በሁለቱም ይቀጣል፤ በሕግ የሰውነት መብት የተሰጠው አካል የሆነ ንደሆነ ከሁለት መቶ ሺህ ብር በማይበልጥ የገንዘብ መቀጮ ይቀጣል፤ የዚህ አካል የሥራ ላፊም ከ3 ዓመት በማይበልጥ ሥራት ወይም ከሃያ ሺህ ብር በማይበልጥ የገንዘብ መቀጮ ወይም በሁለቱም ይቀጣል።

5/ በተገቢው ደረጃ ባለማሸግ ወይም መለያ ባለማድረግ የሚፈጸም ጥፋት

ሀ/ አንድ ሰው በዚህ ደንብ አንቀጽ "6/5" መሠረት በሚወጡ መመሪያዎች በተመለከተው አኳኋን ያል ሸገ ወይም መለያ ያልተሠጠው ሥነ-ሕይወ ዊ የተባይ መከላከያ ወደ ሀገር ውስጥ ንዲገባ ያደረገ ጥፋት ንደሠራ ይቆጠራል።

ለ/ በዚህ አንቀጽ ንዑስ አንቀጽ "5/ሀ" ሥር የተመለከቱትን ጥፋቶች የፈጸመ የተፈጥሮ ሰው ተከስሶ ጥፋተኛ ሆኖ ሲገኝ ከሃያ ሺህ ብር በማይበልጥ የገንዘብ መቀጮ ወይም ከ1 ስክ 2 ዓመት በሚደርስ ሥራት ወይም በሁለቱም ይቀጣል፤ በሕግ የሰውነት መብት የተሰጠው አካል የሆነ ንደሆነ ከአንድ መቶ ሺህ በማይበልጥ የገንዘብ መቀጮ ይቀጣል፤ የዚህ አካል የሥራ ላፊም ከ2 ዓመት በማይበልጥ ሥራት ወይም ከአሥር ሺህ ብር በማይበልጥ የገንዘብ መቀጮ ወይም በሁለቱም ይቀጣል።

6/ በወንጀለኛ መቅጫ ሕግ ወይም በዚህ ደንብ ቅጣት ያልተደነገገባቸውን ማናቸውንም በዚህ ደንብ ወይም በሥሩ በሚወጡ መመሪያዎች የተደነገጉትን በመተላለፍ ጥፋት የፈጸመ ሰው ተከስሶ ጥፋተኛ ሆኖ ሲገኝ፤

የተፈጥሮ ሰው የሆነ ንደሆነ፤ ከሀምሳ ሺህ ብር በማይበልጥ የገንዘብ መቀጮ ወይም ከ2 ዓመት በማይበልጥ ሥራት ወይም በሁለቱም ይቀጣል፤ በሕግ

የሰውነት መብት የተሰጠው አካል የሆነ ንደሆነ ከሁለት መቶ ሺህ ብር በማይበልጥ የገንዘብ መቀጮ ይቀጣል፤ የዚህ አካል የሥራ ላፊም ከ3 ዓመት በማይበልጥ ሥራት ወይም ከሃያ ሺህ ብር በማይበልጥ የገንዘብ መቀጮ ወይም በሁለቱም ይቀጣል።

**11. መመሪያዎች የማውጣት ስልጣን**

ይህን ደንብ ለማስፈጸም ሚኒስቴሩ መመሪያዎች ያወጣል።

**12. የሌሎች ሕጎች ተፈጻሚነት**

ከዚህ ደንብ ጋር የሚቃረን ማንኛውም ሕግ በዚህ ደንብ ውስጥ የተመለከቱ ጉዳዮችን በሚመለከት ተፈጻሚነት አይኖረውም።

**13. ደንቡ የሚጸናበት ጊዜ**

ይህ ደንብ በነጋሪት ጋዜጣ ትሞ ከወጣበት ቀን ጀምሮ የጸና ይሆናል።

## Declaration

I, the undersigned, declare that the thesis is my original work, has not been presented or a degree in any other university and that all sources of material used for the thesis have been duly acknowledge.

**Declared:**

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