ADDIS ABABA UNIVERSITY

COLLEGEOF NATURAL AND COMPUTITIONAL

SCIENCESDEPARTMENT OF ZOOLOGICAL SCIENCES

THE IMPACT OF FREE GRAZING ON ECOSYSTEM DEGRADATION IN CASEOF WEYIRA KEBELE–DORENI DISTRICT,ILUABABOR,ZONE OROMIA REGION, ETHIOPIA

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This is to certify that the Thesis prepared by BizunehAregaKebede entitledTheimpacts of free grazing on ecosystem degradation in case of Weyirakebelein DoreniDistrict and submitted in partial fulfillment of the requirement for the degree ofmasters of science in Biology complies with the regulations of theuniversity andmeetsthe acceptedstandardswithrespect to originalityandquality.

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Abstract

Weyirakebele is locatedin DoreniWoreda ,Ilu Aba Bor Zone, Oromia Regional state, SouthWestEthiopia. My study indicates that the free grazing system has contributed significantly to the landdegradation problem in Dorenidestrict in the case of Weyirakebele. The traditional uncontrolled and freegrazing system in many kebeles of Doreni district has caused severe degradation of the /ecosystem/grazinglands as I observed and collected evidences. Following harvest during the dry season, all cropland becomeopen to free grazing (stubble) until the next growing season. During this free grazing period, the littlevegetative cover is completely grazed, the soils become bare and compacted. The free grazing system alsohas a negative effect on the conservation of ecosystem as animals often damage physical conservationstructures such as ***stone terraces*** *and* ***soil bunds****. Free grazing pressure changes the botanical compositionof the pasture (Jávor, 1999). Török and West (1996) studied the influence of marked population growth ofmouflon(Wild Sheep) on the vegetation composition. The results showed environmental degradation of thecommunities. Free grazing can lead to soil erosion exposing the soil to wind and water erosion. Decreasesaboveground biomass because livestock use the vegetation for feed. According to scholars free grazing isone of the primary contributors land degradations through reduction in vegetation cover, degradation oftop soil, causing soil compactions as result of trampling reduction in soil infiltration rates andenhancement of the susceptibility of soils to erosion. Free grazing is highly affect the ecosystem in WeyirakebeleDorenidestrict Ilu Aba Bor Zone Oromia regional state of Ethiopia. It aimed to examinecommunities awareness on asses their adoption level on controlling their Livestock from free grazing andtoexaminehow tocontrolthelivestockfromfreegrazingand protectecosystemin ordernotto degrade.*

AllthePhysicalandBiologicalconservationstructuresaredamagedbyfreegrazing.

Keywords: - Biodiversity, Ecosystem, Free grazing, Livestock, stream bank

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ACRONYM

FAO……Food for agricultural organization

PAI.....In decreased animal productivity

UN.....United Nations

DW.....DevelopmentWorkers

AOW.....Agricultural Office Workers.

CHAPTER-ONE

1. INTRODUCTION

1.1. Background

1.1.1Freegrazing

Free grazing is a common practice In Ethiopia except in areas where grazing lands are limited in size.Communal grazing lands are important sources of livestock feed in developing countries (ILRI, 1998). Inthe presence of sufficient demand for livestock or livestock products, unrestricted access to the grazinglands may result in overexploitation of the resource and the scarcity rent of the resource would remaininappropriate. Each individual user of the resource enjoys the full benefit of his/her use of the resource butbears only a fractional part of the cost. As a result, the traditional uncontrolled and free grazing system inmany regions of Ethiopia has caused severe degradation of the /ecosystem/grazing lands. In Ethiopia, theincrease in number of livestock coupled with increase in human population has resulted in shrinkage ofgrazing lands and animals are limited to graze on overgrazed communal lands, road side and aftermathgrazing and limited supplementation of straw. Besides, soil erosion and deforestation has worsened thesituation. In line with this, one of the contributing factors to poor soil fertility, land degradation and erosionis the free grazing of animals. Free grazing is common practice in Ethiopia except the areas where grazinglands are limited in size and where the farming system favors growth of perennial cash crops. The grazingsystem in the country also varies by season**.** During the rainy season, when most arable lands are undercrops, livestock are confined to graze on valley bottoms, farm strips and steep hillsides (TsigeweyniTekleab, 1997). The free grazing animals cause significant soil disturbance by trampling on the hillsidesduring the wet season, thus contributing to soil erosion+7789uj8uo. During the dry season, arable landsbecomegrazingareas.

The free grazing system has contributed significantly to the land degradation problem in the Ethiopiaespecially highlands, where grazing on hillsides and other fragile areas is widespread, during the rainyseason when other sources of feed (e.g., stubble grazing and crop dues) are in short supply.Followingharvest during the dry season, all cropland become open to free grazing (stubble) until the next growingseason. During this free grazing period, the little vegetative cover is completely grazed, the soils becomebare and compacted, and farmers have to till the land several times to loosen up the soil to allow infiltrationof the rains and avoid sheet erosion.However, repeated tillage also exposes the topsoil for other forms oferosion.The free grazing system also has a negative effect on the conservation efforts, as tramplinganimals often damage physical conservation structures such as stone terraces and soil bunds.Thus, thefree grazing system results in significant negative externalities, especially for farmers who do not ownlivestock, as they are forced to bear the additional cost of maintaining their plots. However, these samefarmers may benefit from increased soil fertility arising from the manure left by the grazing animals.Whetherornot thecostsoutweigh thebenefits isanempirical issuethatis outsidethescopeofthis study.

1.2. Statementoftheproblem

There are different impacts of ecosystem degradation. These are enabling erosion and compaction of

thelandbywindandrain.Freegrazingcanreducegroundcover.Thisreducestheabilityforplantstogrowand water to penetrate, which harms soil microbes and results in serious erosion of the land. The otherconsequences of ecosystem degradations are loss of biodiversity, pollution of land, destruction of specieshabitat and biodiversity, soil erosion and excessive nutrient run off into lakes, leads to irreversible climatechange and declineeconomicgrowth.

As a result these increases poverty. There fore the objectives ofthestudyspecificallywereattemptedtoanswerthefollowingquestions.

1. Whatistheattitudeofecosystemdegradationmanagementof Dorenidistrictlooklikes?
2. Are there lack of awareness of the community on environmental protection and ecosystem degradationmanagementin caseofDoreni district?
3. AreDorenidistrictpeoplepracticingon ecosystemdegradationprotection?
4. WhatistheawarenessofDorenidistrictpeopleon ecosystemdegradationprotection?
5. Howtoassesstheimpactsoffreegrazingon ecosystemdegradationincaseof Dorenidistrict?
6. Istherefree grazingon ecosystemdegradationinthecaseof Dorenidistrict?

1.3. Objectives of the study1.3.1.Generalobjective

The general objective of the study is to assess the awareness of the community (farmers) on ecosystemprotection and on the management of impact of free grazing on ecosystem degradations in Dorenidistrictin thecaseofWeyirakebele.

1.3.2.SpecificObjectives

- Thefollowingarethespecificobjectivesofthestudy.Toassesstheattitudeoffarmersinthecaseofmanagements oftheimpactsoffreegrazingonecosystemdegradation.
- Toevaluatetheawarenessofpeoplesof DoreniDistricttowardstheimpactsoffreegrazingonecosystem degradation.
- Toreducelackofawarenessofthecommunityontheimpactsoffreegrazingonecosystemdegradation.
- Toenhancetheawareness ofallthe societyonimpact offreegrazingon ecosystemdegradation.
- Totakemeasurementhowtoprotectandconservetheecosystemnottodegradebyfreegrazing.

1.4. Significanceofthe study

The purpose of this study were be mainly awaring the community on environmental protection and freegrazing managementinDorenidistrict,IluAba BorZone,south westEthiopia.The case of Dorenidistrict.People need to be aware of the importance of our environment in which we live and the need topreserve and protect it, as well as the consequences of our actions in the course of developmental activities.Thustheultimateaimofenvironmentaleducationistoredirectandshapehumanbehaviortowardsresponsible acts and commitment to environment. Also this study used to give information to indicate thelevel ofknowledge,attitude of thesocietyor community(FARMERS).

- Toattainingenvironmentalsustainability
- Tokeepenvironmentiseveryimportantforhighcropproductivityandindecreasingpovertyandhuman health.
- Toshow,valueandexpresstheadvantageofhavingtheawarenesstowardsenvironmentalprotection.
- Toawarethefarmershowtominimizefree grazing.

CHAPTER-TWO

2.\Reviewoftheliterature

2.1 Consequencesoffreegrazing

Free grazing reduces vegetative cover thus contributing to soil erosion, reduction of soil fertility, decreasein soil organic matter and soil deterioration of the soil structure. However, land owners may also benefitfrom increased soil fertility due to the manure left by the grazing animals. Botanical composition of thepasture is influenced by the joint effect of several environmental factors. In an experiment, Jones andBunch(1995)foundthatthespreadofaspecificplantspecieswasmoreaffectedbytheannualprecipitation than bythe presence ofanimals. Grazing animals also have an effect on the botanical composition by trampling and selectivegrazing.Furthermore, animal faces and urine change the element content of soil and plants. Speciescomposition is also influenced by the time of the year that a pasture is grazed. Hyderet al. (1975) pointedout that repeated heavy grazing during any particular month in the growing season had approximately threetimes higher effect on key species as did grazing during the months when plants were senescent. The waythat a plant community responds to a specific grazing pressure depends on the season effect. The areacovered by Desmodium spp. decreased as the stocking rate increased; however, the same conditions did nothave the same effect in the next year. Moreover, free grazing pressure decreases plant density. However,this may not decrease the total plant production of a given community, because the roots of other plantsmay simply occupy that space in the soil. These other plant species are often less productive and lesspalatable, often weedy forbs and brush, which would result in decreased animal productivity (PAI, 2004).According to Pratt (2002), it is important to notice that weeds do not make the land unhealthy; they appearbecausetheland is unhealthy.

2.2. Impacts of free grazing on vegetation

Free grazing pressure changes the botanical composition of the pasture (Jávor, 1999). Török and West(1996) studied the influence of marked population growth of mouflon on the vegetation composition of 7rockgrasslandcommunitiesbyre-samplingafter30-50years.Theresultsshowedenvironmentaldegradation of the communities: the presence of protected plant species decreased and that of degradationindicatorsincreased.TherateofdegradationdependedonthetypeofthesubstrateBrizuelaandCid(1993) stated that the first signs of overgrazing were a decrease in legumes and an increase in forbs and inbare soil. Similarly to overgrazing, the lack of grazing also has negative impacts on pastures of continentalclimate,forinstanceit entailsthe spreadofweedand shrubspecies (Jávoretal., 1999).

In an experiment of Longhiet al. (1999) species number was higher within ungrazed, fenced areas areaswheretopographyprovidedprotectionfromgrazing.Moreover,speciesnumberwascorrelatedwithherbage height, which is an indicator of grazing intensity. On the other hand, Paulsamyet al. (1987) foundthat both protected and grazed sites had equal numbers of species with different floristic composition. Fuls(1992)claimedthatlong-termpatch-overgrazinginducedsubstantialvegetationretrogressionwithreductions in basal cover up to 90%. According to Arianoutsouet al. (1985), in the absence of grazingpressure the plant cover were 30% trees, 10% tall shrubs and 25% sub-shrubs. Under high grazing pressurethe plant cover was mainly low woody shrubs. The grazing of a cattle herd was investigated in ourexperiment on the pasture of Hortobágy. Bare soil was found at over utilized areas, such as camps for rest,water and salt sources. As a resultof the fact that the camps were not moved approximately for one decadethe areacovered with no vegetation extended to0.1 hectares. Plant species at the bank of overutilizedareasweregrazingtolerant,notnativeandnottypicaloftheland,suchasLoliumperenne,PolygonumaviculareandChenopodium album.

2.3. Howdoes freegrazingaffect soilerosion?

Free grazing can lead to soil erosion in a few ways. The obvious way is by removing the ground cover /thegrasses/ exposing the soil to wind and water erosion. Free gazing can also destroy the soil structure bycompaction of the soil by the animals reducing infiltration/of keessadabarsuudadhabuu/ and increasingrunoff. When livestock graze an area repeatedly without letting the grasses have enough time to grow back,they destroy not only the plants themselves, but also the root system. When the root system is depleted andwhen the plants are grazed so close to the ground the soil is exposed to the wind and rain and makes iteasier for the wind and rain to lift the soil up and carry it away. Grazing decreases aboveground biomassbecauselivestock usethe vegetation forfeed.

2.4. Impactsof free grazingonsoil properties

Livestock grazing has a negative effect on most soil functional indicators, including carbon stocks, soilnitrogenandphosphorus,dissolvedorganicmatterandmicrobialbiomassandresultedinsignificantdecreases in some soil indicators .Soil organic carbon, soil total nitrogen NH4-N,and microbial biomasscarbondeclined.

Increased livestock numbers in arid regions cause overgrazing which results in reduced infiltration andaccelerated runoff and soilerosion. Resultsof severalstudies indicate thatatthe macro- and mesoscalessoil erosion can increase dramatically due to free grazing, causing increases of 5 to 41 times over thecontrol at the mesoscale and 3 to 18 times at the macroscale (Sharma, 1997). Villamilet al. (1997) pointedoutthoseinappropriatecattlegrazingpractices,suchasfreegrazingharmthequalityofnaturalpastures and soil properties. The soil structural degradation in the upper horizons are approved by high bulk densityvalues, high dry mechanical stanceand low structural stability in comparison with the climaxsituation.Soil and sward are in close connection, which determines the changes in soil physical, chemical andmicrobiological properties. This fact is especially true in areas where animals are grazed for a long time(Kátai,2003).Grasslandsoilsusuallyhaveextremephysical andchemicalproperties aswell.

Soilmicroorganismsplayasignificantroleindevelopingsoilfertility.Thedominantcharacteristicsinfluencing the existence and activity of soil microbes are soil water content and storing capacity, texture,size and rate of pores (Kátai, 1994). However, treading may decrease habitable pore space and increase soilbulk density, which negatively affect soil microbes (Kátai, 1998).Zhang et al. (2001) stated that heavygrazing can cause grassland deterioration because of heavy defoliation and treading, and is often used for weed control.

Sheep Night Penning, a form of heavy grazing, has developed into a successful method of removing the native vegetation and establishing a new pasture. Results show that high sheep density for a short duration removes almost all of the above-ground naturalvegetation, but doesnot significantly affect the soil bulk density, the penetration stance,and the airpermeability. Jiang et al. (1996) also found that sheep night penning combined with grazing has eliminatedthenatural vegetation containingshrubs.

The removal of natural vegetation is caused by the fact that the concentrations of ammonium-N and nitrate-N in the soil were high enough to be toxic to plant roots during and after sheep night penning (Zhang et al.,2001). Abril and Bucher (1999) measured the changes in soil characteristics, nutrient availability andmicrobialactivityonsitesutilizedbydifferentgrazingintensitiesinArgentina.Threesiteswereselected for comparison: a highly restored (no grazing for 20 years); a moderately restored (8 years of restoration);and ahighlydegraded (extremelyovergrazed).

2.5. EcosystemDegradation, DueTo FreeGrazing

Ecosystem degradation is defined here as a process that lowers the productivity ofland, assuming otherfactors such as technology, management, and weather are held constant. The major uses of land in Ethiopiaare agriculturaland pastoraland, hence,ultimately dependenton soilproductivity.By implication, landandsoil degradation becomealmost synonymousconcepts.

Soildegradation(FAO1979)canmanifestitselfas:

1. watererosion(sheet,rill,gullyemission,massmovements)
2. Winderosion
3. Biologicaldegradation(decreaseinhumus)
4. Physicaldegradation(increaseinbulkdensity,decreaseinpenneability)
5. Chemicaldegradation(acidification,toxicity)
6. Excessofsalts(salinization,alkalization)

Free grazing is one of the primary contributors land degradations through reduction in vegetation cover,degradationoftopsoil,causingsoilcompactionsaresultoftrampling,reductioninsoilinfiltrationrate sand enhancement of the susceptibility of soils to erosion/Su et al 2005,Hilker et al 2014/Although the listabove provides some structure for discussion of the different aspects of ecosystem degradation, it does notdirectly identify a key concept: nutrient loss. The treatment of this process varies among sources. Barber(1984, pp. 2-4) deals with this issue under the heading of "chemical degradation." By contast, the U.N.Food and Agriculture Organization (FAO) (1979, p. 19) tracts chemical degradation as including theleachingofbases and toxicityonly

2.6. Freegrazing InEthiopianHighlands

The free grazing system has contributed significantly to the land degradation problem in the Ethiopianhighlands, where grazing on hillsides and other fragile area is widespread during the rainy season whenother sources of feed (e.g., stubble grazing and crop dues) are in short supply. Following harvest duringthe dry season, all cropland become open to free grazing (stubble) until th next growing season.Duringthisfreegrazingperiod,thelittlevegetativecoveriscompletelygrazed,thesoilsbecomebare andcompacted, and farmers have to till the land several times to loosen up the soil to allow infiltration of therains and avoid sheet erosion. However, repeated tillage also exposes the topsoil for other forms oferosion.The free grazing system also has a negative effect on the conservation efforts, as tramplinganimals often damage physical conservation structures such as stone terraces and soil bunds. Thus, the freegrazingsystemresultsinsignificantnegativeexternalities,especiallyforfarmerswhodonotownlivesto ck,astheyareforcedtobeartheadditionalcostofmaintainingtheirplots.Withappropriatemanagementsfor grazingsystemscanmaintaineffectivesoilsurfacecoverandprovideadequateprotectionsagainst acceleratederosion.

However, high rates of surface runoff and erosion have been reported from heavily grazed and/or annuallybumtgrasslandsinanumberofstudiesinthetropics(Bruijnzeel1990,p.118).Inaddition,Smiet(1987)has suggested that both gazing and agro forestry systems are more susceptible to land degradation thanforests, as the margins of safety with these land uses are narrower and more easily exceeded due to factorssuch as fire and free grazing. In Ethiopia, Melese (1992, p. 18) has suggested that some 20 percent of soilerosion comes from grazing lands. In this regard, the EFAP (Ethiopia 1993, p 49) indicated that free gazingis a particular problem in both the high and low potential cereal zones where current stocking rates are wellinexcess ofestimated optimum stockingrates

CHAPTER-THREE

3. MATERIALSANDMETHODS

3.1. Description ofthestudyareaandperiod

The study **was** conducted in Doreni District, Ilu Aba Bor Zone, found in the South West ofEthiopia. The case of DoreniDistrict .It is 564km away from Addis Ababa at the SouthWestpartand54km fromMattutown.

The altitudeof the area is from 900-2,300m, longitude 37^0 16^0-37^0-37'E. The generalclimateoftheWoreda;higher20.3^0c,lower10.1^0c(Average20.3^0c)andtheannualrainfall is above 2500 mm. The agro-ecology of the district is:-Woina-Dega 40%, Dega 60%and kola 0%. The major economic activities are; the types of cross grown in the area aremaize,sorghum,Teff,cashcropslike mango, orange, avocado,coffee, arethe examples.

Inanimal husbandrycow,sheep, goat,horse,donkey,chickensandsoon.

There are also vegetables grown in different kebele like green peppers, potatoes, tomatoes,godere, sweet potatoes.In addition there is also Bee keeping activities in the area usingmodernandtraditionalbeehives.

3.2. Studydesign andpopulation

A cross sectional study design were conducted to accomplish the investigation by collectingimportant data from Doreni District in the year of 2023G.C. The source of population have25% of the resident Farmers of 510 found in Doreni District Weyirakebele, Ilu Aba BorZone,Oromiaregionalstate,SouthwestEthiopia.

The study populationis thesamples that are selectfrommostoftheFarmerslivinginDoreniDistrictthat isparticipatedtogiveinformation ordataforthis study.

3.3. Samplesizeandsamplingtechniques

3.3.1 Samplesize

4 Itwascalculatedbystaticallyformulaforusingpopulationproportionaccordingtothefollowingformula (Daneil 1995)with language translator

5 $$n = \frac{Z^2 pqNd}{2(N-1)+Z^2 pq} \quad \text{(Daniel1995)}$$

6 wheren=samplesizeq=1-p=1-0.5=0.5

7 N=Totalnumberofpopulation

8 Z=levelofconfidencewith95%≈1.96

9 d=marginoferror

10 p=proportion ofpopulation(50%) formaximum samplesize

11 Depending ontheabove formulafrom510 total residents of thestudy area, including one(1)Manager, three (3) Development workers and four (4) agriculture office workers who is working atthe target area about 128 respondents of which 100 male and 28 female respondents were selectedfromWeyirakebele,DoreniDistrict, IluAbaBor Zone, Oromiaregionalstate,SouthwestEthiopia.

12 Theresearcherusedsimplerandomsamplingtechniques.Theresearcherselected25%ofther esidents of 510 and one (1) Manager, three (3) Development workers (DW), four (4) agricultureofficeworkers(AOW)who isworkingatthetarget areawerealso involvedin thestudy.

3.4. SourceofData

Dataiscollectedby usingprimary sourceofdataandsecondary datacollection.Theprimary datacollection is such as interview and the secondary data collection by distributing different types of questionsfor the farmers, for government employees work on some kebele, kebele managers of the study area andcollected or gather the information concerning to the impacts of free grazing and ecosystem degradation inDoreniDistrict,Ilu Aba Borzone.The caseof Doreni District.

3.5. Methodsofdatacollection

Data **was** collected by using questioners,interview and observation forgathering important informationthathas used in process of this investigation.

3.5.1.Questioners

Questioners were prepared and distributed to the office workers, some farmersand other peoplewhoworkinthekebeleinordertocollectinformationfromthemaboutassessingtheawarenessof impacts of free grazing and ecosystem degradation. The questioners include both opened andclosed items. All copies of questioners distributed, collected, analyzed and data is presented in theformoftables andparagraphs.

3.5.2 Semistructure

Semi structure interview were used to gather information from the farmers. The interviewbeanalysis and presents in the paragraphs and some questions are presented orally in order to geteducational information on the assessing the awareness of the community on impacts of freegrazingand ecosystemdegradation in caseof Dorenidistrict.

3.5.3 DirectObservation

Data were be collected by direct observation, questioners and interview. Data observation wasmade as an additional tool while the farmers are feed their Cattles. The information collected werequantifiedand organizedforanalysis.

3.6 Dataanalysis

All the information from observation, interview and questioners were be analyzed. Relevant pointsofquestionersweresequencedaccordingtotheobjectiveofthestudy andanalysiswereconverted into percentages tables and graphs. The interview points were be also sequence andanalyzed.

Finally, based on the result from the analysis, conclusions were drawn and recommendations wereforwarded.

3.7 Ethicalissue

TheresearcherwereaskrequestBiologyDepartmentofAddisAbabaUniversityandZoologicaldepartmen t were write request letter to Doreni district administration office and administration office ofDorenidistrict were givethecorrect dataof farmersfound inthat district totheresearcher.

CHAPTERFOUR

4.1. RESULTSANDDISCUSSION

4.1.1. RESULTS

4.1.2. Afterdatawascollectedandanalyzed,theresultswerereflectedbytablesasfollows

4.1.3. Characteristics oftherespondents

According to the table below 100(78%)male and28(22%) female were included in the study andconcerning their age level 9% of respondents are 12-18 ages, 34% are 18-35 ages, 44% of the respondentswere 35-40ages, 13% were greater than 40 years old, in terms of their religion aspects 19%protestant,25% orthodox, 50% Muslims and 6% areWaqeffata, with regarding to their educationalstatus27% are 1-4 grade level, 23% are 5-8 grade level 16% are 9-12 grade level6% are diplomalevel 5% areDegree and 23% areun educated part of the respondents. In termsof their occupation50% areFarmers,2% are Merchants, so I can understand from table below data analysis that study includes part of thesociety different group , sex, residence religion, different educational status and those un educated part ofthesociety.

Table 1:Frequency and percentage distribution of respondents by their demographic and socio-economiccharacteristics.

No	Items	Categories	Respondents	
			NO	%
1	Age	A,12-18	12	9
		B,18-35	44	34
		C, 35-40	56	44
		D,40andaboveages	16	13
		Total	128	100
2	Sex	Male	100	78
		Female	28	22
		Total	128	100
3	Religion	Protestant	24	19
		Orthodox	32	25
		Muslim	64	50
		Waqeffata/	8	6
		Total	128	100
4	Educationstatus	1-4	34	27
		5-8	30	23
		9-12	20	16
		Diploma	8	6
		Degree	6	5
		Uneducated(illiterate)	30	23
		Total	128	100
5	Occupationalstatus	Farmers	64	50
		Merchants	2	2
		Civilservants	12	9
		Students	44	34
		Other	6	5
		Total	128	100
6	Nationality	Ethiopian	128	100

4.1.4. General idea of the Respondents

Based on questionnaires distributed to the respondents data was collected tabularized and analyzed as following percentage and descriptive statements .

Table2-Theresponsesofrespondentstothequestiondistributed

No	Items	Alt em	Respondents	
			No	%
1	Can you express the impact of free grazing on ecosystem degradation ?Do you believefree grazinghas impact onecosystem?	Yes	78	61
		No	50	39
		Tot	128	100
2	Doyouthinkthatfreegrazinghasnegativeimpactsonecosystem?Especiallyonsoil?	Yes	70	55
		No	58	45
		Tot	128	100
3	Doyouthinkthatallmemberofyourcommunitybelievethatfreegrazingasgoodpractice?	Yes	20	16
		No	108	84
		Tot	128	100
4	Do you believethatfreegrazinghaveanyimportancetotheEnvironment?	Yes	42	33
		No	86	67
		Tot	128	100
5	Doyouthinkthatminimizingfreegrazingcanminimizeimpactonecosystemdegradation?	Yes	78	61
		No	50	39
		Tot	128	100
6	Doyouthinkthatallfarmershaveawarenessonimpactoffreegrazingthatitbringson ecosystem degradation?	Yes	20	39
		No	108	61
		Tot	128	100
7	DoesMinimizingthenumberoflivestocksolvetheproblemofecosystemdegradation?	Yes	20	16
		No	108	84
		Tot	128	100
8	Doesfreegrazingincreasetheproductwe get fromtheCattles?	Yes	42	33
		No	86	67
		Tot	128	100

As can be understand fromtheabovetable 2 item (1)about 39% ofrespondents cannot express theimpact of free grazing on ecosystem degradation. They do not able to express whether free grazing isimportant or not. But 61% of respondents express that free grazing is not important to the ecosystem. Asthey describe, free grazing damage vegetations, expose the soils to erosion.According to table 2 item (2)70% of respondents said that free grazing has negative impact on ecosystem. Especially on soil. Soil iseroded by flood and wind and 30% of respondents said that did not know how free grazing affect theenvironment.These30% respondentsbelievethat free grazingis veryimportant fortheirCattles.

From the above table item (3) about 84 % of respondents responded that free grazing is not good practicefor soil, for Farm land and for all Ecosystems.16% of respondents responded that free grazing is goodpractice. If they release their Cattles they go to everywhere and do what they want. They go to market andthey can go to other place. Therefore it save their time. According to the above table item (4) 67% ofrespondents said that free grazing have no importance to the environment. It has negative impact to theirFarmland,totheirCoffeeplantandalsototheirotherplants.AndalsotheirCattlesmaycapturedandeaten by Wild Carnivores. When Cattles want to drink water, they go to rivers and drink water with Leach.ThiskillstheirCattles.ThereforfreegrazingisnotimportantAsIunderstandfromtable2item(4)33%of respondents responded that free grazing have importance to the Environment and Cattles. According totable 2 item (5) 61% said that minimizing free grazing has minimize impact on ecosystem degradation, and39% of the respondents respond that minimizing free grazing doesn't important to ecosystem. According totable2item(6)39%haveawarenessonimpactsoffreegrazingonecosystemdegradation,but61%haveno awarenesswhetherfreegrazinghasimpactonecosystemdegradationornot.Accordingtotable2item

(7) 16% of respondents said that minimizing number of livestock minimize the problem brought byfreegrazing, but 84% of respondents said that minimizing number of livestock have other impact on income ofthefarmerssominimizinglivestockdoesn'tencouraged.Accordingtothistableitem(8)33%ofresponde nts said that free grazing increase product we get from Cattles, but 67% of respondents said thatfree grazingdoes not increaseproduct we getfromCattles.

Table 3-Thereresponseofrespondentstothequestionoraldistributed

No	Items	Alternatives	Respondents	
			No	%
9	There should be selected grazing placefor livestocktominimizeimpactoffreegrazingonecosystemdegradation.	Agree	50	39
		Stronglyagree	20	16
		Disagree	58	45
		Total	128	100

According to table 3 item(9) about 39% of respondents agree that there isselected grazing place whereCattlesforagetherefoodtominimizefreegrazingand20%arestronglyagreeandabout45%ofrespondents disagree that the selected grazing place doesn't minimize impacts of free grazing on ecosystemdegradations.in caseof WeyirakebeleDoreni district.

4.1.5. Generalideaofrespondents foropen-endedquestions

Depending on questionnaires distributed to the respondents data was collected tabularizedand analyzed asfollowingdescriptivestatements.

10. Howtodevelop theawarenessofthecommunityonimpact offreegrazingin thekebele?

According to the idea of most respondents there are lack of awareness on how free grazing affect theecosystem. So, to develop the awareness of the community on environmental protection and keep theirCattles from free grazing in the kebele, Using different method such as giving different short and longtraining on that they get more benefit if they take care of their Cattles at home than free grazing and freegrazingdamage their ecosystem.

11. WhatmethodpeopleusetoprotecttheirCattlesfrom free grazing?

Keep their animals only in designated areas, not to gallop them in the Grass and forest, prepares animalsfeedandgiveit to them at home.

12. How to develop the awareness of the community, to protect ecosystem from damage by Cattles in theWeyirakebele?

Teachthebenefitsofconservingnaturalresources,teachtheimpactofnaturalresourcedegradationontheir livelihoods, and show the impact of soil erosion on agriculture.Educating the society how to protecttheirenvironment.

13. Whyimportant tokeep environmentsfromfree grazing?

The reason for keeping areas free of grazing is to prevent natural resource degradation. Soil erosion, localairpollution and insufficient livestock income.

14. Whatarenegativeimpactsoffree grazingonvegetations?Howtoprotect?Listsomeofthem?

Plantspeciesdecreased,soilcontentseroded,abovegroundbiomassdecreased,

Caringforenvironments,plantingtrees,preparingfoodforlivestock,protectinglivestockfromfreegrazing

.

15. Describesomeimpactsoffreegrazingonsoilproperties

The respondents specially development workers of the kebeles, Land office employees, agriculture officeworkers and others responds that Soil nitrogen, soil organic matter, phosphorus and all other soil contenteroded byfloodand wind.

16. WhatistheattitudeofecosystemdegradationmanagementofDorenidistrictlookslike?

Accordingto respondents ofthesocietyat different level:-

The attitude of the community of the Doreni District towards ecosystem management among developmentworkers, Village administrators, employees of agriculture and land offices including farmers is verypositive.

The government is working on natural resources conservation and creating awareness for the community.Thereforetheattitude of thecommunityat variouslevels is encouraging.

17. How much is the benefit we get from them if they go and graze themselves rather than keeping theanimals at home?Many people say that if thefood of cattle preparedat home andtakecareofitathome rather than going to pasture on their own, they were give more milk if they are milked, but fewpeopleprefertogo to pastureon their own becauseit saves time.

18. Howmuchfreegrazingisenoughforlivestock growth?

According to most respondents free grazing is not enough for growth of Cattles and some respondents

saidthatifCattlesarenotcaredforeathome,ithasnegativeimpactontheirgrowthandreproduction,andafew peopledisagreethis ideaandencouragefree grazing.

4.1.6. Generalideaofrespondentsfrominterviewquestions

According to the respondents, I asked verbally specially the agricultural development workers, land officeworkers, agriculture office workers and manager of different villages and even farmers said that the freerelease of grazing Cattles has a huge impact. Especially many plants are grazed and destroyed, soil iseroded, especially development workers and agriculture workers told me that **stream banks** are destroyedandthereforeexposed to soil erosion duringrainyseason**.**

As I obtainedinformation by interviewing (asking) my respondentswhenI visiting the areathe freegrazinganimals causesignificant soildisturbance bytramplingstreambank(theterraces).

The Figure below is located in especial place called Fani Zone in Elemo&Weyirakebele. According tomany people I interviewed verbally to gather evidence of my research, during the spring, the people spend30 to 40 days engaged in natural resource conservation. But in the spring the Cattle are left to graze on thegrass so theywalk on it and destroyit, theytrampleit and their fore it rots.

Figure1theabovestreambankiswhatapeopledointhespringfortheconservationofnaturalresources.(Photo by BizunehArega, photo source from study site)

Butitisalsocommonforanimalstoleavepasturefreeandtheywalkonitanddestroyit,destroyingtheplantso n it. Theterracesis destroyed

4.1.7. Generalinformation obtainedfromobservation

The picture below (figure2), this is especial place in Elemo village called Fani Zone where 30 to 40husbands of Weyira&Elemokebelesare looking for a lot of Cattles without any control.Those Cattleswalking through all the grass and plants in the place they eat the wood that the local community has beenplantingfor a week and walk on it and destroy half of it and somerip it off .They were eat and crush allthe coffee plants planted during the summer and all the plants in the area. Especially many small plantstrambled the ground with their feet,crushing some and burying some down in wet ground.as a whole, Iwent to the site and observed that many different plants were destroyed and soil bank degraded.On theother hand, what I observed well is that many animals are present in this place and the nitrogeneuos wastetheydropnowincreases thefertilityof thesoil.

Figure2(photo by BizunehArega, photo source study site)

Theabove figure2 is whatIactuallysaw on thespotwhenIwascollectinginformation formyresearch.

4.2. DISCUSSION

All the data analyzed under the result part of this investigation has been discussed under this topic asfollows. As in Table 2 item (7 and 8) indicates that even though some of my respondents have awarenessimpacts of free grazing most of them prefer to leave their livestock and graze on their own. There arereasonsfor this. It saves them time so they leave their Cattle in the fields to do other work. They go toMarket, Idir, Wedding, Farm etc. Overall, the data of this study shows that especially Table 2 No. 2, andNos.14 and 15 of the open ended questions show that releasing livestock grazing has significant impacts onvarious plants and soil. This is similar with the study conducted by Melese (1992, p. 18) has suggested thatsome 20 percent of soil erosion comes from grazing lands. Free grazing reduces vegetative cover thuscontributing to soil erosion, reduction of soil fertility, decrease in soil organic matter and soil deteriorationof the soil structure. Free grazing can damage habitats, destroy native plants and cause soil erosion. Freegrazing is common practice in Ethiopia except the areas where grazing lands are limited in size .Thegrazingsysteminthecountryalso varies byseason**.**

During the rainy season, when most arable lands are under crops, livestock are confined **(murteessuu)** tograze on valley bottoms, farm strips and steep hillsides (TsigeweyniTekleab, 1997). The free grazinganimalscausesignificantsoildisturbancebytramplingonthehillsidesduringthewetseason,thusco ntributingto soil erosion+7789uj8uo.

Duringthedry season,arablelandsbecomegrazingareas.Thefreegrazing systemhascontributedsignificantly tothe landdegradationprobleminthe Ethiopia especially highlands, wheregrazing onhillsides and other fragile areas is widespread, during the rainy season when other sources of feed are inshort supply.Following harvest during the dry season, all cropland become open to free grazing (stubble)untilthenext growingseason.

During this free grazing period, the little vegetative cover is completely grazed, the soils become bare andcompacted, and farmers have to till the land several times to loosen up the soil to allow infiltration of therains and avoid sheet erosion. However, repeated tillage also exposes the topsoil for other forms oferosion.The free grazing system also has a negative effect on the conservation efforts, as tramplinganimals often damage physical conservation structures such as stone terraces and soil bunds.Thus, thefree grazing system results in significant negative externalities, especially for farmers who do not ownlivestock, as they are forced to bear the additional cost of maintaining their plots. However, these samefarmers may benefit from increased soil fertility arising from the manure left by the grazing animals.Whetherornot thecostsoutweighthebenefits isan empiricalissuethatisoutsidethescopeofthis study.

ChapterFive

5. Conclusions and recommendations

5.1. Conclusions

As I understand from Table 2 about 61% of respondents respond that they have awareness that free grazinghave impacts on ecosystem degradation. Therefore the community keeps their livestock only in selectedplace. During free grazing period, the little vegetative cover is completely grazed, the soil is exposed towind and flood erosion, the soil bund stone terraces is destroyed. Cattles walking through all the grass andplants in the place they eat the wood that the local community has been plantingfor a week and walk on itand destroy half of it and somerip it off .They were eat and crush all the coffee plants planted during thesummer andall the plantsin the area.Especially many small plants trampled thegroundwith theirfeet crushingsome and buryingsomedown in wetground. as awhole.

The community does not know or understand to use a small number of cattle that are of the best breed(good varieties) and have a lot of profits that give good yields, except to breed many cattle that give little profit. There are also lack of awareness and delays in the prompt delivery of selected varieties to the community by relevant bodies such as the government.They perceive that keeping their animals in the chosen place is of little value. They perceive it as a waste of their time.They think it is profitable for their livestock to go where they want and eat grass.

5.2. Recommendations

Basedontheresearchresultthefollowingrecommendationsareforwarded;

- Since there some residents those have no enough knowledge about environmental protection on freegrazing and ecosystem degradation enough advice should be given for those persons or they should beawareofaboutenvironmentalprotection onfreegrazingand ecosystem degradation.

- Agriculture office of the DoreniWoreda should teach the societies how and where to keep theirlivestock

- Government bodies of Doreni Woreda should provide capacity building, training programs forawarenessof environmentalprotection and free grazingonecosystem degradation.

- NGOS should participate by investing money and material kind to help the societies concerning to environmental protection from impacts of free grazing on ecosystem degradations.

- The societies should keep their Cattles in only selected areas, they should plant trees on soil bunds and protect Cattles not to enter into protected areas. They should protect the soil not to exposed to erosions.

- TheCommunityis expected to provideall the necessaryfoodand carefor their animals at home. They should not use free grazing as their Cattles will benefit greatly from free grazing if they only keep them in certain areas.

- The community should stop breeding too many non selected and poor yielding livestock and breed more selected breed (good varieties) and more profitable animals.

References

Abril, A., Bucher, E.H. (1999).The Effects of Overgrazing on Soil MicrobialCommunity andFertilityin theChaco DrySavannasofArgentina.AppliedSoil Ecology.12:2. 159-167.Arianoutsou-Faraggitaki,M.(1985).DesertificationbyOvergrazinginGreece:TheCaseof LesvosIsland.Journal ofArid Environments. 9:3.237-242.

Brizuela, M.A., Cid, M.S. (1993).Initial Signs of Overgrazing in aHeterogeneous Pasture UnderContinuousGrazingbySheep.RevistaArgentinaDeProductionAnimal. 13:1. 61-70

Dolek, M., Geyer, A. (2002).Conserving Biodiversity on Calcareous Grasslands in the FranconianJurabyGrazing: AComprehensiveApproach.BiologicalConservation 104(3),Pp:

Food and Agriculture Organization (FAO) of the United Nations. 1979. A Provisional Methodology for Soil Degradation Assessment. Rome.

Fuls, E.R. (1992). Ecosystem Modification Created By Patch-Overgrazing inSemi-AridGrassland. In:Journal ofAridEnvironments. 23:1.59-69.

Hyder, D.N.-Bement, R.E.-Remmenga, E.E.-Hervey, D.F. (1975): Ecological Responses of Native Plantsand Guidelines for Management of Shortgrass Range. United States Department of Agriculture-AgriculturalRes. Service,Tech.

HolechekJ.L.,GomesH.S.,MolinarF.andGaltD.1998.Grazingintensity:Critiqueandapproach.RangJávor,A.-Molnár,Gy.-Kukovics,S.(1999).JuhtartásÖsszehangolásaaLegelővel.(In:NagyG.-VinczeffyI.Eds.)Agroökológia–Gyep–Vidékfejlesztés.169-172.

Jiang, W.L.-Wa, Q.R.-Liu ,G.Y. (1996). Study on the Effects of Improving Natural Grassland WithSheepNightPenning:1. SheepNightTime,IntensityandHerbageMixture.ActaPrataculturalSinica

Jones,R.M.Bunch,G.A.(1995).YieldandPopulationDynamicsofChamaecristaRotundifoliaCv.Wynni nCoastal South-Eastern Queensland as Affected By Stocking Rate and Rainfall.Tropical Grasslands. 29:2. 65-73.ResponsesofNative Plants andGuidelines for Management ofShortgrass Rang

Washington,D.**C**.87.Kátai,J.(1994).JavítóanyagokHatásaAGyepTalajára.Dgyn12.LegeltetésesÁllatta rtás,Debrecen. 229-247.

Kátai, J. (1998).Relationships betweenthe Physical, Chemical and Microbiological Characteristics onAGrasslandExperiment.Proc.ofThe17Th GeneralMeetingofTheEgf,Debr.,77-81.

Kátai, J. (2003).A TalajÉs A GyepKülönösKölcsönhatása.Dgyn 18.Gyepgazdálkodás 2001.159-

Longhi,F.,–Pardini,A., -Tullio, V.G., -Di Tullio, V.G., -Eldridge, D., -Freudenberger,D. (1999).Biodiversity and Productivity Modifications in the Dhofar Rangelands (Southern Sultanate of Oman)duetoOvergrazing. Peopleand Rangelands:BuildingtheFuture. Proceedingsofthevi InternationalRangelandCongressQueensland,Australia.664-665.

Paulsamy,S.,-Lakshmanachary, A.S., -Manian, S. (1987). Effects ofOvergrazing on thePhytosociology of a Tropical Grassland Ecosystem. Indian Journal ofRange Management 8:2. 103-Pratt,D.(2002). StopOvergrazing. Beef.Minneapolis. 38:12.22

Sharma, K.D., -Walling, D.E., -Probst, J.L. (1997).Assessing the Impact of Overgrazing on SoilErosion in Arid Regions at a Range of Spatial Scales.Human Impact on Erosion and Sedimentation.ProceedingsofanInternationalSymposiumoftheFifthScientificAssemblyoftheI nternationalAssociationof Hydrological Sci.(Iahs),Rabat, Morocco,119-123.

Török,K.,-WestN.E.(1996).TheEffectofOvergrazingontheSpeciesCompositionofDifferentHungarian Grassland Communities. In: Rangelands in a Sustainable Biosphere. Proceedings of theFifthInternationalRangeland Congress,SaltLakeCity,USA.565-566.

Wood M.K. and Blackburn W.H. 1984. Vegetation and soil responses to cattlegrazing systems inTexas Rolling Plains.Journal of Range Management 37: 303ZerihunW.1986.GrasslandscommunitiesonthecentralplateauofEthiopiaVegetation67:3–1

Zhang,Y.J.,Jiang,W.L.,Ren,J.Z.(2001).EffectsofSheepNightPenningonSoilNitrogenandPlantGrowth .NewZealandJournal ofAgriculturalResearch 44:151-15

APPENDIX–I

ADDIS ABABA UNIVERSITY COLLEGE OF NATURALSCIENCE

Department of Zoologica lscience

Questionnaire for Weyira kebele office workers,Farmers and others.

The purpose of this questionnaire is to conduct an action research on assessing the impacts of free grazing on Ecosystem degradation in Doreni district, in the case of Weyira kebele, so that your responses should be frankly needed your honestly response in highly appreciated.

Thank you for your help

Part I questions

This part is about personal please put thick mark in the blank space of corresponding to the appropriate information about yourself.

1. Sex :-Male ☐ Female ☐

2. Age:-A.12-18year ☐ B. ☐ C. 18-35 years ☐ D. 35-40years ☐ D above40 ☐

3. Religion A. protestant B. Orthodox C. Muslims D. Wakefata

4. Educational level A. Illiterate B.1-4 C.5-8 D.9-12E. Diploma F. Degree

5. Occupational status A. Farmers B. Merchants C. Civil servants D. Students E. Others.

6. Nationality_____

Part II. Questions

1. Can you express the impact of free grazing on ecosystem degradation? Do you believe free grazing has impact on ecosystem? A. Yes B. No

2. Do you think that free grazing has negative impacts on ecosystem? Especially on soil?

A. Yes B. No

3. Do you think that all member of your community believe that free grazing as good practice?

A. yes

B. No

7. Do you believe that free grazing have any importance to the Environment?

A. Yes

B. No

8. Do you think that minimizing free grazing can minimize impact on ecosystem degradation?

A. Yes B. No

9. Do you think that all farmers have awareness on impact of free grazing that it brings on ecosystem

Degradation? A. Yes B. No

10. Does minimizing the number of livestock solve the problem of ecosystem degradation?

A. Yes B. No

11. Does free grazing increase the product we get from the Cattles? A.Yes ☐ B.No ☐

12. There should be selected grazing place for livestock to minimize impact of free grazing on ecosystem degradation? ☐ A.Agree ☐ B.Stron glyagre C.Disagree ☐

13. How to develop the awareness of the community on impact of free grazing in the kebele ?_____

14. What method people use to protect their Cattles from free grazing?_____

15. How to develop the awareness of the community, to protect ecosystem from damage by Cattles in the Weyira kebele?_____

16. Whyimportant tokeep environments fromfree grazing?_____

17. What are negative impacts of free grazing on vegetations? How to protect? List some of them.

A_____

B. _____

C._____

18. Describesomeimpactsoffreegrazingonsoilproperties._____

19. What is the attitude of ecosystem degradation management of Doreni district looks like?_____

20. How much is the benefit we get from them if they go and graze themselves rather than keeping the animals at home?_____

21. How much free grazing is enough for livestock growth?_____