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COLLEGE OF SOCIAL SCIENCES AND HUMANITIES DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES

RESEARCH TITLE:

ASSESSMENT OF INDIGENOUS IRRIGATION PRACTICE IN CHEHA WOREDA IN THE CASE OF AMORA MEDA KEBELE

BY:

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Declaration

Temesgen Alemayehu and Zerihun Teshale do here by declare to Wolkite University Department of Geography and Environmental Studies that this thesis is a product of our original research work, and it has not been submitted to any other university for any academic degree. Any materials and information in a report other than our own are duly acknowledged.

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Acronyms

CWADO.....Cheha woreda agricultural development office

CWCSA..... Cheha woreda central statics agencies

EIAR..... Ethiopian institute of agricultural research

FAO..... Food and agricultural organization

IFAD.... International food Agricultural and development

IWMI ... International water management institute

MOA..... Ministry of Agriculture

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Abstract

water is the basic resource on the well being of the whole population not only the population but also other living and non-living things and it is a renewable natural resource which exist in the form of surface water, underground water (in ocean and lake river there were Nemours river in Ethiopia but the productive capacity is not paramount function due to the indigenous irrigation practice of local farmers were low level of awareness. The objectives of this study is to assess indigenous irrigation practice which is found gurage zone cheha woreda amora meda kebele that determine implementation of indigenous irrigation practice in related to soil and water availability of their productivity irrigation farming. .the data was collected by using different instrument such as questioner and interview were used to generate the data based on qualitative and quantitative method the secondary data sources were taken from agricultural and rural development office of the woreda. Field survey was conducted to collect the necessary data from 60 selected sample respondents and the researchers' were selected the sample by simple random sampling. And the data collected were tabulated, analyzed and summarized via description. And also trends of indigenous irrigation practice in people's productivity. And after it was analyzed and discussed by both quantitative and qualitative interpretation. It is noted that the indigenous irrigation program which is sponsored by the government has several draw backs ,therefore , on the basis of the finding of the study this finding suggest that shortage of land , due to population pressure causes farmers to intensity agricultural low production , using land saving and yield augmenting technology .As the result of the determinants that cause erosion hazard farmers who live in this woreda have practiced both indigenous soil conservation structure and modern soil conservation structure for a long period to solve the erosion problems.

CHAPTER ONE

1. Introduction

1.1. Background of the study

Water is a renewable natural resource which exists in the form of surface water (in ocean and lakes, rivers, and streams)and ground water, water is a mobile natural resource that is found in different from and quality, among other forms fresh waters were indispensable for the sustenance of life and of vital importance to all socioeconomic activity. Indigenous irrigation system were typically controlled byes a village community ,but there were many important exception .some villages may be served by several irrigation systems owned by groups within the villages or crosscutting village boundaries .large system can also be found that serve tens of village or scattered hamlets along the way. The land area served by indigenous system may vary from a few hectors to several house and hectare, but the vast majority of indigenous systems were in the range of 10 to100 hectare (Sjoberg 2009).

As indicated in many literature, water has contributed enormously for human civilization and socioeconomic development since early-recorded history. For instance, the first urban center appeared in Mesopotamian river basin and Nile valley before. This is mainly due to the river water for domestic use, transportation and irrigation agriculture. To data, three broad components of water resources development can be mentioned. These were water for domestic use (drinking, food preparation, cleaning, etc.), irrigation development and hydro-power production. However, the concern of this paper is on irrigation development with a special emphasis on small-scale irrigation schemes Soloni (2011).

The term ‘’indigenous irrigation’’ has not been standardized in the literature, but for our purposes a working definition is the following ; the physical structures of water capturing devices (diversion weirs, dams, or wells), conveyance devices (canal, aqueducts, tunnels, flumes), and control structures (gates, out lasts, dividers) by which water is delivered to agricultural fields and the management arrangements for

designing, constructing and maintaining the physical works, allocating and distributing water among the users, resolving disputes, and addressing emergencies or other un for seen circumstances Zake (2012).

The Ethiopian agricultural system is mainly based on by expecting seasonal rainfall. exactly that using only or mainly rainfall is not effective to fulfill the population food demand.

Therefore, other alternatives must be needed to increase food production. From the alternatives, irrigation is one of the mechanisms to enhance food production of the country. It is known that irrigation is continues farming system because it gets sufficient water or permanent water bodies like rivers to produce more throughout the year. Ethiopia has many rivers that flow to different direction of the country. But most of them were not use for irrigation because of peoples working habit on irrigation system. Now a day, some peoples are practicing irrigation in the country Yisahk (2008).

There are some rivers that found gurage zone cheha woreda amora meda Kebele. In this Kebele few farmers use irrigation by using rivers of this local area; hence, their activity is based on indigenous or traditional way of irrigation. In my research, we have seen that their activity made them tired. Even though they were tired by their system, they get benefits from their different production comparing to those people that did not use irrigation on the Amora Meda Kebele. Here in this Kebele the farmers or irrigation were not have this much support from the woreda agriculture experts. Based on our observation these farmers were implemented their irrigation system by themselves in traditional or indigenous system and this leads them not more to produce according to their tiredness. They informed that they need support from agriculture experts to improve their system and production. According to our view, The Woreda agricultural experts have responsibility to follow up support these farmers or who practices indigenous irrigation system to increase productivity of the Amora Meda kebele (CWADO,2009).

1.2 Statement of the problem

Even though, there are numerous rivers were found in Ethiopia, there are limitations to use them in irrigation activity and this leads the country to famine(IFAD 2009).

The problem that made the farmer not to fulfill the demand of the population of the country is mainly their working activity or expecting of rain fall.in this case, they produced only one time a year that means that they have more extra time to produce more but, they did not having more revers has not meaningful even if very, little number of farmers,. Uses irrigation but this irrigation system was indigenous or traditional way that is they cultivate there (in small areas and most of the time they produce twice a year here if they used modern way of irrigation they cover large area with more production but not did so (IFAD, 2009).

In Amora Meda Kebele the problem was similar to the above ones that is the farmers use indigenous irrigation. And it made the farmers more tired in small land.so based on their activity the farmers needed support how to improve their agricultural system to increase their productivity by using irrigation(MOA,2009).

In the case of indigenous irrigation system they would be evolve on a small agricultural land .so, based on our view, farmers of Amora Meda Kebele must change their irrigation system in to modern way of irrigation to get more benefit from their activity.One of the main problems of indigenous traditional irrigation systems in the Gurage region, specifically Cheha Woreda, is their inefficiency and lack of modern technology. These traditional systems often rely on rudimentary methods of water distribution and management, which can lead to water wastage and lower crop yields(CWADO,2009).

Additionally, these traditional systems may not be able to meet the increasing water demands of a growing population or changing climate conditions. As a result, farmers in the Gurage region may face challenges in maintaining sustainable agriculture practices and ensuring food security for their communities(CWADO,2009).

Other issues that can arise from traditional irrigation systems in the region include inadequate infrastructure, lack of access to financial resources for maintenance and improvement, and limited knowledge of modern irrigation techniques. Addressing these challenges will require investments in upgrading existing irrigation systems, promoting sustainable water management practices, and providing support and training to local farmers(CWADO,2009).

1.3 Objective of the study

1.3.1 General objectives

The general objective of this study was aimed to assess the indigenous irrigation practice in Amora Meda Kebele

1.3.2 Specific objectives

- To identify factors why the people of Amora Meda Kebele use indigenous irrigation practices
- To compare and contrast the advantages between indigenous irrigation practice and modern irrigation practice
- To indicate system or mechanisms to improve indigenous irrigation system.

1.4. Basic research questions

This study was intended to answer the following basic question.

1. Why the people of the Amora Meda Kebele practice indigenous irrigation system than the modern system?

2. What are the mechanisms to change the indigenous system in to the modern system?

3. How can create awareness to the people to practice modern irrigation system?

1.5. Significance of the study

- Expecting rainfall for agriculture is not change the life of farmers to fulfill their interests, so they use other methods to increase their productivity. It is irrigation that increase farmers income and fulfill their needs .even though ,the Amora Meda Kebele farmers used indigenous way of irrigation as a result this researches has following significance increase productivity in the amora meda kebele and develop peoples attitude towards practicing irrigations system it help the people who practice traditional irrigation system to modern way of irrigation system according to its result(EIAR,2009).

It indicates the advantages of modern system of irrigation by comparing that of indigenous irrigation system it serves as reference material for people who wish to conduct a further study on the issue and related (EIAR 2009).

If the research includes one Amora Meda Kebele in which indigenous irrigation practiced in cheha woreda, it has been more comprehensive.so according to the resource and time constraint, the investigation of the problem identified is confined only to Amora Meda Keble in cheha woreda specifically on peoples who practice indigenous irrigation system (EIAR,2009).

1.7 Limitations

It is fact that there was no study, which could be completed without limitations.so this research title has some limitations that faced during the study. these limitations includes shortage of time, it is known that this research needs a day to day observation on the selected groups ,so it was one limitation of the study .the other limitation was shortage of stationery materials like pens and papers (EIAR,2009).

1.8 Organization of the study

This research report contains or organized in five chapters .the first chapter consists of an introduction part of the study, which includes background, statement of problem, objectives, and basic research questions, significance's of the study delimitation and limitation during the study (EIAR,2009).

This research report also contains chapter two that contains review of related literature of the study irrigation development in Ethiopia and access of irrigation factors for failures on traditional irrigation practice and production and the extent of respondents initiatives and compare and contrast the advantage between indigenous irrigation practices and modern irrigation practice and system or mechanisms to improve farmers productivity. the other part of this study chapter three which indicates description of the study which present location , physical features and socioeconomic status of the

Amora Meda Kebele people together.the other part of study is chapter four that contains research data analysis and interpretation the respondents finally ,the last part of this study includes chapter five that contain summery conclusion and recommendation of the study (EIAR,2009).

CHAPTER TWO

2. Review of related literature

2.1 Irrigation development in Ethiopia

Ethiopian farmers have practiced agriculture since earliest times using the technology to sustain food supplies of the then low population level. To date agriculture forms the bases of the Ethiopian economy contributing up to 50 percent of the GDP, 90 percent of total export earnings and providing livelihood for 80 percent of the population. Though agriculture was the major economic sector, its production was largely subsistence and predominantly rain- fed and as a result it has suffered from recurrent drought and unreliable rainfall. Small-scale irrigation and income distribution Ethiopia the journal of development studies (Mvan Den R .uban, 2009)..

In most parts of Ethiopia, production from rain fed agriculture is highly fluctuates corresponding to the amount and distribution of rainfall. When there is too little rainfall or uneven distribution pattern, crop failure is certainly to come. in regarded, estimated that a 10 percent decline in rainfall below the long term national average would result in a fall in all cereal yields by an average of 4.2 percent. Such a failure in agricultural production has caused great distress and famine on the society in the past three or four system or mechanisms to improve indigenous irrigation systemwebb and von(2009).

iculture should be supplemented by irrigation in order to achieve national food self-

sufficient and ensure household food security(webb and von vraun 2009).

Agricultural productivity in Ethiopia is now developed. Hence, since in 1950'sthere were mixed farming system (crop production and animal raring) experience with promoting irrigation and other modern agriculture technologies in the effort of intensification. In the last decades small scale irrigation and rain water harvesting were central to Ethiopia's new policy and strategy on agricultural and rural development. Effect of small scale irrigation on the income of rural frame household kaseyehagu of agricultural science 2012 Ethiopia enhancing food security through small scale irrigation (IFAD). According to the MOA report of 2012, the total coverage of irrigation in the country then was only 168,000 hectares which is less than 6 percent of the country's average estimated potential of 2.7 million hectares (as cited in Fuad 2011). Moreover, it has also been indicated by that in Ethiopia irrigation covers less the tow percent of the countries cropped and if all the irrigated land is utilized to produce food crops the contribution of irrigation to the production of food can't exceed two percent Dessalegn (2009).

This shows that in respect of the country's endowment with potentially huge irrigable land, irrigation has made little contribution toward agricultural development and national food self- sufficiency in Ethiopia. Apparently, irrigated agriculture is not an entirely new phenomenon in Ethiopia. As indicated irrational development in Ethiopia is in its infancy stage and not contributing its share to agriculture. However, traditional space irrigation and even same modern irrigation schemes were also not working and poor handing of irrigation systemsWww, sim, Ethiopia info Et/attachment(2009).

In all cases, there was a large potential to improved food production and lively hoods in irrigation areas. Ethiopia was very rich in different indigenous knowledge systems in such areas they practice traditional irrigation to supplement meager perception received during the cropping season. There is a generals perception that the current low performance of some small scale irrigation or mainly practiced in indigenous system schemes is related to a number of issues such as limited capacity, lack of adequate community consultations during project planning and others make irrigation not to play its role on food security. International water management institution lWML(2009).

Apparently, irrigated agriculture was not an entirely new phenomenon in Ethiopia. As indicated on some literature, informal traditional irrigation culture has a history of more than one century in some parts of Ethiopia. Small-scale traditional irrigation has been practiced for decades throughout the high lands where small farmers could be diverted seasonally for limited dry season cropping (Fao, 2005). However, irrigation development in its modern sense has recently been introduced only comparatively in the country. it was during the time of emperor Halle/sllasse that modern irrigation development is introduce to Ethiopia mainly commercial large scale schemes in the awash valley. Since the beginning of the 1950s, some 6500 hectares have been irrigated with sugar cane, cotton and cereal crops (IFAD, 2012).

Fares presently irrigate cereals, vegetables and some perennials have a good market in the vicinity.The methods of irrigation practiced by most of the farmers are wild flooding and the water is distributed to the scheme beneficiaries on a rotation basis the water distribution system of traditional structure is inefficient to deliver the required amount of water in this case high soil erosion seepage losses are major problems. The needs to irrigate at night to irrigate more land are the common experiences of the traditional irrigation beneficiaries. The farmers have reported that from cereals maize, from vegetable onion, and pepper and from were commonly produced and preferred by farmers in most traditional irrigation schemes of the Amora Meda kebele(IFAD,2009).

In general there are problems that affect the development and productivity in Ethiopia, from this problems people's awareness on the use of irrigation is less, lack of finance to fulfill materials, less or no advice for farmers to use irrigation from woreda exports and others were factors for less productivity Amora Meda Kebele(IFAD,2009).

2.2 Access of irrigation

Item regarding the types of systems that use their irrigation, local method of irrigation that means they could not use modern way of irrigation system and they have not ever seen modern way of irrigation system(IFAD,2009).

Regarding to their productivity the respondent's responses that ever uses they were not

productive as their access of lands and rivers. Therefore, they agreed that their method of practicing irrational system is least effective and not productive(IFAD,2009).

2.3 Factors for failures on traditional irrigation practice and production

They respondents 'response regarding to the factors that highly affect their production, all the respondents respond that they factors that hinders their productivity all the respondents responded that the factor that hinder their productivity in their irrigation practice are(IWML,2009).

Improved or quality seeds; according to the respondents' response, on the interview they did not use better seeds to increases the productivity. Because there is no support from the stockholders to use better seeds to their agriculture and also based on my observational we see that they did not such better or quality seed to increase their production.This factor leads them not productive(IWML,2009).

Access;here access indicates according to sharing knowledge by observing others who use better irrigation areas or sites. According to the respondents from the interview, they have not access or chances to share experience from others who implement improved irrigation from other woreda areas. This also leads them for failures of production(IWML,2009).

Support; According to the respondents, they did not get enough support to increase their production on agriculture.The stockholders did not perform their responsibility effectively. Thus us supporting of those farmers of the Amora Meda Kebele leads them not more productive based on my observation, there is no one that helps the farmers during their practice(IFAD,2009).

Capital; to achieve something capital or finance is the main source for filing the desired outcome,in the case of irrigation it is similar to the need of finance so the farmer Amora Meda Kebele were also face lacks of capital to fulfill inputs for irrigational practice(IFAD,2009).

Lack of encouragement; this is another factor that made them not productive in their

activity.According to the respondents, they could be not productive because they did not get support and encouragement from different concerned bodies(IFAD,2009).

2.4 The extent of respondents' initiatives

Regarding to the respondents involuntariness of initiatives in the capable use of modern agriculture irrigation system was below moderate level. They said that they have not positively initiated towards acquiring education from the woreda experts, their interests to share or exchange knowledge of modern way of irrational system. So that they have not interest of increasing their productivity by using modern irrigation system(IWML 2009).

The respondents view of addressing modern irrational system highly concentrated on the woreda agricultural experts by giving adequate education and and arrangement and planning of exchanging knowledge and lead from areas that use well and productive use modern irrigation system from neighboring woreda and zones(IFAD,2009).

This part of the senior essay presents observations of the researcher during practicing the irrigation by selected groups. The select groups for this researchers were practicing irrigation in small land(IWML 2009).

They planted in small land because of limited manpower and of course their system of irrigation would be traditional or indigenous way. All of them were implementing this system because of the absence of enough capital to perform improved way of irrigation(IWML,2009).

This farmers produce onion, tomato, pepper, cabbage, maize, sugarcane etc. This production helps them to change their life (MOA,2009).

even though,they produce different products there is no one to advise them how they produce well,what type of irrigation is better to produce more, even the farmers were use better seeds from Ethiopia institute of agricultural research (EIAR) in Amora Meda Kebele (EIAR,2009).

Some of the farmers select groups use fertilizers. The irrigated land is suitable for

implementing modern irrigation system. Here this farmers observed by the researcher have a dream to use modern way irrigation when their income would high(EIAR,2009).

They were benefited more or less comparing the previous one because now they fulfill their need comparing to farmers who did not practice irrigation.

Finally, based on the observation here in Amora Meda Kebele farmers implement irrigation were practiced in indigenous or traditional way, this leads them not to produce more they also need help or device about the modern system from woreda experts,they also want to use modern system when their income increases. At this time they was use generators improved seeds and also use large farm lands. There for to increases productivity the woreda agricultural experts have responsibility by advising,introducing new ways of irrigation systems to farmers by touring this farmers to areas which a modern irrigation system is practicing,initiating modern farmers who implement irrigation by giving prize or incentives, introducing the importance of irrigation for farmers who did not practice irrigation and others were solution use local rivers for irrigation to develop productivity (OECD,2015).

2.5 compare and contrast the advantages between indigenous irrigation practice and modern irrigation practice

Selection the right way was comes from compared different conditions according to their advantages based on the research farmers should select their production system. Here according to their activity they were not so much beneficiary from their products when comparing to their tiredness, expenditure and their income.However,if their system of irrigation is not effective they should be changed their system to increases their productivity.Therefor,these farmers should select their mechanism or system for a sustainable productivity in their irrigation activity (OECD,2015).

According to the responses from the respondents and from my observation the selected groups are not beneficiary from their traditional system and they should have an interest to change their system in to the improved and more beneficiary system. They also indicated from the interview that if they have enough capital to fulfill the

materials or inputs they were voluntary to practice the modern or they improved way of irrigation(UNFCC,2017).

Based on their response they prefer other system of irrigation or modern way because of the following reasons.

The traditional that they practice time consuming. Make them tread. They were not beneficiary according to their product and expenditure their land small in size to produce large amount of production to price their product also one factor for selection of other amount system (UNFCC,2017).

Beside to the above conditions the farmer should change their system, so to increase productivity these farmers should be able to change their system in to improved or modern system(OECD,2015).

This kind of irrigation was more advantages than they traditional ways because of the following reasons even though the modern system takes large capital than the traditional practice its advantages are.

It practices with modern technology like generators,improved seeds and inset sides and it implements on small farmlands or large farmlands and surplus production for market can be produce to reduce tiredness and waste of time and other factory forced the farmer to change their system and introduce the modern irrigation system(MOA,2011).

2.6 Systems or mechanisms to improve farmer's productivity.

As the study indicated that,the select groups were not beneficiary from their practice. This leads them not more productive from their land. So if their irrigation system was not profitable they should change their system in to more beneficiary system(CWADO,2009).

To increases farmers productivity of the select groups they should change their system of production by the following conditions. These include;creating awareness about the

importance of modern system irrigation and sharing known ledges about the improved system from other user to strengthen their capital by providing credits from governmental bodies to providing trianing from the concerning experts and fulfilling input like generators ,fertilizer quality seed and insect sides and implementation using such input may leads the farmer to practice the modern irrigation system and make them more productive(CWADO,2009).

Finally, based on the above conditions, from interview and observation implication, the researcher deduced that the select groups introduce the improved or the modern irrigation system to get more production and income from their land(CWADO,2009).

CHAPTER THREE

Methodology

3. Description of the study

3.1 Location of the study area

Cheha is one of the woreda in the Centeral Region of Ethiopia. This woreda is named after one of the sub-groups of the Sebat Bet Gurage, the Cheha. Part of the Gurage Zone, Cheha is bordered on the south by Enemorina Eaner, on the west by the Oromia Region, on the north by the Wabe River which separates it from Abeshge and Kebena, on the east by Ezha, and on the southeast by Gumer and Geta. The administrative center for Cheha is Endibir; other towns include Gubre(CWADO,2009).

Elevations in this woreda range from 1900 to 3000 meters. Rivers include the Gotam, Gogeb, and Metrekat. Local points of interest include the Acho Falls on the Wabe river which is 60 meters in height, and Gotam Falls on Gotam River near Emdibir Senior Secondary School which is between 50 and 60 meters in height. An all-weather road was built in 1963 which connects Emdibir north to Addis Ababa, and south to Hosaena by way of Welkite. The subsistence agriculture in Cheha is primarily based on enset, together with corn, sorghum and chickpea, as well as some annual root crops like yams and taro. Important cash crops include teff and Niger seed(CWADO,2009).

Cheha has 87 kilometers of all-weather roads and 49 kilometers of dry-weather roads, for an average road density of 237 kilometers per 1000 square kilometers.absolute location of cheha woreda 8^0 10′ 0" N & 37^0 45′ 0" E (CWADO,2009).

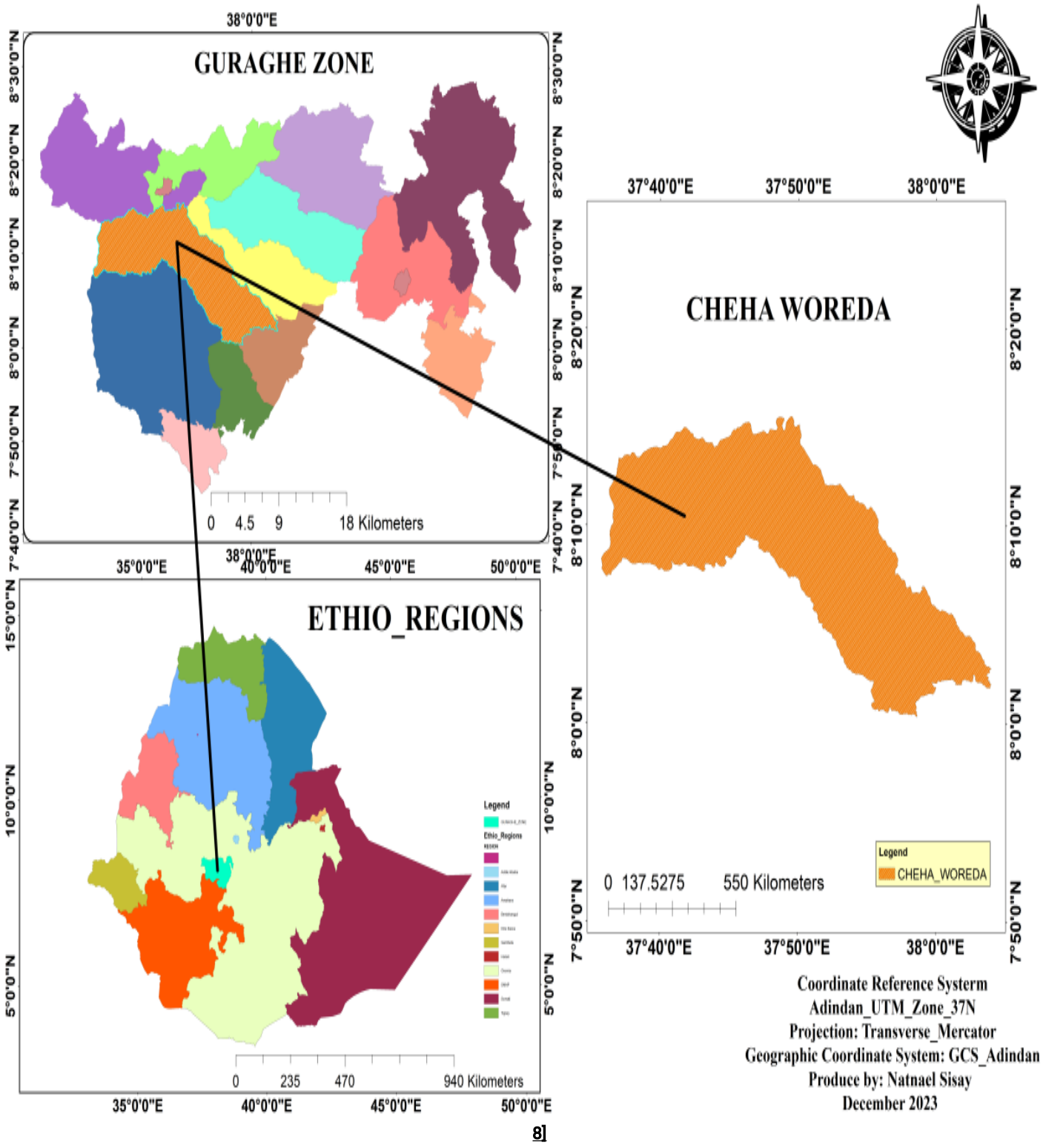

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Figure 1 map of the study area 2018

3.1.1 Topography

The relief of the study area mostly characterized by flat area with some extent flat to

rolling terrain in the Gurage zone occasionally encounter rugged mountain transaction terrain classification of route estimate 64% flat, 30% rolling and 6% mountain including built up area and village(CWADO,2009).

3.1.2 Agro climatic condition

The rainfall and Temperature condition for cheha woreda elevation as it the case for other part country too. According the ministry of agriculture,the agro ecology of the area classified three agroecology zone and include dega highland 2300-3200masl, weinadega highland 1500-2300masl and Kolla lowland 500-1500.the weinadega cover the largest part when which account for about 94% of the Total while dega and kola 6% (CWADO,2009).

3.1.3 Soil Type

According to the woreda's agricultural office ,the study area was characterized by various soil type and particle size distribution in agricultural soils of cheha district in Ethiopia parameters range mean median standard deviation soil pH 4.5-6.5% sand 0.2-20%silt and clay 4.6-93%(CWADO,2009).

3.1.4 Economic activity

Agriculture was the main economic activity of cheha spatial woreda's people. Agriculture in cheha is carved out by the entire social group. Cheha agriculture which was supported by family labor has been subsistence in nature. Based on the climate zone of the district various crops like barely, inset, maize and teff are grown in cheha. in cheha woreda, amora meda kebele was also rich in different animals like cattle, goat, sheep, and other animal. Amora meda's agriculture was also supported by indigenous irrigation system (CWADO,2009).

3.1.5 Population of the studying

According to this woreda has total populations based on the 2007 census conducted by the CSA were 115,951 of whom 56,851 were men and 59,100 women 3693 or 3.6% are it's population were urban dweller.the largest ethnic group reported in cheha who

were almost the only one in this woreda were the sebat bet gurage 99.23% all other group made up 0.77 of the population(CWCSA,2009).

3.1.6 Religion

In this woreda has total populations based on the 2007 census conducted by the CSA are 115,951 of whom 56,851 are men and 59,100 women, 8992 or 7.7%are urban dweller.the plurality of the inhabitants are reported as Muslims 42.98% ,orthodox Christianity 36.3%, are protestant 12.8% and 7.73% are catholic(CWCSA,2009).

3.2 Research design

The researchers was conduct by descriptive research design employed quantitative and qualitative method. The study was conduct assessing the indigenous irrigation practice in Amora Meda Kebel through both qualitative and quantitative research design. Which was the best situated to studies aimed out the relevance of the problem by taking the sample of the respondents (CWADO,2009).

3.3 Sample size and sampling techniques

3.3.1 Sample size

The sample size was determined based on the representatives of sample household the total household participate in irrigation activity was covered 2360 population the researchers select 60 sample household by using simple random sampling method of data analysis(IWML,2009).

3.3.2 Sampling technique

In order to increase the validity and reliability of the data the study used probability technique. From this the researchers have to selected and used a simple random sampling. The reason that researchers was employed to save time and money spatially to avoid biased. Each number of the population was assigned a number of often this selected on simple random sampling. From them 60 respondents were selected out of 441 households in the Amora Meda Kebel kebele (IWML,2009).

According to Yamane sampling size formula cited in luelseged (1997).

Sample size formula.

Where n=sample size

N=Total household

e=error

Given n=?

N=441

e=0.12

n=N/ (1+N (e) 2

n=444/ (1+441(0.12)2

n=441/ (1+441(0.0144)

n=441/7.3

n=60

So 60 respondents were selected from total household 441

3.4 Data source

To conduct this study the researcher was to collected relevant data from both primary and secondary data source were used. The primary data source were gather through questionnaires, interview. The secondary data source was collected from different source of published and unpublished document. Which include book, internet, document etc(OCED,2009).

3.5 Methods of data analysis

To answer the research question, the researchers was use various methods of data interpretation in both qualitative and quantitative data analysis was used. Qualitative data method analysis by using the data collection, the existing situation of the problem are organized explain and summarized by using feasible word were to be written in descriptive form. While Quantitative data were analyzed and interpreted by using numerical like percent frequency, tabular form and using short integer. Which means sex distribution educational level age distribution, hand-holding family size distribution, and degree indigenous irrigation practice was analyzed in study by using quantitative data analysis (OCED,2009).

CHAPTER FOUR

RESULTS AND DISCUSION

4. Introduction

This chapter was concerned with data interpretation and discussion. The data was collected through questionnaires and interview. The questionnaire distributed to 60 respondents. The following tables show their characteristics. such as background (educational statues, sex and age), socioeconomic (quality product. produce per quintal, method of irrigation, productive area per hectare, production season, duration of produced in a year market area. Contribution, problem it production process quality of product any early income.

4.1 Age and sex

Table 4.1 distribution of respondents by sex and age

Age	Sex	Frequency	Percent
18-27	Male	12	20
	Female	10	17
28-37	Male	5	8
	Female	10	17
38-47	Male	10	17
	Female	0	0
48-57	Male Female	13 0	22 0
Above 57	Male Female	0 0	0 0
Total	Total	60	100

The above table 4.1 shows 20% of respondents are male within the total male respondents fall under the age 18-27.From this age group female accounts 17%,42%

were male and 4% were female under age group 28-37 years old.10% and 4% are male found the group between 38-47 years .Above the age group 38 female does not participate in irrigation.

4.1.1 Educational status

Respondents are composed from different educational background ranging from illiteracy to higher education.

Table 4.2 shows the distribution of respondents based on educational status.

Educational status	Sex	Frequency	Percent
Illiterate	Male	13	22
	Female	0	0
	Total	13	22
Primary education(1-8)	Male	12	20
	Female	10	17
	Total	22	37
Secondary education (9-12)	Male	10	17
	Female	5	8
	Total	15	25
Higher education	Male	8	13
	Female	2	3
	Total	10	16
Total	Total	60	100

Source of Survey (2024).

According to table 4.2 the higher percentage of (37%) respondents are primary education that was completed from grade 1 to grade 8.From this male are covered 20% and female are covered 17%. Table 4.25 show accounted by male respondent that was completed from grade 9 to grade 12 was 17% and 8% females .There are also a few male respondents 16% were completed higher education level only. But, the female respondents does not completed above grade 8.The previous literature review, female respondents competed up to grade 10. And also there is a certain percent have been illiteracy respondents but our finding shows there is no illiterate respondent (Masher,

2009).

4.1.2 Method of irrigation

In the study area respondents practice two types of irrigation methods .Traditional and modern

Table 4.3 Method of irrigation

Method	Frequency	Percent
Moderns	22	37
Traditional	38	63
Total	60	100

Source of Survey (2024)

The above table 4.3 indicated that 63% from the total sample population were practiced traditional method of irrigation. The remaining 37% practicing modern methods of irrigation .The traditional method has its own advantage and dis advantage. The advantage of this traditional method is the respondent was easily used and no required more cost.The dis advantage of this method is decreasing product,low quality and exposed to drought.Yigremew Adal (2009) was opposing this idea.According to Yigremew, founding higher percentage practice modern irrigation method.For example, thrice down (drape) irrigation but our findings at the contrary the most respondents used traditional method (flooding irrigation).By this traditional and modern methods, the respondents produced different products.The major product is o nion,tomato,cabbage,tobacco,orange and banana.The tobacco product supply to the monopoly company.

4.1.3. Amount of irrigation land per hectare

Table 4.4.The respondents develop irrigation from the small hectare that is 1/4 up to 2 hector land.

Hector	Frequency	Percent
Less than half hector	15	25
Half hector	20	33
One hector	10	17

One half to two hector	15	25
Total	60	100

Source; field survey, 2024

The above table 4.4 indicated that33%respondent' practices irrigation on half hector and 25% the respondents' practice irrigation on less than half hector land. The other 17% of respondent' practices irrigation one hector land. The remaining 25% respondent' practices irrigation from 11/2 hectors to 9hector land.

Reddy, (2009) was composing this idea the majority respondents practices above one hector of land. Practically the respondents were focused on 1/4 hector of land and half hector of land.

4.1.4 Production season

Table 4.5. Production season

Months	Frequency	Percent
3 months	22	37
5 months	18	30
6 months	20	33
Total	60	100

Source; field survey, 2014

The above table 4.5 shows the highest percent (37%) of taken 3 months. Thus respondents could be produced either 3 or 4 times in a year. Respondents to be taken produced product 5 months, thus respondents produced twice a year. The remaining was 33% of respondents are producing twice a year because they can take 6 months. Yigremew Adal,(2009).He was supporting this idea according to this finding most of the time the majority respondents produced to be taken 3 months. As the same thing, that our finding was respondents were to be taken 3 months. The main variation was our finding study area respondents (33%) to be taken 6 months, But in the previous literature review on one respondent to be taken 60 months.

Table 4.6 production per quintal from one hectors

Quintal	Frequency	Percent
20-29	10	17
30-39	12	20
40-49	5	8

50-59	6	10
60-69	0	0
70-79	4	7
80-89	12	20
Above 90	11	18
Total	60	100

Source; field survey, 2024

The above table shows 17% respondents produced from 20 to 29 kuntal per hector. 20 percentages of respondents produced 30-39 quintal per hector. The other 18% of respondents surprisingly produced above 90 quital per hector.7% of respondents produced 70-79 qunital per hector. 20% of respondents produced 80-89 quite per hector, the majority respondents produced from 20-29 k/hector. Above half respondents were produced 70 up to 80 quintal per hector.But our finding was the highest percent (20%) respondents produced 30-39 and80-89 quital per hector. Certain percent (18%) respondents produced above 90 quintal per hector.

4.1.5. Repetition of production in a year

Table 4.7 repetition of product in a year

Items	Frequency	Percent
2	35	58
3	25	42
4	0	0
Total	60	100

Source; field survey, (2024)

According to the above table 4.7, 42% the respondent's production 3 times a year,they account 25people from the total population, on the other hand 58% of the respondents produced twice a year.Yigremew adale (2009) was support this idea, yigremew finding the majority respondents produced three and four time 3 in a year, because the respondents have reserve land/ alternative land.

4.1.6. Market Area

Table 4.8 the location/ position of market area

No	Item	Frequency		Percent
A	On the product land	25		42
B	Out of the product land	Payment of cost	20	33
		Birr 600-birr 3600	15	25
Total		Non cost	60	100

Source; field survey, (2024)

Source filed survey (2024) as shown table 4.8 58% of the respondents selling out of the product land. The remaining 42% of respondents selling a product land but under 58% 25% respondents not cost payment it was responsible the buyers. 33% of respondents should cost payment for the transport from birr 600 to birr 3600. 25% of the respondents were excluded. Because their agreement was responsible taken the transport cost by the buyer. (Girizppa, 2009. According to his finding the majority respondent's seller the product on the produce land. The merchant or whole sellers directly reach the product area. However, our finding shows as the contrary the majority respondents selling out of the product land.

4.1.7. Cost distribution

Table 4.9 case distribution by different item

No	Item	Frequency	Percent
A	Worker	-	-
B	Input	-	-
C	Output	60	100
Total		60	100

Source; field survey, (2018)

According to table 4.9 100% of respondents required both worker and input for the irrigation agricultural activity's. The respondents needed like fertilizer, pesticide, wedded and human power. But in the previous finding the same to that both input and worker requiring because it is absence for irrigation practices

4.1.8 Distribution of cost by different status

Table 4.10 Distribution of cost by different status

Cost in birr	Frequency	Percent
1467-2126	14	23
2127-2786	5	8
2787-3446	8	13
3447-4106	16	27
4107-4766	10	17
4767-5426	7	12
Above 5426	0	0
Total	60	100

Source of Survey (2024)

The above table 4.10, 27% of respondents where the cost between birr 3447-birr 4106.8% percent of respondents were cost between from birr 2127 to birr 3446, 12 percent respondents were the cost between from birr 4767 to birr 5426, 0% of respondents were the cost from birr 5427 The remaining 25% again the respondents the cost was less than from birr 2126,(grappa, 2009)

According to in the previous finding was the majority respondents have been high cost, because the respondents practice above one hector.With compare, our findings less than half hector.

Table 4.11 problems done irrigation process

No	Item	Frequency	Percent
A	Yes	42	70
B	No	18	30
Total		60	100

Source; field survey, (2018)

As shown the above 4.11, 70% of respondents have a problem.The remaining 30% respondents haven't a problem relatively.The problem of like shortage of water, lack of worker, sometimes and the product was cheap and expensive of inputs yigremew adal, (2002).Finding it is type of problem.The main difference was type of problem.Because

the previous finding pump but our finding does not include problem of skilled main and water pump, because the respondent use a traditional methods.

4.1.9 Quality product

Table 4.12 quality of production in the study

Quality product	Frequency	Percent
High quality	22	37
Medium quality	20	33
Low quality	18	30
Total	60	100

Source; field survey (2024)

The above table 4.12, 33% of respondents was produced medium quality product. 37% of respondents produced high quality of product: the remaining 30% respondents were produced low quality product. Yigeremew, Adal (2009) he was support this idea, according to yigeremew, in the previous findings respondent were have above half percent of produced high quality of product, because of thus respondents were used modern irrigation method, but our finding respondent were traditional method.

4.2 Annual income

Table 4.13 annual incomes from irrigation product

In birr	Frequency	Percent
>1000	45	22
20001-20000	123	36
20001-30000	41	12
30001-40000	14	4
40001-50000	27	8
	62	118

According to table 4.10f respondents the annual income from birr10,001 to birr 20,000,22% of respondents were the annual income from irrigation activity greater than

birr 50,000,12% of respondents annual income from birr 20,001-30,000,8% of respondents were annual income birr 40,001 to 50,000 and 4% of respondents were annual income from birr 30,001-birr 40,000.

yigeremew,(2009)..He was oppose this idea, according to yigeremew, respondents were the annual income greater than our finding, why because the previous one was used modern method, skilled man power,high quality of product and they have large (wide) irrigation land. So,the annual income was very high, but for finding was at the contrary medium quality, traditional method no skilled man powers by this reason compare with previous was the respondents have medium income.

4.3. System or mechanisms to improve indigenous irrigation system.

The indigenous irrigation system in Cheha Woreda utilizes a network of canals, channels, and small dams to collect and distribute water to agricultural fields. The system typically relies on gravity to transport water from a source, such as a river or stream, to the fields.

The canals and channels are carefully designed to ensure that water was evenly distributed to all fields within the system. Small dams were constructed along the canals to regulate the flow of water and ensure that fields receive the appropriate amount of irrigation.

Farmers in Cheha Woreda work together to maintain and manage the irrigation system, with each farmer responsible for maintaining the canals and channels that pass through their land. Traditional knowledge and practices were passed down through generations to ensure the sustainability of the system.

Overall, the indigenous irrigation system in Cheha Woreda was a community-based approach to water management that has proven to be effective in supporting agriculture and improving food security in the region.

4.4 Current in comes

Table 4.14 Current incomes

No	Item	Birr	Frequency	Percent
A	In hand	>5000	18	30
		5000-15000	20	33
		5000-25000	22	37
	Total		60	100
B	In the bank	>25000	13	22
		25000-35000	15	25
		5000-45000	20	33
		<45000	12	20
	Total		60	100

Source of field survey (2009)

The above table 4.14 shows the respondents having money currently by two ways in the bank and by hand,33% of respondents having money from birr 5,000-15,000 in hand other 37% 0f respondents having money in hand from birr 15,000-birr 25,000.The remaining 30% of respondents having money less than from birr 5,000.In the bank 25% of respondents having money from birr 25,000 to birr 35,000, 20% respondents having above 45, 000, 33% of respondents have from birr 35,000 to 45,000 the remaining 22% of respondents having money less than birr 25,000.

CHAPTER FIVE

5. Conclusion and recommendation

5.1 conclusions

Based on the above findings of indigenous irrigation system in Amora meda kebele the selected groups were practicing mainly traditional systems by using revers that cross their local area.According to the data the farmers were not productive and profitable comparing to their tiredness, wasting of their time and their expenditure. Here several factors affect their productivity.

According to the collecting data almost all stock holders were not well participated to develop productivity either by helping or supporting farmers who engaged in indigenous irrigation follow system how to develop their productivity or by introducing the improved or modern way of irrigation system to increase productivity.

The study indicated that the woreda experts were not act to perform their responsibility by giving advice, supplying different irrational equipment’s.So this lack of stakeholders' participation leads the farmers not to get high benefit from their product.The others that could not performs their responsibility include the wereda leader ships and officers.

These bodies could not follow up the farmers activity by preparing field supervisions and not fully control their office experts who they perform their activities .The other concerned bodies for farmers' low productivity include farmers themselves.They were not done their activities.Here these farmers were not tried to force to share experience from others who implement irrigation.

While indigenous irrigation system could provide an entry point in to sustainable resource use at the watershed level, the indigenous system also have an overlooked productivity potential in their own right.In many cases,replacing the indigenous infrastructure with more modern items concrete lined canals, iron gates to control water flow,etc.have little effect on auricular yields,and may actually do damage to the

indigenous management arrangements that make the system operate.

Generally, the main cause for low productivity and less income of the farmers include the completely concerned bodies.

5.2 Recommendation

A. Enhancing the productivity and viability of indigenous irrigation systems requires a thorough understanding of the local social and agricultural context. Successful cases of outside assistance to the indigenous irrigation sector share several features. First they were participatory, with the local community in full control of the development process secondly, the assistance provided complementary to the existing irrigation infrastructure it does not replace what is already there. And thirdly, the irrigation technical assistance was part of a large multi sect oral development program. Based on the literature's and the data, which we obtained from the participants, I tried to recommend the following.

- ✓ As explained in the previous chapters the selected farmers practiced the indigenous type of irrigation. This leads them to produce limited amount of production when comparing with modern type of irrigation.
- ✓ So in order to increase their productivity, the woreda agricultural experts and concerning bodies should be give wide education in order to change farmers' awareness regarding to implement productive irrigation.
- ✓ The woreda agricultural experts should be encourage the farmers in order to use modern irrigation equipment’s like generators or water pipes, supply fertilizers and insect sides, provides large and suitable irrigable land and other supportive materials to farmers to develop their productivity.
- ✓ Farmers should arrange themselves to share experience from those who implement productive irrigation around their area.

Finally, both farmers and woreda agricultural experts should create close relationship to discuss and implement new and modern technologies regarding to modern and

productive irrigation.

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APPENDIX

APPENDIX ONE; QUESTIONNAIRE

WOLKITE UNIVERSITY

COLLEGE OF SOCIAL SCIENCE AND HUMANITIES

DEPARTMENT OF GEOGRAPHY AND ENVIRONMENTAL STUDIES

This questionnaire was filled by cheha woreda and amora kebele selected farmers; dear respondent you were cooperated to fill this questionnaire. This questionnaire was used for the fulfillment of the BA degree student Wolkite university geography and environmental study department.

According to this for the study which has assessment of irrigation practice South Central Ethiopia region Gurage zone and Cheha woreda in amora meda kebele the true and fact answer that you give as about. The finding the questionnaire was solved the problems explain how to solve the problems

For you cooperation and your time thanks in advance

N.B

Your name is not necessary for this questionnaire

By filling this questionnaire anything is not happen on you

Now we have 19 questionnaires. I ask your true and fact answer

Quessonniere of personal information

Sex…… age……

Educational back ground ……..

What kind of irrigation system are you using?

A. Modern B. traditional

For the first question list the advantages and disadvantages

Advantage……..

Disadvantage …….

3. List kind of products that you get using irrigation?

4. How many hectares do you use for irrigation?

5. How many quintals of products do you get from each hectare?.....

6. How much time did it take to cultivate?

7. Annual how many time do you cultivate?

8. Where do you sold the products?

A. in the farm B. out of the farm

9. if you answer is out of the farm for question number 1 how muchdo you cost for the transportation?.....

10. Regarding to the irrigation process for what you cost?

A. Labor cost B. improvement of product C. all

11.if you answer is ‘c’ for the above question list the cost for the following

For labor cost per day……..

For pure per k.g……..

For fertilizer per quintal ……..

For anti-pasted and anti-insect per liter……

12. is there any problem which faced during irrigation process?

A. Yes

B. No

If yes answer yes list them ……

13. What are the actions which are taken by government?

14. How is the quality of the irrigation products?.....

A. Low B. medium C. high

15. Annually how much do you young from irrigation?.....

16. How much capital do you have now? A. on hand…… B. in bank…….

17. What are the fixed assets you get after you started using irrigation?.....

18. How much capital does have before you started using irrigation?.....

19. What is your future plan according irrigation?.....