INSTITUTIONAL AND MANAGERIAL ASPECTS OF TRADITIONAL IRRIGATION SYSTEMS: THE EXPERIENCES OF TWO SCHEMES IN AMARO SPECIAL WOREDA, SOUTHERN ETHIOPIA.

A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES OF ADDIS ABABA UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE MASTER OF ARTS IN REGIONAL AND LOCAL DEVELOPMENT STUDIES (RLDS).

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ADDIS ABABA

Declaration

The thesis is my original work and has not been presented for a degree in any other University and that all the materials used for this research have been duly acknowledged.

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Date Dec. 25, 2006

ADDIS ABABA UNIVERSITY

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By Kassaye Teshager Alemu

Approved by Board of Examiners **Signature**

Chairman Graduate Committee

Advisor

Internal Examiner

External Examiner

Dedication

To my beloved grand mother Abeba Guangul Tessema, for her unreserved effort and enthusiasm to see me in the sitting stool of our nearest elementary school (Guramba).

Acknowledgement

I would like to express my gratitude to my university advisor, Woldeab Teshome (Ph.D) for his continuous support in restructuring my work and guiding my research. His insightful comments are appreciated.

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My friend Ato Workeneh Mekonen and his family assisted me materially and morally, I have special appreciation for them.

Many people have contributed for the successful completion of my M.A education it is very difficult to list down all, my family, my friends, the Gamule and Jijolla irrigation community and their leaders, the Amaro Woreda office of agriculture and the staff, development agents, the field enumerators working with me, and ASE head quarter library staffs (Abdu, Bezawork, and Selmawit) all were my supporters and I should say them thank you.

Kassye Teshager
December 2006

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Acronyms

AAU	Addis Ababa University
ADLI	Agricultural Development Led Industrialization
ASE	Agri-Service Ethiopia
BOA	Bureau of Agriculture
CBIs	Community Based Institutions or Community Based Organizations (CBO)
CO-SAER	Commission for Sustainable Agriculture and Environmental Rehabilitation
CSA	Central Statistics Authority
DAs	Development Agents
DOA	Woreda Office of Agriculture
EWWCA	Ethiopia Water Works Construction Agency
FAO	Food and Agricultural Organization for the United Nations
GDP	Gross Domestic Product
HA/s	Hectare/hectares
IDD	Irrigation Development Department
IFAD	International Fund for Agricultural Development
ILRI	International Livestock Research Institute
KA	Kebele Administration
KDA	Korrie Development Association
MOA	Ministry of Agriculture
NGOS	Non-Governmental Organizations
NWRC	National Water Resources Center
ODI	Overseas Development Institution of UK
SNNPRS	Southern Nations, Nationalities, and Peoples Regional State
SPSS PC	Statistical Package for Social Sciences Personal Computer
SSI	Small-Scale Irrigation
SWOT	Strength, Weakness, Opportunity, and Threats
WRDA	Water Resource Development Agency
WUAs	Water Users Associations

Glossary of local terms

Angurie	A term in Korettie language which mean the whole irrigation system including the canals, the management and processes
Belg	Short rainy season (Feb- April)
Bikilessa	The term in Korettie language to mean kebele irrigation users committee
Korrie	A nationality found in Amaro special Woreda with its language Korettie and the people Korrie.
Meher	Long rainy season (June- September)
Qorro	The person who is responsible for the water distribution at the command area level
Tagessa	The term in Korretie language to mean two or more Qorros or water fathers
Woreda	It is equivalent to district
Kebele	The smallest administration structure below Woreda

Abstract

This study tries to demonstrate the management practices and the institutions that contribute to the long time persistence of traditional irrigation systems and identify the major challenges that traditional irrigators encounter in rural areas of Ethiopia.

As reviewed literatures indicate, traditional irrigation practices in Ethiopia are not studied well and there is no sufficient information documented. Moreover, past studies conducted in this regard are concentrated on the technical or the hardware aspect, while, the soft ware or institutional and management aspect is neglected. Therefore, this study is aimed to improve understanding and knowledge of traditional irrigation practices. The focus is on experiences of two schemes in Amaro special Woreda, Southern Ethiopia.

It is based on socio-technical systems theory, which outlines that irrigation systems are shaped by interaction of technical and social aspects. Irrigation technical practices are socially constructed, have social requirements for use, and social effects. This study also uses Uphoff's irrigation management framework analysis.

The data collection methods of this study are both qualitative and quantitative with primary and secondary data sources. Household survey using structured questitionnare, with required sample size was used to collect primary data at the field level. Secondary information was collected using structured checklist. Key informants interview and focus group discussions were also conducted. The data was analyzed using SPSS computer software producing appropriate tables and summaries.

From this study it can be concluded that the irrigation activity in Amaro is well established and persisted for long. Some of the factors that contributed for the persistence are: the presence of volunteer and skilled water distributors (Qorros), communally accepted local rules, skills to establish structures, ownership feelings of the irrigators, and existence of traditional irrigation management institutions (irrigation committees).

Key words: irrigation, management, institutions, and traditional.

Chapter One: Introduction

1.1. Background of the Study

Irrigation is the supply of water to agricultural crops by artificial means, designed to permit farming in arid regions and to offset the effect of drought in semi-arid regions (FAO, 1997:2). Even in areas where total seasonal rainfall is adequate on average, it may be poorly distributed during the year and variable from year to year. Where traditional rain-fed farming is a high-risk enterprise, irrigation can help to ensure stable agricultural production. Ethiopia is repeatedly hit by drought and there is rain shortage in most part of the country. Therefore, irrigation is important to achieve food security.

Irrigation in Ethiopia dates back several centuries, if not millennia, while "modern" irrigation was started by the commercial irrigated sugar estate established in the early 1950s in Awash valley. Various sources give different estimates of irrigated area, but recent sources indicate that the area equipped for irrigation was nearly 290,000 hectares in 2001, which is 11 percent of the economical irrigation potential of 2.7 million hectares. (FAO, 2005:4). This indicates that Ethiopia's utilization of its irrigation resources are very minimal and require urgent action by all development actors.

According to FAO (2005:5), four categories of irrigation schemes can be distinguished:

- Traditional irrigation schemes: These schemes are constructed under self-help programmes carried out by farmers on their own initiative and vary from less than 1 hectare to 100 hectares. The total irrigated area is estimated to be about 138,000 hectares and about 572, 000 farmers are involved. Traditional water committees, locally known as 'water fathers', administer the water distribution and coordinate the maintenance activities of the schemes. The major drawback of traditional irrigation schemes is related to unstable head works and faulty systems of irrigation stemming from lack of technology and knowledge.
- Modern small-scale irrigation schemes: These schemes use technologies for irrigating up to 200 hectares and are constructed by the government/NGOs with farmer's participation. They are generally based on direct river diversions but they may also

involve micro-dams for storage. The area equipped for irrigation in 2002 was about 48,300 hectares and about 74,100 farmers were involved. The operation and maintenance of the schemes are the responsibility of the water users, supported by the regional authorities/bureaux in charge of irrigation development and management. Water Users Associations (WUAs) are formally established in some schemes but traditional water management dominates in most of the modern schemes.

- Modern private irrigation: Private investment in irrigation has recently re-emerged with the adoption of a market-based economy policy in the early 1980s. Virtually all irrigated state farms were privately owned farms until nationalization in the mid 1970s. At the beginning of 2000, private investors had developed about 5,500 hectares of irrigated farms, distributed in Afar (37 percent), Oromia (48 percent) and the Southern Nations, Nationalities and People's Region (SNNPR) 15 percent.
- Public irrigation schemes: These schemes comprise medium- and large-scale irrigation schemes with areas of 200-3000 hectares and above 3 000 hectares respectively and a total estimated area of about 97 700 hectares. They are constructed, owned and operated by public enterprises. These schemes are concentrated along the Awash River Course and were constructed in the 1960s-70s as either private farms or joint ventures. No such schemes have been developed for the last 7-8 years.

The focus of this thesis study is on traditional schemes described under the first category.

Regarding management of schemes medium and large-scale irrigation schemes are managed by government enterprises (MoWR, 2001:2). The water management of small-scale irrigation schemes is the responsibility of the farmers themselves, mainly through informal/traditional community groups.

A comprehensive and integrated water resources management policy, prepared by the MoWR, was adopted in 2000. Some of the guiding principles are: i) recognition of water as a scarce and vital socio-economic resource to be managed and planned strategically; ii) recognition of water as an economic good; iii) stakeholders to be involved in water resources management. This policy is an opportunity for development of irrigation farming in the country.

The policy sets the overall objective of the Irrigation, (which is one chapter of the water resources management policy), is to develop the vast irrigated-agriculture potential for the production of the food crops and raw materials needed for agro-industries in a sustainable way (MoWR, 2002:25).

The government of Ethiopia also develops water resource sector strategies and short-, medium- and long-term sector development programmes prepared for the period 2002-2016. These strategies include the financing of water resources management and development; the creation of an enabling environment; trans-boundary rivers management; stakeholder participation and gender mainstreaming; disaster-prevention and public safety, and environmental health standards (MoWR, 2001:2). These policy packages are important opportunities for those to be engaged in irrigation agriculture in the country.

Various reports indicate that even in good years Ethiopia cannot meet its large food deficit through rain-fed production. Growing population pressure in the highland areas of rain-fed agriculture on a rapidly declining natural resource base has secured irrigated agriculture a prominent position on the country's development agenda. Ethiopia plans to develop an additional 274,612 ha of irrigated land (127,138 ha small-scale and 147,474 ha medium- and large-scale) up to 2016 (FAO, 2005:6). However, while human, land and water resources for irrigation development may be available; constraints are the lack of institutional capacity, private sector involvement and markets.

According to FAO (2000:3), smallholder irrigation development has shown throughout the developing world that it can be used as a key drought mitigation measure and as a vehicle for the long-term agricultural and macroeconomic development of a country. Successful smallholder irrigation schemes can result in increased productivity, improved income and nutrition, employment creation and food security. However, institutional and management evaluation of smallholder irrigation systems is very essential in order to be able to derive lessons from the past experiences and also to help policy makers in formulating sound policies for further irrigation development.

According to Don Peden et al, 2002 irrigation development has five aspects:

1. **Engineering and Technical:** design, construction and equipment
2. **Agronomic:** crop, livestock, land and water management
3. **Institutional:** extension, input supply, credit, marketing
4. **Policy:** incentives, pricing, cost recovery
5. **Organizational:** water users associations, coordination among stakeholders

Usually more emphasis is given for technical and engineering aspects, with little consideration of institutional, policy and organizational aspects (Peden, 2002:2).

In the case of this study the focus is on institutional and organizational aspects.

This study therefore aims to improve understanding and knowledge of traditional irrigation systems, their institutional arrangements, and management practices dealing with experiences of two traditional irrigation schemes found in Amaro special Woreda of southern Ethiopia. It intends to generate information and increase understanding to assist in future planning and management of smallholder irrigation.

1.2. Statement of the Problem

In Ethiopia, irrigation development is a priority for agricultural transformation, food security and poverty reduction, but poor practices of irrigation management relegate efforts to improve livelihoods, and expose people and the environment to risks. Because of lack of skills and institutions to manage irrigation systems, irrigation structures quickly fall into a state of disappear, and conflicts over access to water constrain smallholder farmers (ILRI, 2002:2).

A recent study conducted by FAO indicated that little effort is exerted by the government of Ethiopia to improve traditional irrigation systems. It is also known that there is poor management of constructed small-scale schemes in the country. Once the construction of irrigation schemes is completed, they are handed over to the beneficiaries but maintenance remains within the responsibility of the government. The absence of any appropriate local-level

organs of the government to cater for small-scale irrigation has resulted in a lack of guidance in irrigation management at a community level. With the government and non-government intervention in many areas there is an increase in irrigated areas and more users, irrigation water management and rules for water allocation are becoming more complex and problematic. Disputes are already common, especially between upstream and downstream users. The recent decentralization process is under way with regional and lower level administrative organs, which are becoming more autonomous in aspects related to irrigation management (FAO, 2005:10).

The same study by FAO indicates that many modern small-scale schemes in Ethiopia are not successful in serving the irrigation community fairly and equally due to inherent problems caused by conflict over use of irrigation water and land. However there are many traditional schemes that have lasted for a long time managed by the local community. Traditional irrigation practices are not studied well in this country and the information documented in this regard is very minimal. Therefore, there is a need to study the experiences of traditional irrigation management practices to gain understanding and experiences that may be helpful to reduce the management and institutional pitfalls of small scale irrigation in this country and else where. For this basic reason studying traditional irrigation institutional arrangements and management practices that exist for long in rural areas of the country has a tremendous advantage to provide experience for all irrigation actors in general and local irrigation communities in particular.

Yet, studies conducted regarding irrigation are concentrated on the technical or the hardware aspect, while the software or institutional and management aspect is neglected. In this regard, Mollinga (1998:11-12) in Woldeab, 2003 criticizes the professional irrigation literature by pointing out three limitations: the treatment of technology as a black box or abstract; a limited concept of human agency; and the absence of the study of the social relations of power. He argues that an interdisciplinary investigation of irrigation requires insight into its technical, organizational or institutional, and socio- economic and political aspects.

Moreover, enabling institutional and organizational condition and good management of irrigation schemes is becoming increasingly recognized, as an essential means to achieve successful irrigated agriculture (Pavlov, 2004 in Shimelis, 2006). However, past research has

highlighted that under performance and many problems of irrigation systems are based on shortcomings and weaknesses in institutional development and in the management of the schemes (ODI, 1995 in Shimelis, 2006).

Therefore, this study will attempt to fill this gap by answering the following questions:

1. How is a traditional irrigation system managed in Amaro Woreda?
2. Who are the institutional actors involved in irrigation management in Amaro?
3. What are the major challenges that traditional irrigators encounter in Amaro?

1.3. Research Objectives

1. To understand the indigenous irrigation management practices in Amaro.
2. To identify institutional actors working in irrigation management in Amaro.
3. To understand the major challenges that traditional irrigators encounter in Amaro

1.4. Significance of the Study

This study will attempt to provide some help in increasing understanding of traditional irrigation practices in rural Ethiopia, providing information on why traditional schemes are sustainable for long and give a clue on institutional aspects of the systems. This may help for the government and non-governmental actors to give due regard and attention for traditional practices.

It is hoped that this study will help to guide policy formulation and proper implementation of small-scale irrigation practices.

It will shed light on the local constraints embedded in the traditional schemes. Moreover, the studied schemes will get advantage of knowing their operational status and information for future improvement.

1.5. Scope and Limitation of the Study

About 22 traditional schemes exist in Amaro Woreda; among these schemes this study tries to cover only two. This is due to extreme time and budget constraint.

The data documentations of the irrigation systems are very poor and there was not enough data in the Woreda government offices that could support the study.

1.6. Organization of the Paper

This paper is organized in to six chapters:

Chapter one deals with general introduction, including background of the study, statement of the problem, research objectives, research questions, significance of the study, scope and limitation of the study, and organization of the paper. **Chapter two** describes the literature reviewed and theoretical frameworks. **Chapter three** explains the research methodology employed, including selection of irrigation systems, data collection methods and data analysis. **Chapter four** describes the study area in brief including analysis of **SNNPRS**, **Amaro** special Woreda, Gamule and Jijolla irrigation systems. **Chapter five** gives a detailed account of results and discussions of this study focusing on the experience of the two schemes with regard to indigenous irrigation system management, formal and informal institutional actors, and internal and external challenges. **Chapter six** expresses the conclusions of this study and possible suggestions for future actions.

Chapter Two: Literature Review and Theoretical Frameworks

2.1. Literature Review

According to Wyss (1999, in Woldeab 2003:19), the practice of small-scale irrigation schemes operated by traditional methods has been passed down from antiquity. However, the importance of small irrigation development as a means for socioeconomic transformation has not been considered since the Second World War (Vincet1994 in Woldeab 2003:19).

The history of irrigation water use for agriculture dates back to the early civilization of humankind. However, as noted by Peter Stern (1979:13), irrigation developed during the first half of the twentieth century was universally beneficial. He also explained that the importance of small-scale irrigation development got some attention on a seminar sponsored by FAO in 1970 in the Philippines. The seminar concluded that more attention should be given by government to the development of small-scale irrigations. The strongest argument in favor of this idea is that small scale traditional irrigation is easier than large-scale development because the problem of human management is reduced to a manageable scale.

Importance of small scale irrigation for agricultural development is also emphasized by others. For instance, FAO (2000:16) concluded that smallholder irrigation has brought much success to farmers, among which are:

- Enabling farmers to grow high value crops and increase their income and therefore improve their livelihoods.
- The schemes helped in reducing the rural to urban migration by offering the rural population an alternative source of employment.
- In arid areas where drought is frequent phenomenon irrigation helped as a coping strategy.
- With a more integrated approach smallholder irrigation can be the basis for other rural infrastructure to be developed in areas which could otherwise have remained without roads, telephones, schools and clinics.
- Smallholder irrigators have developed a commercial mentality

- Crop yields and farmer incomes have gone up manifold.

Even though small scale irrigation has the above advantages both in the world and in Africa there are also constraints identified by many writers, FAO (1997:17) pointed out that although many Sub-Saharan countries have realized the critical role of irrigation in food production there are also a number of constraints that have been responsible for a relatively slow rate of irrigation development in this region. These constraints are:

- Inadequate physical infrastructure and markets.
- Poor investments in irrigation.
- Lack of access to improved irrigation technologies.
- Lack of cheap and readily available water supplies.
- Poor resource base of farmers.
- Fragmented and small size of landholdings.
- High interest rates.
- Poor transportation and marketing facilities.

Regarding irrigation in Ethiopia until recently, the water potential of Ethiopia was not accurately known, and even today this is still a contentious issue. There have been different estimates of the irrigation potential of the country, and the issue has not been satisfactorily resolved. Dessalegn, referring the Ministry of Agriculture (1986), said that the total irrigable land in the country is about 2.3 million hectares, on the other hand, the International Fund for Agricultural Development (IFAD 1987) gives a figure of 2.8 m, while the Office of the National Committee for Central Planning's 1990 figure is 2.7 m (Dessalegn, 1999). From this information we can deduce that Ethiopia has a huge potential to develop its irrigation farming so that the food shortage problem would improve.

When we see the history of irrigation in Ethiopia we find that in the pre-Revolution period, the chief purpose of irrigation was to provide industrial crops to the growing agro-industries in the country, many of which were controlled by foreign companies, and to boost export earnings (Tom Catterson and etal ,1999). The main crops grown were sugar cane, cotton, sesame, fruit and vegetables. In the Rift Valley areas, some irrigation was used to grow food crops.

The Derg, like its predecessor, was keen to promote large-scale and complex water projects. For much of the lifetime of the Derg, very little attention was paid to small-scale and traditional irrigation schemes constructed and managed by farmers. With the nationalisation of industrial and agricultural enterprises, the government's emphasis was to promote high technology water development schemes managed by state-controlled agro-industrial and agricultural enterprises. It was only in the second half of the 1980s, as a result of the devastating famine of 1984/85, that the Derg began to show interest in small-scale water management schemes (Dessalegn, 1999:24).

However, irrigation development in Ethiopia did not attempt to involve the farming population. Modern irrigation by and large bypassed the farmers; the technology involved and the operation and management of this technology was inaccessible to them. On the other hand, there is a long tradition among farmers to manage water for small-scale agricultural use.

Traditional irrigation is a complementary to rain-fed agriculture, and the crops grown are often horticultural crops and fruit trees. Farmers have a keen awareness of the benefits of irrigation and are willing to invest their labour in the construction and maintenance of the schemes.

Many of these schemes are managed by elected elders known as "water fathers" or "water judges" and this traditional management system has proved effective in many instances. In some cases, the irrigation schemes are managed by Kebele administrations. It is thus evident that farmers have proven ability to organise themselves and to manage small-scale irrigation systems. The labour and discipline necessary to maintain these systems over many decades is evidence of a high level of practical knowledge of water management in the rural areas (Tom Catterson and etal ,1999:12).

On the other hand, those smallholder farmers who practiced traditional irrigation were denied proper support from government in order to upgrade irrigation systems.

After the collapse of the military regime, community owned small-scale irrigation schemes were allowed to enjoy their autonomy. But still they suffer of multifaceted problems manifested in different aspects such as; management and organizational problems, financial management of

irrigation, access to credit, input provision and market facility, diversification of crop production, integrated management of natural resources, etc (Dessalegn, 1999:28).

In recognition of this fact, during the past few years of the country's agricultural development program establishment of small-scale irrigation was considered as one of many agricultural development strategies to maintain sustainable growth of the sector.

With regard to benefits of small scale irrigation in Ethiopia, the finding of Lemma Dinku, (2004) shows that smallholder irrigations are very important especially in those areas where insufficient and erratic rainfall is a recurrent phenomenon as a result rain fed agricultural production is not a dependable enterprise. For instance, in one of the studied irrigation scheme the available income sources, the average household income obtained from irrigation cultivation constituted 69.18 percent, 76.15 percent and 75.92 percent during the three years period (2001-2003). In another scheme in 2002 and 2003, the average household income obtained from irrigation cultivation was 75.49 percent and 61.49 percent as compared to other sources of income respectively.

The findings of the study about small scale irrigation and household food security by Seid Yassin (2002), highlights that the positive impact of irrigation development helps to sustain, diversify and increase agricultural production. He further elaborates that irrigation enables farmers to generate more income and maintain productive assets like draught oxen. The study also revealed that irrigation promotes the use of agricultural inputs through supply of water during the dry season and when the amount and distribution of the main rain is found to be inadequate. Such opportunities of irrigation improve food availability and food security situation of irrigation households. The study result stresses that those households with access to irrigation have been able to double their annual income through the production of high value horticultural crops. Irrigation is providing gainful self- employment for participants and improving household access to marketable food. Moreover, households could diversify their diet composition and found at a better nutrition status due to diversified food sources produced through the use of irrigation.

2.2. Theoretical Frameworks

2.2.1. Irrigation systems as socio-technical systems

Irrigation systems are socio-technical systems, which embrace both social and technical system components and subsystems (Huppert, 1989:27). In the socio-technical approach, the investigation of irrigation technology is based on a perspective called "social shaping of technology" (Mollinga, 2003:17). This perspective investigates the social dimension of irrigation. According to the same author, the basic idea of the perspective is that "irrigation technologies not only mediate people's relationships with biophysical processes, but also shape the people-people relationships that are part of irrigation" (Mollinga, 2003: 17-18). The three concepts comprising the social dimension of irrigation, and providing the basis for defining irrigation systems in terms of socio-technical systems, as given by the above author, are social requirements for use, social construction and social effects.

The concept of 'social requirements for use' refers to the fact that there are demands created by irrigation technologies on the management structure. In other words, to be put in use, the technologies require management structure of the irrigation system in which they are used. "This means that particular social conditions have to be fulfilled for the technologies to work effectively, and the different technologies require different enabling conditions" (Mollinga, 2003:18).

The second concept (social construction) can be theoretically formulated and generalized as ... irrigation technologies are socially constructed. This means that (i) technology development and design are social processes in which different stakeholders interact (communicate, negotiate, take decisions, struggle, etc), and (ii) that the nature of the process and the different perceptions and interests of the stakeholders shape the technical characteristics of the technologies [together with the properties of the material used and the nature of the (bio) physical mechanisms involved] (Mollinga, 2003:19).

Regarding social effects as a concept of the socio-technical approach to irrigation, the author states that irrigation technologies have social effects. In a more elaborate way, it means that

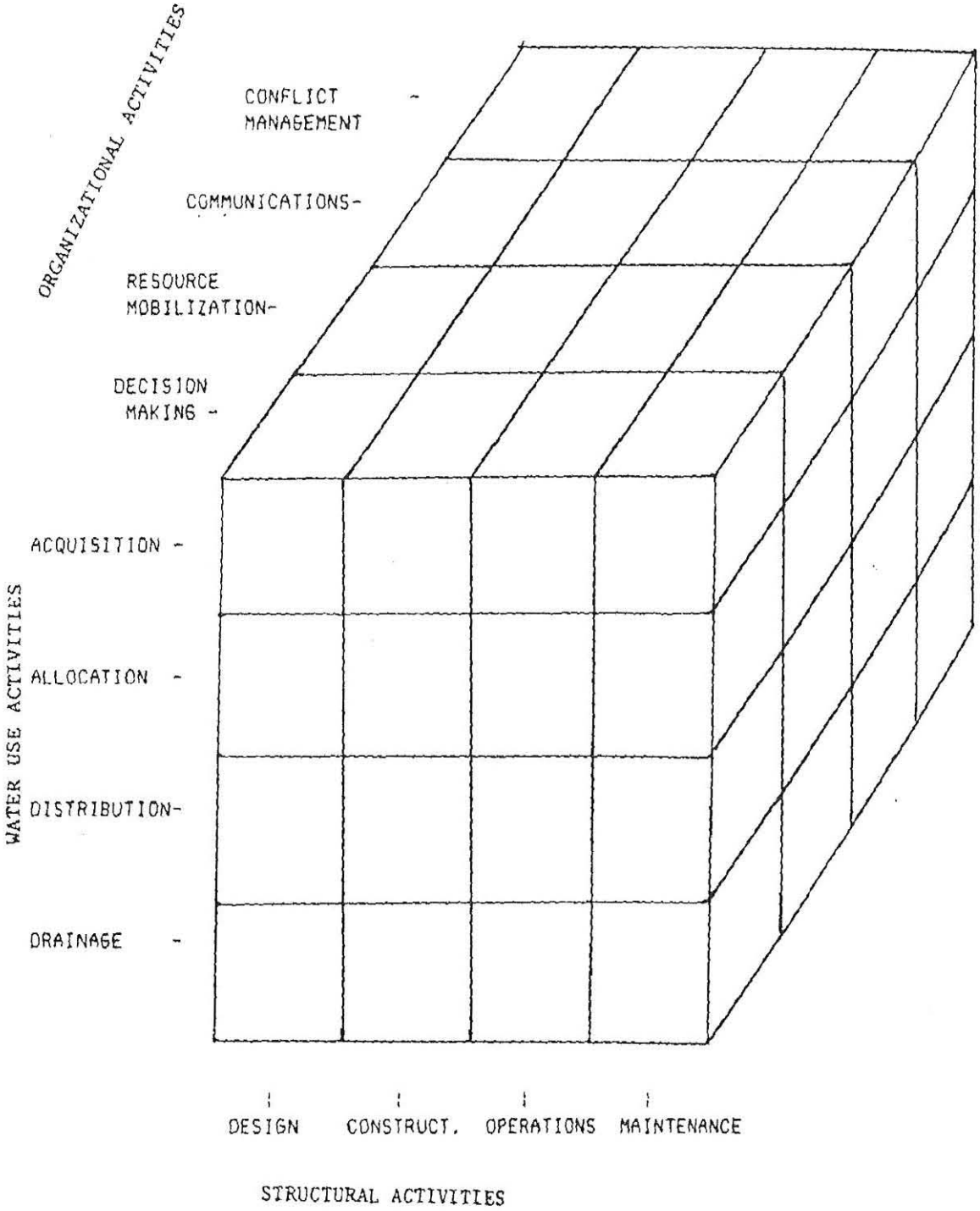
peoples' livelihoods are affected by irrigation technologies because they have effects on crop production, peoples' health, and other things.

The establishment of the socio-technical nature of irrigation being as given above, its analytical framework can be seen as follows.

2.2.2. Framework for Irrigation Management

This study in addition to socio-technical approaches of irrigation studies tries to adopt Uphoff's management framework as a complementary theoretical framework. This analytical framework for the analysis of irrigation systems are developed by the Cornell Irrigation Studies Group (Uphoff etal., 1986). Irrigation system development and the management techniques that evolve with time vary according to: the physical setting, the social structure, the cultural precedents, the biological circumstances, the administrative structure, and the economic opportunity. This framework provides three common categories dealing with water use, structure and organizations. These are distinct entities as focal points of irrigation management activity. The irrigation activities that focus on water emphasize obtaining an adequate and assured supply (acquisition), scheduling (allocation), and utilization at the right place and at the right time (distribution), and prevention and removal of excesses (drainage). The activities that focus on organizations emphasize the actions of individuals or organizations to manage the structure (decision- making, mobilizing resources, and communicating the plans and schedules) and conducting all these actions within certain consensual rules (carefully managing water conflict) to deliver the water to the point of use for agricultural production.

Figure 2.1. Analytical Framework for Irrigation Management (after Uphoff, et. al., 1986)



This paper uses the following definitions as concepts for analysis:

1. **Water Use**: it includes activities of water supply, scheduling, distribution, and drainage.
   - **Water Acquisition:** It is the supply of water from surface or subsurface sources.
   - **Water Allocation**: It is the assignment of specific amounts of water per share rights or units owned by the users. The allocation process thereby determines who shall have access to water and when and how much they shall receive.
   - **Water Distribution**: it is the partitioning of the supply among uses and among users with three dimensions: equity, adequacy, and reliability.
   - **Drainage**: the removal of excess supply which occurs as a rising water runoff. In many cases, this spills over into acquisition when it includes the tail water reuse system
2. **Structure:** It is one of irrigation management activity which comprises design, construction, operation and maintenance.
   - **Design:** It is starting up of the structure ideally first and practically second.
   - **Construction:** Build the structure according to the design with available materials.
   - **Operation**: It is the act of utilizing structures to deliver water
   - **Maintenance**: Sustaining the life of the structures in to deliver irrigation water to the fields properly
3. **Organizational Aspects:** It is irrigation management function which comprises decision making, resource mobilization, communication, and conflict management.
   - **Decision Making:** it is accomplished at several levels depends on the structure of the irrigation system
   - **Resource Mobilization**: It represents the appropriation, marshalling and utilization of funds, manpower, materials, information, or any other inputs needed by the committee or the user farmers.
   - **Communication:** It is relationship of irrigators to institutions and each other
   - **Conflict Management:** Conflicts occur naturally in any human interaction and becomes especially important when dealing with a scarce resource such as irrigation water. Humans tend to have long memories and past conflicts may never be fully resolved, conflicts can occur at every level at institutions or at irrigator level.

Chapter Three: Research Methodology

3.1. Selection of the Irrigation Systems

Traditional irrigation in Amaro special Woreda of southern Ethiopia is very old traditional practice, which is intricately linked with the culture and life of the people. The farmers are very skillful operators of irrigation structures. Reports by the government and non-governmental organizations indicate that irrigation practice contributes a lot to food security of the people. This study is focused on two traditional irrigation systems, namely, 'Gamule' and 'Jijolla'. Gamule irrigation scheme has a well constructed concrete canal. The canal is 3 kms in length constructed in 2002 with the assistance of a national NGO called Agri- Service Ethiopia. Jijolla scheme is an indigenous scheme with soil canal constructed of stone.

Before selecting these schemes relevant secondary information was examined for all 22 traditional schemes of the Woreda. A sort of SWOT (Strength, Weakness, Opportunities, and Threats) analysis was done with the help of agriculture office and the Woreda information offices staffs focused on criteria of old age and relatively many irrigation beneficiaries. Using this analysis the two schemes are selected for detail study. These selected schemes are relatively old and are accessible.

3.2. Methods of Data Collection

This research employs the combination of qualitative and quantitative methods. These are survey, fieldwork, focus group discussion, key informants interview, and documentary research methods. The data sources for this research are both primary and secondary sources.

3.2.1. Secondary Data Collection

This research used published and unpublished materials prepared for other purposes such as annual reports of the Woreda office of agriculture, programme documents of a local NGO called

Agri-service Ethiopia which is working in the Woreda, studies conducted in the past and the newsletter of the Woreda information office are among the documents refereed for this study. For this purpose, a structured checklist was prepared that listed down all the required data. The checklist contained the following basic issues:

1. General information on location, climate, land use, population, topography, land area, potential irrigable area, main problems of the area, and infrastructure situation.
2. Information on agriculture of the area including crop production, livestock situation, and agricultural extension services.
3. About the irrigation system in the area
4. About major irrigation institutional actors of the area
5. About major constraints and benefits of traditional irrigation practice in the area.

To collect additional data and triangulate with the existing, the researcher made contacts with ministry of water resources at federal level, regional office of water resource, and Woreda administrative office.

3.2.2. Primary Data Collection

Primary data was collected using various methods such as key informant interview, focus group discussions, structured questionnaire, and observation of events in the irrigation systems.

Key informants were the Woreda government officials, experts, and other non-state actor's experts and the irrigation schemes water user's committee or association executive members. This was conducted for the purpose of generating a general understanding of the irrigation systems, historical background, the major technical, institutional and management constraints and to identify more relevant variables for the study. For key informant interviews 15 individuals were contacted. Detailed one to one discussions were conducted mainly on issues of water use, structure, organizational aspects of the local irrigation management practice, the formal and informal institutional actors involved in irrigation system management of the area, and on major constraints of irrigation.

For focus group discussion 18 individuals from the two systems were selected using the criteria of their knowledge of the irrigation system and duration of membership in the system. The irrigators in the head end, middle, and tail end are grouped into three groups in each scheme. The discussion focused on their irrigation management experiences regarding water use, structure, organizational aspects, major institutions, and major constraints. These discussions with the groups helped the researcher to triangulate in formations collected by other methods.

3.2.3. Sample Size and Sampling Techniques

For the questionnaire survey 78 (16%) irrigators from a total of 482 household heads that were listed on the Kebele irrigation committee list were randomly selected using the following procedure:

1. Check the list of irrigators in the respective schemes,
2. The irrigators were stratified into head end, middle and tail end based on their location in the layout of the irrigation systems so that the end results of the study reflect the views and situations of irrigators in the three locations.
3. For Gamule scheme there are about 231 beneficiaries registered by the Kebele water committee who are using the "Wuda" stream. We classify the scheme into three parts according to the positions of the farmer's irrigation plots. Accordingly, 39 farmers were selected as a sample representative of all scheme irrigators proportionally 13 farmers from each plot positions. As the numbers of female-headed scheme users were very low it was attempted to include the available number of female farmers in all positions.
4. Similarly for Jijolla indigenous scheme the number of beneficiaries who use the "Dorba" stream were almost similar to Gamule with about 251 beneficiaries. 39 sample households randomly selected in each plot position. Here, the available numbers of female-headed households were included in the sample.

Five enumerators and two facilitators were employed to fill in the structured questionnaire prepared for the household survey. One female enumerator was assigned to work with female interviewees' in order to make communication easier with the sampled female irrigators. The questitionnare was first prepared in English and translated to Amharic by the researcher to make

the discussion of the interviewer and interviewee conducive. The interview was conducted with a combination of Amharic and Korrette languages. All the enumerators were capable enough to understand Korrette, while most of the respondents can speak Amharic.

A day-long training session was prepared in Kelle town by the researcher for the enumerators to acquaint them to the survey process and to make clear how the questionnaires should be filled. Another day was also spent pre-testing the questitionnare in the non- sampled irrigation scheme in Kelle Kebele near the Woreda center.

The total duration of field work was 30 days. The survey was conducted from March 11- to April 06, 2006.

3.2.4. Profile of survey respondents

The total sample size of respondents of Gamule and Jijolla is seventy eight, which are 16% of the whole irrigators. All of the respondents are irrigators using irrigation to supplement the rain fed crop production. To maintain the gender balance both women and men were interviewed. Among the respondents, women constitute 13 percent while the figure for male is 87 percent. Since the total number of female irrigators are very small all the female households are included in the survey; they are about 2 percent of the whole irrigators. The age of irrigators in Gamule scheme ranges from 18 minimum to 70 maximum with average age of 40 years. While, in Jijolla the age of irrigators ranges from 18 minimum to 75 maximum with average age of 44 years.
In Gamule the family size of the irrigators differ from 2 minimum to 15 maximum. While in Jijolla the family size of the irrigators differs from 1 minimum to 12 maximum, the average family size of both schemes are 8, while the standard for the Woreda is 5. This indicated that irrigation activity in the area supports more families than rain fed agriculture alone. When the number of family members increased it is obvious that labor availability for irrigation is high. So, irrigators with more family numbers encounter lesser labor shortage for irrigation.

In Gamule the irrigators live in the village with a range of 4 years minimum and 59 years maximum, the average age being 24 years. The irrigators use the irrigation scheme to the

minimum 1 year and the maximum 42 years with average irrigation life of 17 years. While in Jijojlla the irrigators live in the village from 7 years minimum and 75 years maximum, with the average age of 29 years. The irrigators use the irrigation scheme to the minimum 4 years and the maximum 50 years with average irrigation life of 17 years. For both schemes the service years are more than 17 years and this shows that irrigation activity is long term engagement in the area. And the traditional irrigation activity helps the community members to live stable with minimum migration to other areas.

3.3. Data Analysis

The collected quantitative data obtained from the questitionnare survey was analyzed by using SPSS PC+ computer software. This quantitative analysis used frequency tables, descriptive graphs, percentages, and summarized figures. While the qualitative data which was obtained from the focus group discussion, key informants interview, and field observations were analyzed using qualitative data analysis techniques emphasize given for patterns, trends and values.

Chapter Four: Description of the Study Area

4.1. Southern Nation's Nationalities and Peoples Regional State (SNNPRS):

The study areas lie in Amaro special Woreda of the Southern Nation's Nationalities and People's Regional State (SNNPRS). The regional state is located in the south-western part of Ethiopia: bordering with Kenya in the south, Sudan in the south west, Gambella regional state in the west and Oromia regional state in the north and east. The rainfall situation is generally erratic and low in most parts of the region. The records from 1995-2005 show, that only 24.6 percent of the region gets annual rainfall of more than 1600 mm (BOPED, 2001) (for the map of the Region see Annex 1).

According to the central statistics authority (CSA), population size reached 11, 064,818 (2003) with its growth rate above the country's average. The urban population growth rate is 5.3 percent per annum whereas that of rural is 3.5 percent.

As far as culture is concerned, it is diverse due to the existence of various ethnic groups with their own particular characteristics and tradition.

Lowlanders generally have a pastoral culture and tie their lives with cattle husbandry, while highlanders are settled farmers, depending on farm production as a major source of their livelihood security. Cereals are predominantly produced in the region, while root crops such as Enset, Cassava, Yam, Taro and Sweet potato have a significant role in the economy of the region. Coffee, Cotton and Spice production are among the major farming activities carried out for cash earning in some parts of the region.

As a result of the existing big agro-ecological differences there are different farming systems which range from traditional to modern practices, but at varying scale of coverage from the use of simple traditional hoe, and draft oxen power to the use of tractors in the region. There are two farming and harvesting seasons in the region, "meher" as a major production season and "belg" (small rainy season).

The region under study is sufficiently enriched with water bodies, which can be used for irrigation on top of their other possible uses. As far as their irrigating potential and hydraulic discharge is concerned, they are considered to be vast and adequate enough to serve all the required demands: for hydropower, drinking, transport, and for agriculture. The regional assessment and economic profile indicate that the irrigation potential of the region is great. It is also recommended that this potential can be used to cope with the prevailing food shortage problem in the region (SNNPRS, 1997).

4.2. Amaro Special Woreda

Location and Geography: Amaro Special Woreda is located in the Southern Nations Nationalities and Peoples Regional State of Ethiopia. It is bounded in the North and East by Oromia and on the South by Burji Special Woreda and in the West by Semen Omo Zone (Chamo and Abaya lakes) (WOA, 2005) (for the map of the Woreda see Annex 2).

The capital town Kelle, located 478 km south of Addis Ababa and 203 km south of Awassa, is the regional capital city. The Woreda is characterized by plain, mountainous and undulating terrain. The altitude ranges from 1200 to 3600m.a.s.l. The Amaro mountain chain, Dello Mountain (3601m absl) being the highest peak, drops sharply to south east and gently North West till it reaches the lowest elevation at Gelana River and Lake Chamo respectively.

The Woreda enjoys a special administrative status, which is equivalent to the power and authority that the zonal administrations in the region have. This privilege emanates from federal constitution of Ethiopia which states that these Woredas that have distinct ethnic identity and language are eligible for local autonomy. The Woreda consist 31 Kebeles, One Kebele being the town Kellie.

Photo 4.1: Amaro mountain chain

Climate: the current rainfall pattern in Amaro is characterized by erratic and uneven distribution over the two rainy seasons, namely belg and meher. On the average the area used to receive a minimum of 735 and a maximum of 1200 mm rainfall per annum. There are three distinct agro climatic zones, namely Dega/Cool, Woinadega/ mid cool and Kola/hot covering 30 percent Dega, 38 percent Woinadega, and 32 percent Kola. The mean annual temperature of the area is recorded as 22 degree centigrade and the maximum and minimum averages are 32 and 12 centigrade respectively.

Soils and Land Use: The total land area of the Woreda is estimated to be 170,980 hectares. There are four major soil types in the area, classified as clay to clay loam, loam to silt loam, and sandy to sandy loam the farmers are also classify them as red, sandy, black and brown. Land use is categorized into crop land (59 percent), grazing (9 percent), forest (22 percent), and others (10 percent). The Woreda is endowed with varieties of trees, bushes and shrub species.

Agriculture: It is the main occupation of the population of Amaro. It is mainly rain-fed, although it is supplemented by irrigation. In the area, different types of cereals, pulses, root crops, and cash crops are grown. The major ones are Maize, Teff, Wheat, Barely, Haricot Beans,

Enset, Casava, coffee and chat. According to livestock data of the Woreda office of agriculture, the total livestock population is 296,954 of which cattle were 19.7 percent, goats 13.3 percent, sheep 11.6 percent, poultry 54.2 percent, and equines 1.1 percent. The area is also suitable for honey production.

Population: The total population of the Woreda is about 139743 (50% Female, 50% Male) in 2005. Distribution of the population between rural and urban dwellers was 97 percent and 3 percent respectively. The total number of households in the Woreda is 22,284. The average family has 5 persons. Crude population density in the same year was 68 persons/ km^2.

Traditional Irrigation Practices: The people of the Woreda have a long-standing legacy of practicing well- developed traditional irrigation systems. The livelihood of the community depends on irrigation. These traditional practices have been under use for over a century. The major sources of water for traditional irrigation used by the communities are perennial/ seasonal rivers (streams) and springs. Most of the rivers (streams) used by the community for their traditional irrigation practice are seasonal streams that dry up during dry seasons and usually provide inadequate flow that is short of satisfying the overall irrigation demand.

According to the Woreda office of agriculture 2005 annual report, the numbers of traditional irrigations are 22, one modern scheme being constructed by the regional sustainable agriculture office (CO-SAER) in 'Korre' Kebele. Potential irrigable land is 2912ha for the traditional and 133 ha for the modern schemes. While currently irrigated area of land in the Woreda is 100 ha for the modern and 2713 for the traditional schemes. Numbers of farmers who are irrigating in these schemes are estimated to be 415 for the modern and 6824 for the traditional. Main crops grown in the irrigation schemes are teff, maize, haricot bean, cassava, and sugar beet. The major cash crops are Coffee, Enset, Chat and Fruits.

Formal and Non-formal Institutions of the Woreda: At Woreda level the following institutions are exist such as: the Woreda administrative office, office of agriculture, health, education, cooperatives, justice and police, water resources, information office, finance and economy, and telecommunication, and women affairs. There are NGOs such as Korre

development association (KDA), Agri-Service Ethiopia, and religious institutions such as Kale-Hiwot church, Mekaneysus, Catholic, Islam, and Orthodox churches. UNICEF is also providing support for the Woreda sector offices.

At Kebele level the following major institutions exist:

1. Government Institutions: Kebele Administration (KA), development centers of the Woreda office of agriculture, schools, and health posts or clincs. The KA is responsible for managing and coordinating implementation of overall political, social and economic activities. The development agents (DAs) represent the Woreda office of agriculture at Kebele level.
2. Formal community based institutions: here KDA also exist at Kebele level. Two service cooperatives are exist who are organized on voluntary basis to provide industrial goods to member farmers and to sell members produces in the towns. Some of the main functions are: provide agricultural inputs (farm implements) and consumer goods such as salt, soap, and clothes, selling farm products, especially coffee, give transport services for members as well as non members, sometimes it also provides credit services for members.
3. Local (informal) institutions: in this category Agri- Service Ethiopia initiated Community Based Institutions (CBIs) are found in the nine Kebeles. Their major roles are to mobilize the community, to coordinate the community activities and to facilitate the management of the programme activities of the organization. There are also voluntary institutions organized for various purposes by a group of local people. These are institutions that are organized by community own initiatives targeted to assist day to day life. Edir, Equb, Debo and water committees are in this group.

   Equb is a small traditional group whereby money is contributed by each member and then paid to each member in turn until all members have been paid. Equb is formed by men or women but is never mixed. Women form Equb especially for weaving purpose while for men it is a system of saving money for purchase of farming inputs and consumption items.

The purpose of Edir is mainly for wedding and mourning occasions. Sometimes the members contribute money, but mostly members bring fuel wood, coffee and enjera and join the family during mourning period.

Debo is a local institution where members of a community form a task force and support each other in case of additional labor requirement by an individual farming household. Usually Debo is needed during peak agricultural activities like land preparation and harvesting, house construction and collection of construction materials.

4. Non-Governmental Organizations (NGOs): In nine of the Kebeles ASE is working on integrated food security programme. Religious institutions also exist at Kebele level these are: Mekaneysus, Kalehiwot, Orthodox, and Catholic churches.

Social Settings and Cultural Profile: The people of Amaro are of Korre ethnic group and from Cushitic origin. Their language is Korettie. According to the reports of the Woreda administration the Woreda is composed of 95 percent Korrie, 3 percent Amhara and 2 percent Guji Oromo ethnic groups. The Korrie ethenic group is further divided into four clans, namely Koressie, Kannaye, Gachie and Manna. Koressie and Kannaye are the dominant between whom marriage is possible. Menna and Gachie are the two minority classes who are looked down on for their extra off-farm occupations such as, pottery and metal work. According to a recent estimation by the Woreda administration office, Koressie make up 47 percent, Kannaye 50 percent, Manna and Gachie 2.5 percent, and Others 0.5 percent. Polygamy is a common practice in the area.

Gender Relations: Women have productive, reproductive and community roles in the society. Most of the household day to day duties like grinding, fetching water, fire wood collection, caring children; preparing food, and processing of Enset are performed by females. In the farm area women perform all activities like weeding, picking coffee beans, harvesting, and other similar activities.

In Korrie nationality, in heritance of assets is totally for male child. The female headed households are not usually registered by the Kebele administration. In the Korie family, men

play the major role in ownership and decision making of the major family affairs. Sell of coffee, food crops, livestock and honey are dominantly made by men, though in some cases there is consultation with wives. Women's decision is limited to sell of chicken, egg and milk, butter, and Enset products.

4.3. Gamule Traditional Irrigation System

Gamule is one of 31 Kebele administrations in Amaro special Woreda. It is 20 kms from the Woreda capital Kelle in the east. Gamule is a rural Kebele where all of the residents are rural.

Population: Its total population of the Kebele was about 4196 in 2005, where 2090 are male and 2105 female. Total household heads of the Kebele are 800 in 2005, where 650 are male and 150 are female. Little recognition is given for female household heads by the Kebele administration.

Topography: the total land area of the Kebele where the Gamule traditional irrigation found is 3941 ha. With step slope, mountainous and hill topography 16 percent, undulating gentle slopes 20 percent, some foot slopes and degraded land 38 percent, and flat long slopes 26 percent.

Agro-ecology: The main agro ecological zones of the Kebele are: Dega or highland 13 percent, Woiynadega or mid land 23 percent, Kolla or low land 30 percent, and dry Kolla of dry lowland 34 percent.

Land Use: Land use of the Kebele is cultivated land 25 percent, fallow land 13.3 percent, forest land 18.3 percent, grazing land 16.7 percent, homestead 20 percent, and miscellaneous 6.7 percent.

Gamule Irrigation Situation: Irrigation activity in the Kebele is a century long occupation of the farmers. This irrigation scheme is believed to be established during the reigh of Minilik II. Its length is more than 3 kms. This traditional scheme was upgraded with the help of the local NGO working in the area called Agri-Service Ethiopia, at the cost of hundred thousand birr in

Population: The Kebele population is estimated to be 7659 in 2005 with equal proportion of male and female. The households are 1531; only 231 are female household heads.

Jijolla Irrigation Situation: irrigation activity in the Kebele is a long time engagement of the farmers. This irrigation scheme is believed to have been established in 1980 by volunteer farmers coming down from the highland parts of the Woreda. Its length is more than 3 kms dividing in to upper town and downtown users. The 3 km canal is stone and soil paved with some necessary outlets poorly constructed. The stream used for Jijolla irrigation scheme is called Dorba. Total numbers of irrigators in this scheme are about 251, with males 244 and females are only 7. All the women headed households are sampled for the detail questitionnare survey. Total irrigable area is estimated to be 300 hectares while currently irrigated are 150 has.

Institutions in Jijolla: Like other Kebeles currently there are 3 staffs of office of agriculture, responsible for the overall agricultural extension activity of the Kebele assigned as forester, general agriculture and livestock experts. There is on health clinic and one elementary school in the Kebele. Like in other Kebeles Idirs, Equibs, and Debo are also functional here. The Mekeneysus church is the major religious institution active in development assistance of the Kebele, with major activities of development support, health and education support. There is a relatively big market which serves Woreda community; small vehicles give transport service to Kelle and Agere-Mariam towns.

Chapter Five: Results and Discussion

Based on the analysis of the collected primary and secondary data, the results and discussions of the research are presented as follows.

5.1. Water Use

From the key informant's interview, focus group discussions, questionnaire survey, and researcher's observation, in the study areas water use activities such as: water acquisition, water allocation, water distribution and drainage are closely followed up and controlled by elected community members. They are locally called 'Qorro". The Qorros are respected male household heads and are not paid for their service. Furthermore, there is an apex committee (Kebele water committee) with five members, which controls the overall irrigation system. This committee is also meant to solve issues related to the irrigation system that are beyond the capacity of the Qoros.

The traditional arrangement recognizes the right of any community member in a given scheme for equitable use of the available water. Water distribution and allocation of the available water among groups/individual users depends on the discharge from a stream. The duration of irrigation each farmer has to apply at his farmland is equitably distributed and announced (by the qorro) to the user community members accordingly. When need arises to change or make different arrangements on the duration of irrigation among members and in the event of conflicts among user farmers, the water committee holds a session to revise the water allocation arrangement and resolve any prevailing problem there to. If the case is beyond its capacity, the water committee takes the case to the Kebele's judicial office to solve it. The following sections will elaborate all water use practices in the studied areas:

5.1.1. Water Acquisition (Supply)

Water acquisition is the supply of irrigation water from water sources. The water acquisitions in the studied schemes are from the small streams through diversion head works constructed near

the head of the streams. In the Gamule scheme the water source is the stream called Wuda River, which flow approximately 5 kms long starting from the foot of Amaro Mountain to the lowland Gelana River to the east of Kelle town. This stream is very small but permanently flows through out the year the farmers in addition to irrigation use the stream as a source of drinking water for humans and animals. There is only one diversion from this stream which is used for traditional irrigation for Gamule Kebele. While, in Jijolla, the water source is Dorba River with the stream head starting in the Amaro mountain chain flows to the lowland until it reaches Gelana River to the west of Kelle town. Like the Wuda River the Dorba River is also used by the community for human and animal drink. Wuda River is also flows permanently through out the year. In both schemes flooding is the method used for watering the crops. Land ownership based water use right is a common practice in Amaro.

5.1.2. Water Allocation (Scheduling)

Water allocation here is to mean the assignment of specific amounts of water units owned by the users. The irrigation system in studied areas somehow allocates entitlement or rights to the water among the farmers who have a plot of land around the schemes. The allocation process determines who shall have access to water, when and how much the user shall receive. The common principle used here is dividing the water in proportion to the area of land irrigated by each farmer.

The water allocation is fully managed by the Qorro. The scheduling is based on the size of land. A farmer can get water from 1 to 3 days per month depending on water availability in the stream. After the farmer gets his turn the Qorro will stop the water and allocate it for the next farmer. The Gamule traditional irrigation scheme has a canal of 3 km length and lined with cement, with relatively equal length of head end, middle, and tail end plots. Most irrigators are found in the middle position. All respondents surveyed express that they all use supplementary irrigation in the rainy season. The water in the stream becomes low in the dry months. The major reasons for this poor water availability are shortage of rainfall and poor capacity of the stream, and there is also some water loss due to poor water utilization skills.

While the Jijolla traditional irrigation scheme has a canal of 3 km length with soil and stone lining. With relatively equal length of head end, middle, and tail end plots. Most irrigators are in the head and tail positions.

In Jijolla, only 46 percent of respondents use supplementary water for irrigation in the wet season, the remaining 54 percent do not use irrigation water in the rainy season because of shortage of water in the stream caused by drought and frequent damage of the canal. The impact of the shortage decreases the amount of production of cereals and there is also decline in the productivity of long stayed or permanent crops. With better lining of the canal the water availability may increase.

In the two schemes in particular and in Amaro in general there is no payment for irrigation water except labor and material contributions during construction and maintenance of structures. The only income source for the schemes is the fines imposed on those irrigators who are not fulfilled their individual responsibilities of water use, in the structure activities, and in other irrigation organizational activities.

Generally, the schemes are not financially strong, and this is a weak point in all traditional irrigation schemes in Amaro.

5.1.3. Water Distribution

Water distribution among individual farm households is based on rotational basis as per the prior allocation of number of hours decided by the committee and announced before the on set of irrigation schedule corresponding to each plot position of the water users. In the two schemes it takes about six to nine months for a farmer to get another round of the water allocation. According to the key informants in the woreda office of agriculture the duration in the Woreda varies from Kebele to another depending on the size and type of the water source.

Water distribution is the role of the Qorro, who tries to satisfy the needs of all irrigators depending on their plot size. The water from the main canal is released by the Qorro to the sub-

canals and each farmer's plot. The Qorro strictly follows the rules of water allocation, which is decided by general assembly of irrigators and practiced for long.

In Gamule, 80 percent of respondents indicated that there is fair water sharing among all users, while the remaining 20 percent complain about unequal water sharing. According to the informants the main disadvantaged of unequal water sharing in the two schemes are poor men and women. Usually rich farmers receive more water than their poor counterparts. Those who assert that water distribution is not reasonable express their reaction by becoming reluctant to participate in communal irrigation activities such as construction and maintenance. Most of them also jointly accuse the Qorro to the Kebele water committee. The key informants of the kebele water committee members and the development agents in the two kebeles said that there is no major problem in water sharing in most times it is fair.

Table 5.1: Irrigator's Feelings on Fair Water Sharing

Fair Water Sharing	**Gamule (%) (n=39)**	**Jijolla (%) (n=39)**
Fair	79.5	87.2
Un fair	20.5	12.8
Total	**100.0**	**100**

Source: Household Survey, April 2006

In Jijolla, 87 percent of respondents indicated that there is fair water sharing among all users, while the remaining 13 percent complain about unequal water sharing.

Regarding crop water requirements there is a guideline prepared by Woreda office of agriculture. Some copies of this guideline are in the hands of Kebele extension agents. Some of the extension agents try to teach farmers about the rates, while others do not. There are also some informal crop water rates from indigenous knowledge that shows how many days are required to water permanent crops, horticultural crops, and cereals which usually varies from area to area. In the two Kebeles, the extension agents were asked to clarify about the guideline

but they said that most farmers are not willing to follow what they told them about crop water requirements they prefer their indigenous experience. According to the extension agents the crop water requirements obliged the irrigator to irrigate its crop according to the following guides:

1. Irrigate the enset fields for four hours
2. Irrigate the coffee fields for three hours
3. Irrigate the sugar beet for two hours
4. Irrigate the other crops both permanent, vegetables, and cereals for one hour

However, most of the survey respondents are not agree with these guides and they prefer their indigenous practices of watering their crops as long as the water is enough. In fact, give priority for enset, coffee, and sometimes maize.

In Gamule, 56 percent of the respondents say they use the appropriate crop water requirement rate, while 44 percent say they do not use proper rates. In the two schemes most of those who use the proper rates, get the rates from their own experience, some from the Qorre, and very small irrigators get the rates from extension agents. Those who use the rates usually stop watering when the rate is met but those who do not use the rate do not stop watering. This causes water logging (excess water problem) and affects crops.

In Jijolla, only 33 percent of the respondents use the appropriate crop water requirement rate, while 67 percent do not use proper rates.

There are about 6 Qorros in Gamule scheme. 87 percent of the respondents say the actvity of the Qorro is fair, while 5 percent say the Qorro is biased towards himself, and 8 percent say the Qorro is biased towards his family and friends. In Jijolla there are about 3 Qorros. 92 percent of the respondents say the activities of the Qorro is fair, while 8 percent say the Qorro is biased towards himself and his family and friends. In general if the Qorro does not carry out his duties properly he will be dismissed from his job by the Kebele water committee or by the general assembly of irrigators. Each year there is the Qorro election meeting. The Qorro can be elected as many times as the community needs him.

Regarding the fairness of the Qorros the woreda office of agriculture experts, development agents, and other key informants agreed on that most of the qorros are fairly treat the irrigators. However, there might be some qorros who are not serving the community in proper way this is usually indicate their interest of requiring some payments (corruption). The corrupted qorros are replaced immediately by the general irrigators meeting or by the Kebele water committee.

Generally, the presence of the Qorro system is one main peculiar factor for the persistence of irrigation sector in the area.

During water distribution to farmer's fields some farmers use more than their allocated amount by stealing water turn without the knowledge of the Qorro. These are called water distribution defaulters.

In Gamule, there are water distribution defaulters. 64 percent of the irrigators believe this while the remaining 36 percent do not believe the existence of defaulters. Those who believe that there are defaulters, confirm that there are also appropriate measures to be taken by Kebele water committee. In Jijolla, 39 percent of the irrigators indicated the existence of defaulters while the remaining 61 percent do not observe the existence of defaulters. Most of the key informants and participants of focus group discussion participants mentioned the existence of the water distribution defaulters. However, there are rules and regulations formulated by the community and developed progressively including new issues encountered. These rules and regulations are known and accepted by the community. These rules helped to correct the defaulters.

In the two schemes all respondents synonymously agreed that there are rules formulated and endorsed by the general assembly of all irrigators. The rules include fines agreed on and known by all irrigators. The fines are first warning for minor defaulting of water turn, money payment for repeated misdeeds, and complete banes from irrigation service for major misdeeds. From the discussions the researcher had with key informants the following weaknesses of the rules were mentioned.

1. It is not written or recorded formally

2. Not properly implemented by the Kebele water users committee or the qorro
3. Sometimes the defaulter forges the committee or the qorro

Besides, most respondents agreed that the rules are enforced. These rules are followed by the Qorros and minor fines are imposed by them, if there are major defaults the next level is the Kebele irrigation water users committee that makes most of the decisions, the other higher level is the Kebele administration. If the defaults are very serious the cases can be taken to the formal court.

In addition to rules and obligations there are also values and principles respected by all irrigators in these schemes, the values and principles are existing till the start of the irrigation system formulated by fore fathers and transferring to generations orally with improvements through time. The survey respondents, the key informants, and the focus group discussion participants were asked to list some of the values and principles they remember and those practiced today, the following values were listed out:

1. Respecting the rules of the community, respect the water committee members, due respect for the qorro, the government officials, and respect for each other especially for elderly, women, and handicaps.
2. Observe the proper functioning of irrigation structures around their plots and care for the whole structure
3. Do not miss use there water turn and use the water efficiently for the allocated crop type only
4. Give priority of water for permanent crops such as: enset, coffee, cassava, sugar beet, and chat in their respective order.
5. Do not touch the doors and openings of the structure with out the permission and presence of the Qorro.
6. Control cattle movements so that they are not destroy the structure, and crops
7. Give top priority for human and animal drink
8. Every irrigator should know the roles and responsibilities of Qorros, water committee members, extension agent, the kebele administration and cooperate or obey accordingly.

Regarding the feelings of canal ownership most of the key informants mention that ownership of the system greatly affects farmers' attitudes and behavior. In both schemes all respondents believe that the irrigation canal is owned by the Kebele irrigation users committee. While the irrigation water in a farmer's plot are owned by the respective farmer. Generally, the presence of the Kebele irrigation users committee as an institution to administer the irrigation system is another contributing factor for persistence of the irrigation systems in Amaro. However, recently the woreda administration office tries to intervene on these committees to persuade irrigators to elect some party members or cadres. In the two kebeles now the idea is rejected by the community and the power of the administrators are not long lived because of their fast turnover, however, in the future some irrigators have told their fear that the government may try to control the committee and use for political purposes.

There is special consideration of regarding emergency water needs; many respondents believe that there is special consideration of water distribution for the crop type and stage of growth. If there is emergency water need the irrigators can contact the Qorro to get early advantage without waiting for their late water turn.

5.1.4. Drainage

The drainage of water is the removal of excess supply which occurs as a rising water table or as tail water runoff from upper fields.

Regarding excess water problem, in Gamule, 64 percent of the respondents said that there is excess water problem in some of their plots. The others (46%) not mention the problem. Those who said there is problem manage it by removing excess water and temporarily stop irrigating. In Jijolla, 64 percent of the respondents say there is excess water problem, while 36 percent say there is no problem in their scheme.

In the two schemes there is no experience of re-use the drained water, only 8 percent of the respondents have some experience.

Since drainage requires communal efforts participation of all irrigators are required when the problem is severe and cover most of the farmer's fields. However, in the two schemes there is no community participation in drainage activities. The major reason for not participating in drainage is that there are no major problems that require community mobilization in the schemes.

Photo 5.1: Enset farm damaged by excess water, Jijolla irrigation scheme

The key informants and focus group discussion participants agreed that mostly in wet months there is excess water problem, however, in the dry months the problem is not exist. The extension agents are advising some farmers not to flood their plots excessly but the farmers need the excess water because it eases plowing.

5.2. Irrigation Structures

Structures in the context of this study are all structures constructed and used to convey water to the irrigable field plots. These structures in most traditional irrigation areas are rudimentary, and the alignment and exact location of the structures are not clear to anyone who expects big sized, permanent and lined structures (Ostrom, 2005:10)

Photo 5.2: Cemented irrigation canal in Gamule crossing the irrigation plots

The findings and discussions focused here in structures include issues of design, construction, operation and maintenance. All these activities are communal functions performed by all irrigators together with a facilitating role of Kebele irrigation users committee, the Qorros and the Kebele administration.

5.2.1. Design

Design requires some skill which most of the irrigators' lack. Design is usually conducted by the Qorros and some experienced farmers. The role of Kebele administration is to facilitate the community mobilization process and to maintain order and stability. The design implementation is managed by the Kebele irrigation users committee.

The initiation of designing and construction of irrigation schemes in Amaro is usually coordinated by elder irrigators who are living in the highland part of the Woreda for long and when they feel land shortage in the highland they will resettle in the lowland parts after crossing the Amaro mountain chain. The Amaro people usually compete for land with the Gujji oromos in the lowlands.

In Gamule scheme the design started some 70 years back the person called Mitsalku who came from the highland he motivated other fellow farmers and start designing the canal by diverging and digging the soil and using wood tubes as a bridge to transfer water from the stream. Most farmers and key informants in the two schemes also told us the same story. After the first design there are always minor changes yearly depending on the flow of the stream and the rainfall condition. After 67 years of service the canal is lined with cement with the help of local NGO called Agri- Service Ethiopia with out major change of the first design.

While in Jijolla, the design of scheme is believed to be started before 50 years ago with the initiation of a group of farmers lead by Kalaiddie Qossie with the help of Ato Mitsalku who started scheme in Gamule some 20 years back 30 kms far.

With regard to community participation in first or consecutive yearly designs the response of the surveyed farmers are presented as follows: In Gamule 56 percent of respondents say they do not participate in design activities because of young age, lack of required skill, and some are not interested to participate. From the 44 percent participants minimum participation is 1 times, maximum is 10 times, and average participation is 4 times in the whole life of the scheme. Most of them participate in the whole scheme and some of them on their own plot only.

In Jijolla 59 percent of the respondents are participating in the design of the scheme structure. 41 percent not participate the reasons are the same to Gamule.

5.2.2. Construction

Irrigation canals are constructed at the head of the stream and throughout the scheme either using industrial material (such as cement) if available, or more commonly with local materials (soil, sand, stone, grasses) found in the community. In construction of irrigation structures both the skills and labour contribution of all community members are desirable. Usually in Amaro groups of farmers have worked hard to develop their water resources, investing large amounts of their labor and, in some cases, cash. Some have constructed long canals through jungle, hard rock, and a long the face of cliffs. Often they have hired workers from other near by Kebeles who are skilled in cutting canals and tunnels through hard rock. Until very recently all materials used were from the local community.

The construction is conducted every year at the end of the rainy season in the form of campaign called by the Kebele water committee and with the help and permission of the Kebele administration.

The decisions when, how and where to build the structures are made by the irrigators themselves and brought to common discussions. Thus, each user follows the status of the river flood flow, and the need of supplementary irrigation and the need to build or maintain the structures. The decisions on each issue are made based on communal agreement.

The whole irrigators should participate in the construction activity at least by sending one strong family member to the spot. The pertinent rules developed by the irrigators themselves include that every user has to contribute equal labor force and construction tools during the construction of structures. The irrigators who did not attend the construction campaign would be fined of money equivalent to the daily labor cost in the locality. Then, the collected money would be

spent on drinks and food in working days. The punishment could also be in terms of water turns in irrigation period.

The Gamule scheme diversion canal is lined up with cement and proper concrete structure with the community and the local NGO called Agri- Service Ethiopia, financial support in 2003. The total length of the lined canal is almost 3 kms long. It has cattle trough at the tail end using for livestock drink. In the lined canal some people also use the water for household consumption for drink or washing. The farmers and the key informant's repeatedly mentioned the importance of the concrete structure in its advantage for water use efficiency and in minimizing conflicts. Having separate cattle trough is useful for animals and protecting the structure destruction by animals. There is a modern value at the head of the canal opened and closed by the qorro. And there are many sub canals ever 500 meters to divert the water to the farmer's fields also closed and opened by the qorros.

Regarding irrigator's participation in construction, In Gamule 69 percent of the respondents participate in construction of irrigation structures; only 31 percent do not participate because of lack of skill and lack of interest. The minimum participation frequency is 2 times, maximum is 20 times, and average participation is 7 times. Most of participants take part in any part of the scheme at any one time.

The structures in Jijolla irrigation scheme are built with local materials based on the skill of the irrigators themselves (Photo 5.3). The irrigators themselves decide the alignment of the structures. The structures consist of temporary stream diversions, earthen canals, and wood troughs as by pass, underneath road crossing small tunnels, water storage devices at intervals of the canals and division boxes made of soil bunds. A diversion structure is built with stone boulders and tree branches. Then compaction and filling of the spaces between the boulders using gravel, sand and mud are done in order to minimize seepage. However, as the structure is not well founded and just suspended on the alluvium, it is difficult to significantly avoid seepage. So, the main technical problem of the diversion structures and the earth canals is that they are subjected to seepage. The structures are not also permanent and need to be built almost every year as they are often washed away by the seasonal flood during rainy season.

Table 5. 2: Irrigator's Participation in Construction

Construction Partici	Gamule (Percent) (n=39)	Jijolla (Percent) (n=39)
Yes	69.2	72
No	30.8	28
Total	**100.0**	**100.0**

Source: Household Survey, April 2006

In Jijolla 72 percent of the respondents participate in construction of irrigation structures; only 28 percent do not participate because of lack of skill and some lack of interest. From the participants their minimum participation frequency is 1 times, maximum is 8 times, and average participation is 4 times a year. Most participate in any part of the scheme. Only a few concentrate on their own plots. From the two schemes, maximum community participation is observed in Jijolla because the canal is not lined with cement.

Photo 5.3: Jijolla irrigation head work constructed with wood to carry water to the fields

5.2.3. Operations

Operations here, refers to the act of utilizing irrigation structures to deliver water. The irrigation operation activities in Amaro are mainly conducted by the qorro and the irrigator. The qorro controls the flow of water from head canal to tail end and facilitate water distribution to irrigator's plots. While the individual irrigator in addition to take care of the whole canal, appropriately using its allocated amount is necessary.

Operations of structures in the Gamule scheme are for two basic purposes: one is to irrigate plants and the second is to provide drinking water for livestock. The day to day practices of operations of structures are the role of the Kebele irrigation users association and the Qorros. Participation of farmers in operations is usually concentrated on their own individual plots. Operation of structures in the Jijolla scheme is solely to irrigate plants. Sometimes the community members use the irrigation canal water for household consumption such as drinking and washing purposes.

5.2.4. Maintenance

Maintenance is sustaining the life of constructed structures to deliver water. Like construction maintenance is a function conducted in the form of major campaign called by the water committee supported by the kebele administration.

Maintenance of irrigation structures is a responsibility of all irrigators. Maintenance is always conducted at the end of the meher and belg rainy seasons. The structures which are not well cemented need frequent maintenance. In both schemes maintenance is conducted by all irrigators communally, coordinated and facilitated by the Qorros, Kebele irrigation users committee and the Kebele administration. The irrigators have an obligation to participate in all maintenance activities of the whole canal, minor maintenance around each farmer's plot may be conducted by the individual farmer. However, if an individual faces difficult situation he can contact the qorro and he can get full assistance from neighboring farmers. Maintenance is mostly conducted in

sluck periods where agricultural activities are less the farmers enjoy it working together and drinking with the fines collected by the water committee. The payment as a fine is the same as construction one person will pay a daily laborers payment if he is absent in one maintenance day.

Regarding irrigator's participation in maintenance, most irrigators in Gamule do not participate in maintenance; only 31 percent participate due to less damage of the irrigation canal as the canal is cemented. The only activity they conduct is canal cleaning which will be performed with small manpower. Frequency of participation in irrigation maintenance varies from 1 times minimum to 10 times maximum with the average of 3 times a year. Most irrigators participate in the maintenance of the whole scheme, only a few works on their own plot. The Gamule scheme is not frequently damaged and only 30 percent of the respondents observe little damage. The major causes of this minor damage are both flood and animal movement.

Table 5.3: Irrigator's Participation in Maintenance

Maintenance	**Gamule (%) (n=39)**	**Jijolla (%) (n=39)**
Yes	31	87
No	69	13
Total	**100.0**	**100.0**

Source: Household Survey, April 2006

In Jijolla most of the irrigators participate in maintenance, only 13 percent do not participate due to lack of interest for communal work. Frequencies of participation in irrigation maintenance vary from 1 times minimum to 10 times maximum with the average of 4 times a year. Most irrigators participate in the maintenance of the whole scheme with only a few working on their own plot. The Jijolla scheme is frequently damaged, about 2 times a year. The major causes of this damage are mainly flood and some animal movement.

In Gamule 39 percent of the respondents observe livestock movement around the irrigation canal; while in Jijolla 85 percent of the respondents have observed it. Livestock are moving

around the irrigation scheme to find water and pasture of fodder. Livestock damage the scheme by eating the crops, breaking the irrigation canal and causing soil compaction and traction.

The key informants and the focus group discussion participants commented on good participation of farmers in construction and maintenance of irrigation structures. They admire the active role of the water committee and the commitment of the qorros in mobilizing irrigators. But they believe that there is always lack of proper support from the government organizations especially from the development agents, as the development agents give more focus for other activities than irrigation.

5.3. Organizational Aspects

Here the focus of the findings and discussions are on the issues of major decision making practices of individual irrigators and communal decisions, mobilization of communal resources, communication among all stakeholders, and conflict resolution mechanisms.

The major actors in organizational aspects of traditional irrigation schemes are the irrigators, the Qorro, the Kebele water committee, the Kebele administration, the Kebele extension agent, Woreda office of agriculture, and Woreda administration office.

5.3.1. Decision Making

Decision making of irrigation management is conducted by the community together and by individual irrigators depending on the issue. Communal decision making is conducted by all irrigators during general meetings, by committee executives, by administration personnel and by Qorros. Individual irrigators also make decisions on their individual irrigation activities.

Decisions regarding water acquisition are responsibility of irrigators meetings particularly it is a responsibility of the Kebele water committee together with the Kebele administration. According to respondents recently there is a tendency of the Kebele administration to control the

activities of the Kebele irrigator's water committee. This tendency is not pleased irrigators they are trying to object it indirectly by electing non party members as the Kebele irrigator's water committee members. The researcher raised this issue when conducting key informants interview with the woreda administration and woreda office of agriculture authorities they say the situation is correct and the government is intentionally pushed this idea that irrigation water in Amaro is a precious resource which is number one solution for food insecurity problem of the area should get better political leadership. About the objections of farmers they said that "it is a temporary activity in the future with continuous discussion the farmers will understand the importance of political leadership".

Regarding water allocation, distribution, and drainage activities the major decision is made by the Qorro and by irrigator's (in their respected plots).

Irrigation is practiced in the dry and wet seasons. Especially in dry seasons all irrigators are participating. Little farmers sell labor for survival. In all other irrigation activities the decision is for Kebele water committee in communal issues while individual issues are left for the irrigators themselves. Detail view of the survey respondents are presented below.

In both schemes all respondents practice irrigation in the dry seasons.
Regarding their plot hiring practices, only 5 percent of the respondents in Gamule and 6 percent in Jijolla hire out their plot due to shortage of labor. Therefore, plot hiring in the irrigation fields is a less frequent practice.
Irrigation activity is the major employment for most farmers in the Kebeles. But, for most of the irrigators the alternative means of survival is rain-fed agriculture, some get relief assistance, and very few are engaged in non-farm income generating activities. Some of the respondents sell labor for survival by working mainly on fields of other farmers. Most farmers work in their community not migrating to far areas, only 2.5 percent in Gamule migrating in search of employment. In Jijolla there is no migrating of farmers in the Kebele in search of employment.

In both schemes the means of cultivation of the plot are the sole decision of the irrigators. However, the Kebele extension agent gives advice to some of the irrigators. Most of these farmers follow the recommendations given.

In both schemes the respondents say they are free to make all major decisions about their irrigation practice. In Gamule 48 percent of respondents cultivate Maize, Teff, Coffee, Enset, Cassava, Haricot bean, and Sweet Potato in their order of importance, 20.5 percent cultivate Enset, Coffee, Cassava, and Sugar cane, 18 percent cultivate Enset, Coffee, Cassava, and Chickpea, while the remaining 13.5 percent cultivate Banana, Cassava, Enset, and Maize. 54 percent of respondents use the cultivated crops for household consumption, 44 percent use for generating income, only 2 percent prefer cultivate less labor requiring crops.

In jijojlla 54 percent of respondents cultivate Maize, Teff, Coffee, Enset, Cassava, Haricot bean, and Sweet Potato as in their order of importance, 23 percent cultivate Enset, Coffee, Cassava, and Sugar cane, 15 percent cultivate Enset, Coffee, Cassava, and Chickpea, while the remaining 8 percent cultivate Banana, Cassava, Enset, and Maize. 59 percent of respondents use the produced crops for household consumption, 36 percent use for generating income; only 5 percent prefer produce less labor requiring crops.

In both schemes the irrigators have little information about alternative crops they could cultivate, only 5 percent used improved varieties.

5.3.2. Resource Mobilization

Resource mobilization represents the appropriation, marshalling and utilization of funds, manpower, materials, information, or any other inputs. In the two irrigation schemes there is no subsistent amount of money because there is no water fee, the only money they collect is the fines from those committing misdeeds. However, this money is spent on ceremonies during construction and maintenance campaigns to drink local borde and local tej.

With regard to community participation in mobilization of communal resources, all respondents agreed that there are community resources for the scheme stored in the houses such as small farm implements, some money, and unused land. The owners of these resources are the Kebele water committee and through it all irrigators.

Individual irrigators contribute labor, sand, grass, small farm implements, and management skills for the scheme. All the community members are equally served by community assets for the communal activities.

All the local resources are used for maintenance and construction of the main and subsidiary canals, no individual irrigator is allowed to use these community resources for individual use.

5.3.3. Communication

In the two irrigation schemes frequently identified communication levels are:

1. **Farmers communication with other fellow farmers:**

Farmers are meeting in the churches and markets and other social gathering. In these meetings they always share information about their irrigation system such as: the activity of the committee and the qorro, the water situation, the condition of the structures, the resources and other issues. In this regard farmers are open and transparent in their culture to talk what they observe each other.

2. **Farmers communication with the Qorro:**

Farmers are frequently meet the qorro to know their water turn, and water availability and on the situation of the structure. The qorros request local irrigation system situation from farmers and he give sufficient information for their questions also. This determines the quality of the qorro as

one cretiria to elect for second or more time. Since the qorros have no other specialized trainings to teach the farmers, however, they try to communicate what they know for the irrigators.

3. Farmer's communication with the Kebele water committee, extension agent, and Kebele administration:

Farmers rarely meet the Kebele water committee it is only on the general irrigators meetings and if the farmer is needed for especial obligation. The communication of the farmer with extension agents is not so frequent that the numbers of extension agents are minimal and the extension agents are contacting always the group leaders and contact farmers only. So, technology dissemination and information on new inputs and improved farm practices are is not sufficiently communicated to farmers. The irrigators meet the Kebele administration on political and administration issues they rarely talk about their irrigation business.

4. Qorros communication with the Kebele water committee:

The Kebele water committee is the immediate supervisor of the qorros and sometimes the qorros are member of the committee. The qorro and the water committee have a *weekly* meeting arrangement. The qorros also attend the bi-monthly meetings of the committee. In these meetings all issues of the irrigation system is raised and discussed. The committee chairperson is always conducting external communication duties.

5. Kebele water committee communication with the Kebele administration:

Now a days Kebele administration tries to communicate and supervise the activities of the water committee as water is considered as a precious resource of the Kebele which should be managed and controlled by the government. Some conflict situation between the committee members and some high conflict situation among irrigators are presented to the Kebele administration and get solution.

6. **Kebele water committee communication with the Woreda administration:**

The Kebele water committee meets with the Woreda administration is a rare event. The Jijjola Kebele water committee chair person told the researcher that he meets the woreda administration only once in a year when he was in Kelle town to request fertilizer and seeds for the irrigation scheme.

7. **Kebele water committee communication with extension agents and woreda office of agriculture:**

Kebele water committee frequently meets with the Kebele extension agents to deal with various issues like input requirement and other improved practices. However, rarely meets with the Woreda office of agriculture.

These communication ties are not performed formally they are usually conducted in the informal way. So, the information needs of farmers are not satisfied as required.

All the respondents are happy if their irrigation structures are improved. The main reasons behind this are to cultivate more crop quantity, to increase water allocation, and to improve community relationships. All irrigators get enough information about the irrigation system from each other, from the committee, from the Qorro and from the government officials mainly through their cultural ties.

5.3.4. Conflict Management

The unwritten traditional principles and regulations guiding the rights and obligations of the community members generally form the basis for the day to day functioning of the conflict resolution system. This traditional arrangement of the irrigation system in Amaro has a deep-rooted conflict management mechanism.

From the key informants' interview, from focus group discussion and the survey the source of conflict in irrigation schemes are competition for irrigation water, land and other common resources. The frequent reason of conflict in the area is loss of land when the irrigation canal is constructed and maintained.

In Gamule only 15 percent of the respondents reported their asset losses, while in Jijolla 5 percent come across some loss. Majority of respondents did not lose any assets. The losers are not worried about their asset loss during construction of the scheme; this is mainly because of great enthusiasm and interest of farmers to have an irrigation scheme in their locality. The older the irrigation practices in the area the lower the conflict due to asset loss. Among the respondents most of the losses are grazing and cultivated land, and some loss of small farm implements. 98 percent of the losers accept the loss positively in light of the future benefits. Only 8 percent of the respondents experienced conflict no more than one time. Frequent conflict in the scheme is rare there are only minor conflicts mainly due to poor water distribution, about 64 percent of respondents mention water distribution as the main cause of most conflicts in the scheme.

In Jijolla only 8 percent of the respondents experienced conflict, up to three times. Frequent conflict in the scheme is rare there are only minor conflicts mainly due to poor water distribution. About 44 percent of respondents mention water distribution as the main cause of most conflict in the scheme. There is some conflict during structure construction and maintenance between the committee and the irrigators.

Product theft is also one major cause of conflict. In Gamule, 23 percent of respondents indicate existence of theft in the locality. In Jijolla, 56 percent of respondents indicate existence of theft in the locality. Major theft is practiced by unemployed people both at night and at day. The theft is commonly connected with irrigation conflict. Some of the hostile activities which may cause conflict are:

1. Livestock grazing in irrigated plots of others
2. Not respecting other farmers' turn
3. Product theft

4. Farm plot borders

Results of the survey indicated that there are a few cases in which farmers encounter minor problems of farm land loss and conflict over access to irrigation. Some of these problems evolve overtime and their absence currently does not mean that they will not occur in the future. Thus, to protect and control these problems regular follow-up and proper management by the committee is necessary.

5.4. Agriculture Related Practices of the System

5.4.1. Land for Irrigation

In Gamule the size of individual's total cultivated land (Both irrigated and rainfed) ranges from 0.13 hectare minimum to 4 hectare maximum, the average land size is about 1.29 hectare. While the land size allotted to irrigation varies from 0 .13 hectare minimum to 2 hectare maximum, the average holding is 0.7 hectare.

Table 5.4: Land Allotted for Irrigation by each Farmer in Hectares

	Minimum	Maximum	Mean	Std. Deviation
Gamule (n=39)	.13	2.00	.6910	.51166
Jijolla (n=39)	.5	3.00	1.27	.63

Source: Household Survey, April 2006

In Jijolla size of total cultivated land of irrigators range from 0.5hectare minimum to 3 hectare maximum, the average land size is about 1.27 hectare.

Land is owned by the government and distributed freely to farmers. This is common practice and legal in Ethiopia, however in both of the two schemes the respondents told us that the following land tenure situations exist:

1. Hiring or leasing land for production or cash for limited period of time

2. Buying from individual farmers

The key informants including the woreda government officials and the development agents belive that they know the practice, still they do not want to stop it as it is not pertinent problem. Some argues that this practice is also found in the neighbouring Woredas (such as Burji and Gugi) stopping it in Amaro may push some people to these Woredas and minimize the number of the Korre population.

All the respondents confirm that they farm their land by themselves. They all also care for the fertility of their plots using various techniques which ranges from fallowing to compost and chemical fertilizer application.

Regarding land ownership in Gamule 82 percent of the respondents own land, 8 percent plow their spouse's, and the remaining 10 percent are rented land. While in Jijolla 87 percent of the respondents own land, 3 percent plow in the lands of spouses, and the remaining 10 percent have rented land.

Farmers were asked about the mechanism of land distribution for youths, in both of the schemes children seeking land can get some through the redistribution of land, intensifying cultivation on underused land, inheritance, and purchase from others. Renting is also common.

In both schemes 54 percent of the respondents have children who seek to have their own land. This may require conducting land redistribution or use uncultivated land in the future.

About 93 percent of the sampled households in Gamule believe that they have permanent title of ownership of their farm land, while, the remaining 7 percent are not sure about it. 80 percent of respondents indicate that they feel the land is their own which motivates them for hard working. While in Jijolla about 100 percent of the sampled households believe that they have permanent title of ownership of their farm land.

The Key informants believe that the land ownership title is on the name of the household head. The Woreda Administration officials have a plan to give land certificates for the farmers in 2007.

In both schemes minimum irrigation application is 1 times a year, maximum is 3 times and the average is about 2 times a year.

5.4.2. Crop Production

Major agricultural crops produced by irrigation in the schemes in their order of importance are maize, teff, enset, cassava, sweat potato, and sugar cane. While major cash crops produced by irrigation in the scheme are Coffee, Haricot bean, and Chat.

Table 5.5: Amount of Total Production of an irrigator by Irrigation in Quintals in 2005

	Minimum	Maximum	Mean	Std. Deviation
Gamule (n=39)	.50	30.00	6.0769	6.54794
Jijolla (n=39)	1	120	11.82	20.31

Source: Household Survey, April 2006

Photo 5.4: Cassava farm field using irrigation in Jijolla

Minimum annual production through irrigation per an individual irrigator in Gamule is half quintal, maximum is 30 quintals, and the average production is only 6 quintal a year. While in Jijolla minimum annual production per an irrigator through irrigation is one quintal, maximum is 120 quintals, and the average production is 12 quintal a year. This variation between the two schemes is due to more land size in Jijilla.

In Gamule the minimum number for use of irrigation is one month, the maximum is 6 months, and the average is 2.5 months. In Jijolla the minimum number of months the irrigators use irrigation is half a month, the maximum is 5 months, and the average is 2 months. The variation accounts to the cemented canal structure in Gamule but not in Jijolla.

5.4.3. Labor for Irrigation

The labor needed to operate family farms is characterized by seasonality and the family's work schedule, which is dictated by the agricultural calendar. The availability and type of family labor has also direct relationship to agricultural practices of the farmer.

In Gamule there is no labor shortage in the scheme, and most of the respondents do not use hired labor for their irrigation activity. The major reasons for not using hired labor are: enough family labor, no enough labor available for hire, and too expensive wages in their respective order.

In Jijolla there is no labor shortage in the scheme, and only four of the respondents hire labor for their irrigation activity.

5.5. Institutions Involved in Irrigation Management

With regard to governance in irrigation systems Ostrom (1992:45) in Woldeab (2000:24) identifies three layers of rules that cumulatively affect irrigation systems.

1. Operational Rules: refer to the day to day sessions concerning when, where, and how to withdraw water, monitoring of actions, and rewards and sanctions assigned to actions. This rule is followed by qorros, and irrigators specifically and the Kebele water committee, Kebele administration, and development agents are adhered by this and follow the implementation.
2. Collective – choice Rules: are used by irrigators, their officials, or external authorities in making management policies. A change in policy implies a change in operational rules. This rule is observed and implemented by woreda and Kebele government authorities. The irrigators and their committees also ruled with these rules.
3. Constitutional- choice Rules: determine who is eligible to participate in the system and what specific rules will be used to craft the set of collective choice rules. In the crafting of irrigation institutions, suppliers and users should be encouraged to design their institutions. (Wodeab, 2003).

When studying traditional community managed irrigation systems it is essential to understand the processes of decision-making, both on an individual and a collective level. In this context it may be important to use an institutional perspective in order to understand what factors that determines whether communities will cooperate or not to achieve collective benefits. With this concept, "we refer institutions as sets of formal and informal rules and norms that shape interactions of humans with other and nature" (Agrawel and Gibson 2001:14). Thus institutions are not only governance systems but also patterns of behavior and norms and values.

In this case institutional arrangements are an interrelated set of institutions to enable coordinating activities to achieve social goals.

With this theoretical background we will proceed to major institutional actors in the studied schemes or in Amaro Woreda. These institutional actors in their hierarchy from top to bottom are presented below:

5.5.1. Woreda Administration

Woreda administration is the highest government organ in the Woreda its main responsibilities are to keep peace and order, manage all government sector offices, and support the irrigation schemes technically through office of agriculture and intervene during the conflicts between two and more Kebeles, and administer higher problems of irrigation. This being the case mostly the Woreda administration role in managing the studied schemes in Amaro is indirect. No frequent contact with irrigators. The farmers and the key informants believe the Woreda administration is not give due concern for the irrigation in the area. This is also believed by the administration authorities the office head told the researcher that even if 'we know the importance of small scale irrigation for food security because of manpower shortage the required support and attention is not given'. For the future the Woreda plans to have irrigation experts in the office and will strongly assist the establishment of irrigation cooperatives in all the Kebeles.

5.5.2. Woreda Office of Agriculture

Offices of agriculture assign extension agents at Kebele level and give agricultural extension support for farmers. This office is responsible for all agricultural aspects of the Woreda. The offices give technical and organizational support for all the irrigation schemes. Agronomic aspects of irrigation are emphasized by this office. Because of low capacity in terms of manpower and budget the required technical and agronomic support for the irrigation schemes are not as expected.

5.5.3. Kebele Administration

It is the lowest government structure which performs all administrative tasks of the Kebele. It follows up the irrigation practices; work with the Kebele irrigators committee, mobilizing the community for irrigation, solve high irrigation conflicts; keep peace and stability in the Kebele.

The Kebele administration facilitates irrigation users meetings; helps the committee during election of the committee executive members and the scheme Qorros. It also watches closely the performance of the Kebele irrigators committee. However, recently the Kebele administration tries to control most of the activities of the Kebele irrigators association and its executive committee. This is not accepted by the committee members and the irrigators in the future this may create some problem on the performance of the schemes.

5.5.4. Kebele Extension Agent

The Kebele extension agent represents the lowest structure of the office of agriculture. Her/his main role is to give agricultural extension support for the Kebele's farmers. She/he gives technical advice to irrigators, demonstrates agronomic practices, facilitates input distribution and access to credit facilities, and give support regarding markets and transport of produces. She/he also participates in all organizational aspects of the irrigation schemes. The extension agents in the two schemes are new and only get six months training on some specialized fields like forestry, animal science, and general agriculture. They lack experience and skill to assist the activities of the irrigators in an improved way. Further training and upgrading is required.

5.5.5. Kebele Irrigation Water Users Committee

The irrigation water committee at Kebele level is elected by the general assembly of all irrigation water users sharing a water source. The water users' general assembly can call off any or all committee members upon incidences of failing to carry out their duties. On the other hand, upon any misdeeds contrary to regulations by individual community member(s), the irrigation management committees usually seek arbitration of the legal system in their respective Kebeles. However, there are no written by laws governing the statuary function and the various regulations of both the committees' responsibilities and the different operational aspects of the irrigation system.

Every 3 years in Gamule irrigation scheme and every four years in Jijolla all irrigators gather in the Kebele administration office with the initiation of the staff to elect the Kebele irrigation users committee executive members and to assign scheme Qorros. The committee has seven executive members with one chairperson, one vice chairperson, one secretary, one finance head, one cashier, and two auditors in Gamule. While in Jijolla the committee has five executive members with one chairperson, one vice chairperson, one secretary, one finance head, and one cashier.

The committee has a formal meeting twice a month and can call a meeting once in a month for all water users

The kebele irrigation committees' members told the researcher about the typical tasks of the irrigation committee in both schemes as:

1. Represent the irrigation community in contacts with government and non-governmental agencies
2. Coordinate with other community institutions and decision-making bodies
3. Ensure efficient and effective overall management of systems:
    - Take up assigned roles and tasks from the irrigators general meetings
    - Ensure equity of water distribution and irrigation management
    - Organize contributions of irrigators such as: sand, stone, and grasses
    - Organize effective organization and management of the schemes in the Kebele
    - Ensure accurate financial management of their resources collected from fines
    - Promote effective use of structures
    - Hold regular committee meetings (usually monthly)
    - Ensure good communication at all levels
    - Provide information and feedback

The working period of the committee is three years in Gamule and four years in Jijolla, if there is default in the activities of the committee the general meetings of the irrigators will solve the problem. The same persons may be elected for several times if they are suitable for the task. The criteria for election are long-term membership, education level, mobilizing skill, commitment,

and trust from the community. Usually males are preferred for this position. This is non paid task with free voluntary service.

5.5.6. Scheme Qorro

The irrigators arrange meetings to nominate a water distributor (Qorro) among them. The nomination of the Qorro is quite rational that someone whom they believe capable and interactive to most of the irrigators is usually nominated once every year. The scheme Qorro is elected by irrigation community through the facilitating role of the committee. The scheme Qorros in Gamule vary from three to five, in Jijolla they are three. Some of the criteria for election are mainly water distribution skill, high experience of irrigation construction and agronomy, high communication skill, strong to travel to all farmers' plots, and fairness to all users of the scheme. Their major responsibilities are to administer proper water scheduling and water distribution on rotational basis, to patrol irrigation fields to check the status of crop water requirements, to identify those irrigators who violate the rules and bring the cases to the committee, and to resolve conflicts that occur among irrigators at field level otherwise bring them to Kebele committee.

5.5.7. Religious Institutions

There are four major religious institutions in both areas, such as: Mekan Iysus, Kale Hiwot, Orthodox christian, and Catholic. Their main role is in conflict resolution and teaching on good working habits. These institutions are active during mobilizing the community for construction and maintenance tasks. Most of the Kebele irrigation committee members are church leaders for instance, the Gamule scheme chair person a priest for the Mekan Iysus church, while the Jijjola scheme chair person is also head of the local Kale hiwot church.

5.5.8. NGOs

In Gamule the only NGO working is Agri- Service Ethiopia, a national NGO established some 35 years ago, which started its work in Amaro Woreda in March 2001. Its intention is to conduct integrated food security programme. The major components of the programme are community training on various topics and skills, agricultural development activities of crop production and animal production, irrigation canal construction, education, health, gender, and natural resource management.

It supports the irrigation community in constructing the scheme canal to be used for agriculture and livestock drinking. The community mentions the roles of this NGO as encouraging. The NGO also works on providing potable water supply for human consumption and has built an elementary school and a heath post.

There is an institution established by this NGO at Woreda and Kebele level, called Community Based Institution (CBI). It is an institution of farmers who are beneficiaries of the NGO programme. The main role of CBI is to mobilize beneficiary farmers to act together in planning, implementing, monitoring, and evaluation of the NGO activities. It has some role in the irrigation scheme, leads the canal construction activity in cooperation with the Kebele irrigation committee and facilitates farmers training.

The role of this NGO in irrigation management is minimal, only participating in canal construction and community training.

In Jijolla there is no NGO active involved in the area. The community always insists the government and near by NGO offices to work with. They are very much interested and eager. They need assistance on the canal construction of the irrigation scheme, especially.

Most of the irrigators (56%) in Gamule did not get any support from the NGO working in the area. 87 percent of the irrigators in Jijolla confirm that they did not get any assistance from

NGOs. Therefore, it can be concluded that the NGO coverage with in these Kebeles is very small.

5.6. Institutional Arrangements Supporting Irrigation Systems

Studies on institutional aspects of irrigation generally focus on rules and regulations regarding operation of systems, questions concerning centralization and decentralization of systems of management, user participation versus state-run system (Wade 1988).

While others added that institutional arrangements which facilitate collective action in small scale irrigation systems (Blank, H.etal in Shemelis 2006:6) as:

- Land tenure and water rights (formal and informal)
- Users organizations and their by laws and enforcement characteristics
- Stakeholders and their relationships in irrigation management (government, farmer's organizations and users).

There are many institutional arrangements may support irrigation systems. However, in the studied areas the major ones are presented below.

5.6.1. Micro Finance

Saving and credit service helps farmers obtain micro finance to improve their irrigation farming. They usually use the money for input purchases such as fertilizer and pesticides, pay for labor, purchase appropriate seed varieties etc. However, in the two schemes there are no formal credit institutions, the only available ones are informal institutions such as individual lenders, friends, relatives, Edir, iqibs, and churches. The credits obtained from these informal institutions require a very high interest repayment which has to be paid back within a short period of time. They are not readily available for every one who needs cash. The amount of money is also too small to bring sound improvement.

The major credit source in the area is credit obtained from relatives, next is from friends. Credit found from individual lenders serves only 10 percent of respondents in Gamule and 8 percent in Jijolla.

Most of the respondents do not want to borrow money, because of fear of being in debt and insecurity about their ability to pay back loans.

In Gamule 44 percent, and in Jijolla 51 percent of the respondents have borrowed money from friends, relatives, and individual lenders. The major reasons to borrow are to purchase livestock, farm implements and inputs; and some for human and livestock medication. They repay their loans by selling livestock, cash crops, and crops respectively. Regarding the saving habit of irrigators the table below shows respondents' saving habits.

Table5. 6: Money Saving Practice of Irrigator's

Money saving pra	**Gamule (%) (n=39)**	**Jijolla (%) (n=39)**
Yes	79.5	87.2
No	20.5	12.8
Total	**100.0**	**100.0**

Source: Household Survey, April 2006

80 percent of respondents in Gamule and 87 percent in Jijolla experienced saving money. Mechanisms of saving are different from other rural areas of such as keeping in house and saving in the bank. However, in Amaro people can save their many giving to theirs iqubs to save for them, or purchase livestock to sell it when cash is needed, lending to others, and entrusting to relatives until they need it. From the table above we can conclude that the saving experiences of farmers are very good and have a good potential for development.

Even if the farmers are poor and lead a subsistence life they have a habit of paying government tax on time. This shows that are committed to develop their area. See table 9 below for the response of the respondents.

Table 5.7 Tax payments of farmers

Tax Payment	Gamule (%) (n=39)	Jijolla (%) (n=39)
Yes	92.3	94.9
No	7.7	5.1
Total	**100.0**	**100.0**

Source: Household Survey, April 2006

92 percent of respondents in Gamule, and 95 of Jijolla respondents pay tax for the government. To pay taxes the irrigators sell crops, livestock, other household assets, and borrow money. Minimum tax payments per year are Birr 10 in Gamule 7 in Jijolla, maximum payment Birr 70 in Gamule, and 50 in Jijolla, with an average of Birr 33 in Gamule 23 in Jijolla. This includes land user fee and income taxes.

5.6.2. Market and Transport

All of the respondents sell their produce by taking it directly to the market. The nearest market for Gamule is the Kelle market, which is at work in every Tuesday and Saturday while for Jijolla it is Jijolla market, which is at work in every Wednesday and Friday. All of the respondents in Gamule transport their produce by carrying while in Jijolla some use pack animals. Regarding the distance of markets to irrigator's plots, see table 10 below.

Table 5.8: Distance of the Nearest Market to Irrigators Plot

	Minimum	Maximum	Mean	Std. Deviation
Gamule (n=39)	1.00	10.00	4.1026	2.03321
Jijolla (n=39)	.5	6.00	2.4615	1.42526

Source: Household Survey, April 2006

The minimum distance of the market to the irrigators plot is 1 km for Gamule, .5 km for Jijolla, maximum is 10 kms for Gamule 6 kms for Jijolla, and the average is 4 kms for Gamule 1.4 for Jijolla.

The irrigators sell their produce by taking negotiating on an individual level. There is no association or cooperative to assist them in marketing. Some of the farmers face marketing problem. The majority of irrigators complain about low prices of their produce, lack of transport, and low demand for produce. The price is very low as it is determined by the consumers, not by irrigators. The major consumers of irrigation produce are local merchants and individual users. Some local merchants take the produce outside Amaro Woreda.

5.6.3. Research and Extension

Institutional actors that are mentioned above are expecting to support the irrigators in aspects of research and extension. Encouraging farmer's participatory research is one area. The government and non-governmental actors have to intervene on research about the basic aspects of small scale irrigation. Some of them could work on technical or engineering aspect, others on agronomic aspect, institutional and management aspect also needs research. However, in the localities there are no institutions working in this regard. A little effort is exerted by the local NGO, Agri-service Ethiopia in Gamule to organize the so called innovative farmers to conduct participatory research with professional researchers it is a good start but it is not as intensive as expected.

All respondents synonymously indicated that there is no any relationship with research organizations. Only one respondent told us that he has relationship with researchers working on tse tse-fly control.

Farmers also need to get extension service. In Gamule there are four extension agents, 3 of them working for the office of agriculture with a background in general agriculture, livestock, and forestry fields respectively, while one extension agent is working for the local NGO, mainly concentrating on community training. In Jijolla there are three extension agents of the Woreda

office of agriculture. Even if, the number of extension agents seems enough, their service to the farmers is not adequate. See table 11 for the respondent's response below:

Table 5.9: Individual Irrigator's Response about ever been visited by an Extension Agent

Visited by Ext Agent	Gamule (%) (n=39)	Jijolla (%) (n=39)
Yes	43.6	51.3
No	56.4	48.7
Total	**100.0**	**100.0**

Source: Household Survey, April 2006

Only 44 percent of respondents have access to extension services in Gamule, while have access 51 percent in Jijolla. Most of them get assistance of the agents during land preparation stage, and some of them during pest infestation periods. In general there is no frequent visit by extension agents.

The NGO extension agent in Gamule cooperates with some farmers during field days, on farm demonstration, input provision, and training.

Most of the respondents (44% in Gamule and 64% in Jijjola) reported that they require scheme capacity development support from other actors.

5.6.4. Tenure and Property Rights

Tenure in this study refers "the terms and conditions on which land, water and other natural resources are held and used, while property rights are set of rights and obligations governing the access of an individual or group to the stream of benefits which can be derived from a resource" (IFAD, 1995:3). It is well known that most important incentives for gaining adequate benefit

from irrigation are clear and recognized collective and individual rights over water, land, and infrastructure.

According to discussions held with key informants and focus group participants the following most important rights were identified:

- The right to establish an association or committee to manage the irrigation system
- The right to use, both on individual farms and for the irrigation system as a whole, a certain amount or share of water of an acceptable quality and quantity;
- The right to cultivate land and choose what crops to plant, with collective protection against conversion of irrigated land to other uses;
- The right to use, repair, and improve irrigation infrastructure;
- The right to determine what irrigation services will be provided and by whom;
- The right of the committee to adopt rules, by laws, irrigation service plans, and budgets;
- The right of the committee to establish, collect, and reinvest the irrigation service fee (without having to transmit the funds to the government);
- The right of the committee to assign penalties, settles disputes, and obtains legal support.
- The right of the committee to give consent to or refuse external assistance; and
- The right of the committee to maintain representation in a higher-level or Woreda level.

However, when we consider the situation of property rights in the studied schemes there are no clear property right laws they are only customary. The above rights are implemented in the area only by common sense, there is nothing legally or formally bind users in support of these rights.

Regarding the land tenure, it is a national issue where land is owned by the government to be distributed to farmers freely. However, in the studied area there are other aspects of land tenure which are informally performed by farmers these are buying/selling, hiring, or inheriting land.

drainage. This affects the irrigators not to produce cereals and vegetables. They prefer to use the available small water for permanent crops.

2. **High number of irrigators**: in the area, the irrigation water usage right is open for any body that has farm land in the irrigable area. This is positive in one side regarding the rights of farmers, but it affects the proper utilization of the available water and land resources. There is usually non-economical or less efficient utilization of these resources.
3. **Fragmented land plot**: Even if the average land holding of irrigation land of the area is about 0.7 ha, which may be enough for a household, this is further fragmented into various plot sizes which makes it very small to utilize the water optimally.
4. **No formal and legal water users association**: the existing irrigator's water use committee is not formally and legally registered by the concerned government organization. It can not legally represent the irrigators in all aspects of irrigation management. It is customary and voluntary association, no salary or payment for leaders, and there is usually poor accountability for committee members. The committee members lack skills and capacity to enlarge the activities of the irrigation system.
5. **Low water use efficiency**: According to the Woreda office of agriculture estimate, nearly 83 percent of the irrigation water is lost due to inefficient conveyance and application techniques of the existing system. There is extremely poor water use efficiency of the farmers as they are applying water for their crops through simple flooding of the fields. Most of the water is also lost due to transpiration.
6. **Lack of skill of irrigators**: Most of the irrigators learn agriculture through practice and some skill transfer from their fathers. There is no training arranged for farmers. Almost all of them lack basic skills to cultivate their irrigation field properly.
7. **Poor cropping pattern**: Due to water shortage and lack of skill the farmers cultivate only permanent crops in their irrigation plots such as Enset, and Coffee. Farmers give less priority for cereal crops; however, according to the reports of the Woreda office of agriculture there are obvious indications that the overall size and productivity levels of the existing irrigated fields have good potential in terms of the vast land and its suitability for diversity of crops and cropping pattern.

The irrigators try to manage these internal constraints by using their local resources, cultivating permanent cash crops such as Enset, Coffee, Cassava, and Chat. The irrigators share experience among them selves and attentively follow the recommendations of the scheme Qorros and the irrigation committee.

In addition to these common challenges particular problems in Jijolla are the following:

1. The embankments constructed across the main stream cannot resist the peak flow of the runoff during rainy seasons.
2. Seepage problem at the collection chamber, diversion points and along the diversion canals, significantly reduce the amount of water supposed to reach the fields
3. Small size of the structures to store the required amount of water it is also another constraint that limits the magnitude of water application and causes frequent breakage of the structures.

5.7.2. External Challenges

These are challenges imposed by external agents, and shall be solved by the assistance of external institutions. The irrigators mentioned many external challenges. Some of them in their priority order are described below:

1. **Low agricultural extension service and research support:** in these irrigation systems there is a need to have agricultural services to improve the traditional practices exercised by farmers, among others training on water use efficiency, how to build low cost irrigation structures management of major irrigation decisions, improvement in communication, conflict reduction, improving resource mobilization skills, knowledge to improve farming inputs, cropping pattern are required. Improving the production, marketing, and transportation practices are also needed. Research support on the experience of traditional irrigation potentials and constraints could be performed.

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ABSTRACT

To institute meaningful preventive measures for the control of HIV/AIDS, there is need for an insight about the sexual behavior and knowledge of HIV/AIDS of the adolescent population, who form a significant proportion of at risk-group. A study of the sexual behavior and knowledge of HIV/AIDS and other STIs, using questionnaire, FGD, and key informant interviews, among 1000 randomly selected school adolescents aged 15 to 19 years was carried out in Hulet Ejju Enesie District of East Gojjam, Amhara Region, Ethiopia.

About 97% of the study population was aware of AIDS and other STIs, while 91.5% rightly knew that AIDS could be transmitted through sexual intercourse. Similarly, more than 80% of the respondents believed abstaining from sex, stay faithful to one partner, and consistent and correct use of condoms could enable to avoid HIV-infection.

Overall, 40.2% of adolescents had already had first sexual experience but more males than females reported having experienced first sexual encounter. The mean age of sexual commencement was 15.92 years. Females (mean age of sexual commencement of 15.56 years) become sexually experienced earlier than males (16.04 years), Majority of adolescents (60.4%) did not use any contraceptive methods during their first sexual debut. Among the sexually experienced adolescents, 46% of them practiced sexual intercourse with multiple partners (mean number of sexual partners = 2). About 66% of adolescents did not perceive the risk of contracting STIs, including AIDS, though only 11.4% of them used condoms consistently during sexual intercourse. Age, peer behavior influence and parent (father)-adolescent discussion about sexuality were found significant predictors of adolescents' sexual experience.

There noticed a wide gap between knowledge, and use of preventive methods of HIV/AIDS. Reproductive health, and effective IEC programmes to intensify efforts towards improving adolescents' perception of risky sexual behaviors and motivate them to undertake behaviors and sexual values that would limit such risks are recommended.

CHAPTER ONE

INTRODUCTION

1.1. Background

The Human Immune-deficiency virus (HIV) causing Acquired Immune Deficiency syndrome (AIDS) was first recognized in sub-Saharan Africa in Rakai District of Uganda among fishermen and traders and their families in 1982 (Serwadda, D. Et al., 1985, cited in Ntozi, M. and Kirunga, C., 1998). Over the last fifteen years or so the disease has spread over the whole world but particularly rapidly in sub-Saharan African Countries.

The spread of HIV/AIDS in Africa has been devastating, having reached pandemic proportions in most parts of the continent. As of December 2002, an estimated of 42 million people were living with HIV/AIDS in the world, 29.4 million (69%) of these being from sub-Saharan Africa. Moreover, 70% of the new HIV infections in the world during the same period were from the above-mentioned region. Prevalence of HIV/AIDS among 15-49 years old adults was the highest in sub-Saharan Africa (9%) (Keeling, P., 2003).

In 2004, 3.1 million people have dead of AIDS in the world. The most recent estimates show that, in 2004 alone, 4.9 million people were newly infected with HIV (UNAIDS/WHO, 2004).

Rates of HIV infection are still increasing in many countries in sub Saharan Africa. The most recent estimates showed that 3.1 million people, in this region, were infected in 2004. This means that there are now an estimated 25.4 million people living with HIV/AIDS (Ibid).

The rates of HIV prevalence are highest in some Sub Saharan African countries. In Botswana, for instance, some 37.3 percent of the adults are living with HIV in 2004, which makes the country the second highest in the world after Swaziland (about 38 percent) in HIV/AIDS prevalence. In Botswana, life expectancy is only 39 years, while it would have been 72 years, if it were not AIDS (UNAIDS, 2004).

According to the same source, the Republic of South Africa, with a total of 5.3 million (21.5 percent) infected people, has the largest number of peoole living with HIV/AIDS in the world.

In Ethiopia, the HIV/AIDS situation has evolved from two reported AIDS cases in 1986 to a cumulative total of 147,000 by mid – 2003 but the vast majority are unreported. It is currently estimated that 1.6 million people are living with HIV/AIDS. The number of new AIDS cases is estimated to increases from 122,697 in 2003 to 177,232 in the year 2008 (MOH, 2004). The same source also indicated that the current estimated adult HIV prevalence at national level is 4.7% (12.5% for urban and 3.0% for rural).

On regional levels, the Amhara region is one of the regions with highest HIV/AIDS prevalence. In the region, it is currently estimated that 626,834 people are living with HIV/AIDS. This figure is estimated to reach 758,248 by the year 2008. The regional adult HIV prevalence is 6.7% (15.5% for urban and 5.6% for rural) and it is estimated to be 7.3%, 15.6%, and 6.2% for regional, urban and rural areas respectively in the year 2008 (Ibid). In the region, the urban epidemic seems to be stabilizing after around 1996/97, whereas the rural epidemic shows a rising trend, thus the total regional trend is increasing.

Results of the analysis of surveillance data revealed that prevalence decreases with age. At age 15 to 24 years have the highest mean HIV prevalence. Prevalence in the age group 15 to 24 years represent "recent" infections and hence demands attention (MOH, 2002; 2004). The same source indicated that the peak ages for AIDS cases are 25 to 29 years for both males and females. Given that the average incubation period between the time of infection and the time of emergence of full blown disease is about eight years, the mean age at which people become infected must be 15 to 24 years for females and 25 to 34 years for males. The MOH also documented that the number of females infected between 15 to 19 years are much higher than the number of males in the same age group. The discrepancy may be attributed to earlier sexual activity among young females and the fact that they often have older partners.

Heterosexual contact is the most common form of HIV transmission in Ethiopia (MOH, 2002; 2003). Adolescence is a period of life that has come to regarded as a period of intense sexual derive, sexual and drug experimentation. Adolescents are, therefore, a vulnerable group at risk of contracting HIV/AIDS (Unuigbe I. et al., 1999). In some African countries up to 60% of all new HIV cases occur among 15-24 years old (World Bank, 2004).

1.2 Statement of the Problem

AIDS has been called a disease of behavior (AIDSCAP, 2000). If people avoided risky sexual behaviors – by using condoms or abstaining from sex except in monogamous relationships, they could avoid contracting HIV/AIDS.

Transmission of HIV/AIDS through homosexual and heterosexual intercourse accounts for 86 percent of all cases worldwide (Gncalves, F., 1994; cited in Ntozi, M. and Kirunga, C., 1998). In Sub Saharan African, the epidemic is spread mostly through heterosexual intercourse (UN/WHO, 1991; Cited in Ntozi, M. and Kirunga, C., 1998). In Ethiopia, heterosexual intercourse is the most common form of HIV transmission (MOH, 2003; 2004).

Therefore, studies on sexual behavior of the sexually active population in general and the adolescent in particular are very crucial in designing, implementing and monitoring effective adolescent friendly intervention programs, targeted in behavioral changes that enable to prevent/reduce HIV/AIDS infection. Investigating the level of knowledge about HIV/AIDS and other STIs is also equally important. From a theoretical standpoint, knowledge can be used as a form of self-empowerment. According to the AIDS Risk Reduction Model, knowledge of AIDS is necessary to recognize one's behavior as high risk and then to take action to change that behavior (Catania et al., 1997, cited in IFPP, 2003). This knowledge may, therefore, influence the degree to which persons acknowledge their behavior as risky and the types of precautions they take to reduce their risk (IFPP, 2003).

However, such studies in Ethiopia, particularly in Amhara region are limited and insufficient. The few available research works mainly address the urban adolescents only, nearly neglecting the rural adolescents where the HIV/AIDS prevalence is on a rising trend.

In light of the above consideration, this research has tried to study the sexual behavior of school adolescents, their knowledge about HIV/AIDS and other STIs, and other factors related to adolescent sexuality in Hulet Ejju Ensie district of Amhara region, with is typical representative of rural settings in the region. The study has tried to determine the extent to which pre-marital sex; multiple sexual partners and other risky sexual behavior are performed by the school adolescents.

1.3 The Rationale

The problem and the study site are selected based on the following rationale;

1. In Ethiopia knowledge of adolescent sexual behavior as well as their knowledge regarding HIV/AIDS and other STIs at micro level in general and rural settings in particular is insufficient. However, such knowledge is very essential in designing and implementing site specific, local area sensitive intervention programs.
2. The Researcher's deep knowledge and experience of the study area also initiated to conduct a research on adolescent sexuality and knowledge of STIs and HIV/AIDS.
3. The researcher's good relationship with the school community and the district administration body also facilitated data collection processes.

1.4 Objectives of the study

General objectives

The general objective of the study is to provide an insight into the sexual behavior of school adolescents, and their knowledge of HIV/AIDS and other STIs in Hulet Ejju Enesie district. Ultimately, the study supplies information on what intervention mechanisms are effective in protecting school adolescents from HIV/AIDS infection.

Specific objectives

1. To describe the socio-demographic characteristics of school adolescents
2. To investigate the sexual behavior of school adolescents
3. To assess the level of knowledge of HIV/AIDS and others STIs
4. To examine adolescents' perception of their sexual behavior
5. To examine the factors affecting the sexual behavior of school adolescents.

1.5 Research Hypotheses

To achieve the stated objectives, the study made use of the following hypotheses as a research guide:

1. Adolescents who have sexually experienced friends/peers are more likely sexually experienced
2. Adolescents who have had discussion with their fathers about sexual issues are less likely sexually experienced.
3. More of the males than the females have knowledge of HIV/AIDS
4. Adolescents' perception of their risky sexual behavior differs by their religion

1.6 Significance of the study

Knowledge about the sexual behavior of school adolescents as well as their knowledge of HIV/AIDS and other STIs is important in designing, implementing and monitoring intervention programs against the spread of HIV/AIDS and other adolescent reproductive health matters; especially in targeting district adolescents at school.

However, the few available research findings of such issue are aggregate at macro level. Thus, the findings of this research is expected to contribute a little to fill the gap in understanding the sexual behavior of school adolescents in the mentioned district. Besides, researchers, organizations (government, local and international NGOs, etc.) and others who are interested to work on adolescent sexual and reproductive health in general and on HIV/AIDS prevention and control in particular would benefit from the findings of this research. It may also serve as a base line data for further works.

1981

1.7 Review of Related Literature

The first cases of AIDS were described in homosexuals in the United States in 1981. Later reports showed that HIV could affect other segments of the population through different modes of transmission. The Human Immune deficiency virus (HIV), that causes AIDS, found in large numbers of body fluids especially in blood, semen, fluid from the female genitalia and breast milk (MOH, 2003). The same source stated that there are three major modes of HIV transmission from infected person to another. These are: unprotected sexual intercourse with infected person; mother to child transmission; and transmission through blood and blood products. Of the three, heterosexual intercourse is the predominant and increasing mode of HIV transmission worldwide.

Because most HIV infections are the result of heterosexual intercourse, the disease tends to affect people in age group that is broadly defined as "sexually active" between 15 to 49 years (also this is not to say there are no infections below and above this age range) (MOH, 2003; UNAIDS, 2004).

The significance of this epidemiological characteristics is that the age group susceptible to infection is also the most economically and socially active. Under normal circumstances, people in this age group are also least likely to be ill/die. The issue of social and economic impact of the HIV/AIDS epidemic stem from unusual rates of severe illness and premature death that is produced in this age group.

There is no cure or vaccine for HIV/AIDS, currently. However, there are treatments, which include the following:

TOI

- **Treatment of opportunistic infections**: all infections should be treated promptly and aggressively because a simple problem can cause life threatening situations;

POI

- **Prevention of opportunistic infection (prophylaxis)**: preventing of opportunistic infection with HIV/ infection entails measures to prevent exposure to opportunistic microorganism in the environment; and

- **Anti retroviral therapies**: these are drugs, by slowing the ability of the virus to make copies of itself, can enable to lengthen some people's lives by a few months or years. However, they are unable to get rid of HIV and cure a person of HIV disease. The medicines have to be taken for life (MOH, 2003).

In the absence of effective vaccines, the only preventive strategy that is likely to work is the one that aims at changing human behavior. Thus, the key to this end is information, education and communication (IEC). IEC related to STIs, including HIV/AIDS is addressing cultural and behavioral issues that tend to favour indiscriminate sexual behavior. Old values such as religious interdiction of adultery and fornication could be invoked by religious leaders (Ayana and Melaku, 1998).

1.7.1 The Adolescent and HIV/AIDS

Today's adolescents are the AIDS generation. They have never known a world without HIV. Millions already have died yet the HIV/AIDS epidemic among adolescents' remains largely invisible to adults and to adolescents themselves. Stopping HIV/AIDS requires comprehensive strategies that focus on adolescents (Kiragu, 2001). Because most HIV infections occur during adolescence, focusing on them appears to be a crucial strategy (Ibid).

Another reason to focus prevention efforts on adolescents is that HIV-positive adolescents, because they were recently infected, are highly infectious. HIV is most infectious when viral loads in the blood are high, resulting in HIV shedding in many body fluids. Normally, there are two such periods: The first period, the primary infection, occurs immediately after HIV infection and lasts only a few months. The second period is at the end, when HIV infection progresses to AIDS (Anderson, 1996; Cates et. al., 1997; Royce et al., 1997). Because adolescents are likely to have been recently infected, many are at the primary, most infectious stage, where behavior change could be especially effective at reducing further HIV transmission (Cates, et al., 1997; Royce et al., 1997).

Adolescents are at greater risk of HIV/AIDS, with substantial gender disparity. The risk of becoming infected with HIV during unprotected sex is two to four times greater for a woman than a man (Ainsworth and Over, 1997; UNAIDS, 1999). Male to female transmission is more likely because during vaginal intercourse a woman has a larger surface area of her genital tract exposed to her partner's sexual sections than does a man. Also, HIV concentration is generally higher in a man's semen than in a woman's sexual secretion (Laurence, 1999).

Adolescent women are at even greater risk than adult women. The vagina and cervix of adolescent women are less mature and less resistant to HIV and other STIs. Changes in the reproductive tract during puberty make the tissue more susceptible to penetration by HIV. Also, hormonal changes associated with the menstrual cycle often are accompanied by a thinning of the mucus plug, the protective sealant covering the cervix. Such thinning can allow HIV to pass more easily. Adolescent women produce only scant vaginal secretions, providing little barrier to HIV transmission (Berman, S. and Hein, K., 1999; Iversen, 1999; Inversen et al., 1999; Moscicki et al., 2001). For unknown reasons, women get sicker at a lower viral load than men (US,OAR et al., 2000).

In order to have an effective HIV/AIDS prevention and control strategy there is a need to have more information on adolescent behavior and their sexuality.

1.7.2 The Adolescent Behavior and Sexuality

There is no universally accepted definition of adolescence. Most societies define the beginning of adolescence as coinciding with the on set of puberty. However, the time when adolescence ends and adult status commences is usually socially oriented and therefore differs widely among cultures (Pathfinder, 1999; MOH, 1995; Eshetu and Ayana, 1998). Despite these cultural differences, there is a general consensus that the age between the end of childhood and the on set of being an adult is being regarded as adolescent period (Yemane, 1994; pathfinder, 2002).

The period of adolescence is composed of a series of phases (stages) rather than one homogenous stage. Accordingly, distinctions are made among early adolescence, which covers the period from age 10 through age 13, middle adolescence, from 14 through age 16, and late adolescence, from age 17 through age 19 (Pathfinder, 2002).

Adolescence is a period of transition, when a young person experiences physical, psychological and social changes. It is a period of unpredictable behavior (Earl, 1995; Petersen and Crocke, 1986; Turner et al., 1989). Because their social, emotional and psychological development is incomplete, they tend to experiment with risky behavior, often with little awareness of the danger. In fact, risky sexual behavior is part of a larger pattern of adolescent behavior, including alcohol and drug use, delinquency, and challenging authority (Ensminger, 1987). Lacking the judgment that comes with experience, adolescents often cannot appreciate the adverse consequences of their action (Kiragu, 2001).

Sexual practice among adolescents often attracts wide spread attention and usually disapproval. Policies toward young people reflect the view that sexual activity should not occur before marriage. Pre-marital sexual experience has become more common, however, as the age at first marriage has risen and the age at puberty has fallen (Graham et al., 2000; Negussie, 1998).

A number of health surveys undertaken in developing countries have indicated that most of the adolescents are sexually active. Sexual initiation among adolescents in sub-Saharan Africa starts early. For instance, age at first sexual experience averages 16 years for females in Ethiopia, 16 years for females and 17 years for males in Uganda, 17 years for both sexes in Tanzania and 16 years for Kenyan adolescents (Pathfinder, 1999).

The same source also indicated that pre-marital sexual activity is universally taboo in the region (Sub-Sahara Africa), but the practice is very different from this. A wide variation in the proportion of adolescent women who become sexually active before

marriage exists from country to country, ranging from 5% in Niger to 60% in Kenya. As age at marriage rises, so do the rates of pre-marital sexual activity. In two-thirds of the sub-Saharan Africa surveyed by DHS, over 25% unmarried adolescent women aged 15-19 reported that they are sexually active. Unfortunately, evidence suggests that many adolescents are not using contraceptives (including condoms) to prevent pregnancy during this gap between first sexual experience and marriage which put them at risk of contracting STIs, including HIV/AIDS.

UNFPA (1998) also documented that Africa is facing a crisis among its young people: the great and growing prevalence of unprotected, unguided, and uninformed adolescent sexual activity. The well-being of these adolescents is being threatened by the alarming increase in the number of dependents and children; the wild fire of the AIDS pandemic; the suffering of young women who are maimed or killed by unsafe abortions; and the growing number of unwed mothers and the breakdown of traditional families.

In Ethiopia, there are few pockets and scattered studies, mainly on urban areas, about adolescent sexual behavior. A study carried out by shabbier I. et al (1997) showed that over one third of kola Diba school students had experienced sex, and the mean age of sexual commencement was 16.4 years. Females become sexually active earlier than boys. The study also indicated that urban students had earlier sex (15.9 years) compared to their rural (17 years) counter parts.

A survey undertaken by Family Guidance Association of Ethiopia (FGAE) (1998) on knowledge, attitude, and practice of sexuality and reproductive health among Jimma youth indicated that 32% of the youth said they had had intercourse (46% for males and 20% for females). In Jimma religious affiliation of the youth appeared to play a role in their level of sexual activity. The proportion of sexual active females among Muslims was 9.7% followed by protestants (18.2%) and orthodox Christians 23.9%. Whereas, the level of sexual activity among male Muslims (45.5%) is lower by 1.7 percentage points than Orthodox Christians. Generally the findings showed that those

who affiliated with orthodox Christian are prone to premarital sexual activity than the followers of other religions, though not significant.

- Another research conducted by Solomon (1990) on Addis Ababa high school students showed that the age of first sex range between 12 and 18 years and 70.5% had first sex between the age of 14 and 16. A similar study by Hailue (1997) on Harar town adolescents indicated that about 50% adolescents had their first sexual experience at age of 15 to 17 years.

An interesting study by Gage (1998) conducted on Kenyan adolescents documented appreciable results regarding how adolescents perceive and decide sexual intercourse. It is put forward that decisions about sex appears to derive from insufficient knowledge and misconception rather than from a rational consideration of alternatives and consequences of sexual behavior. The study revealed that many adolescents in Kenya believed that they could avoid pregnancy by such measures as washing their genitals after intercourse, jumping up and down after sex, and having sex standing up.

Sexual partner

Type and numbers of sexual partner has also a significant role in HIV/AIDS transmission. Many studies done on sexual behavior revealed that a number of people have sexual experience with more than two persons in their lifetime. For example, among Ekiti people around half of the males and about a quarter of the females had ten or more partners. In free town, it was also found that 29.3% of men have had more than eight sexual partners, which is the mean number for the entire population (O. Adegboha, 1995; cited in Samson, 1997). In Ethiopia, 70% of girls and 55% of the boys have reported to have 2 to 5 persons in Addis Ababa high school (Solomon, 1990).

- Another study on Nigerian adolescents also revealed that adolescents practice multiple sexual partners. It is found that most of them experience with more than one partner (Sunmola, A. et al., 2003).

1.7.3 Adolescents and condom use

Condom knowledge and use play an important role in preventing the transmission of HIV/AIDS and other STIs. Family planning communication and social marketing campaigns often promote the dual role of condoms in preventing pregnancy and avoiding STIs (Harvey, 1998).

When used correctly, condoms prevent HIV infection. Laboratory tests show that no STI organism, including HIV, can pass through an intact synthetic condom. In fact, a condom protects against any STI that is passed through bodily fluids (Osmond, 1998).

Studies that evaluated condom effectiveness among heterosexual couples showed that consistent condom use protected against HIV. The most convincing evidence comes from studies of couples in which one partner is infected with HIV and the other is not. Such studies have found low risks of HIV transmission among consistent condom users (i.e. less than 1% per year) (Saracco, A. et al., 1996).

Any sexually active person-whether married or not should use condoms to avoid STIs unless that person and his or her sex partner are not infected and have no other partners.

- Young people today are marrying later than in older generations but are starting sex just as early. Few adolescents use condoms the first time they have sex, despite the risks. Adolescents often do not consider the long-term consequences of current actions, and they take more risks, thinking "it can't happen to me" (Gardner, R. et al., 1999). This thinking puts adolescents at a greater risk of contracting HIV/AIDS than other segment of the population.

- Studies on sexual behavior of adolescents indicated that condom use among adolescents is low. A study conducted on the three Ghanaian towns adolescents for example indicated that 50% of the adolescents reported condom use in their recent sexual practice (Glover, E.K., 2003). But another research conducted with a nationally representative data of Ghanaian adolescents' revealed 24% males and 20% of females

reported consistent condom use in their recent sexual experience (Karim, A.M., 2003). The Ethiopian DHS 2000 also indicated low condom use. 13% of women and 30% men reported condom use with a non-cohabiting partner at last sexual intercourse (CSA and ORC Macro, 2001).

Many people who are actually at risk of contracting HIV/AIDS or other STI think that they face little risk and thus have little motivation to use condoms (Dolezal, C., 1996). It is unlikely that all sexually active people will always use condoms when need. Powerful social norms encourage men to take sexual risks, such as visiting commercial sex workers, and at the same time discourage condom use. Traditional gender roles keep women from talking about sex or asking for condoms. There are other obstacles to condom use. Some people know little about condoms, dislike them, cannot afford them or cannot obtain them easily.

In the era of AIDS adolescents need guidance, encouragement, and access to condoms. Yet they often face providers belief that adolescents should not be sexually active and thus do not deserve services (Donovan, P., 1998). Adolescents are more likely to use condoms when they think others do, too. Often, however, condoms suffer from a poor image and negative attitudes. In some places condoms suffer from an image problem. Some people have a negative view of condoms because of personal experiences with them, but more often the problem is bad reputation, false rumors and myths (Ali, K.A., 1996; Ankrah, E.M. and Atika, S.A., 1997; Glover, E.K., 2003). People often associate condoms with unclealiness, illicit sex, infidelity, and immoral behavior (AIDSCAP, 1997, and Ankrah, E.M, and Attika, S.A., 1997).

In general, the above-mentioned evidences indicated that adolescent sexual activity is becoming common but condom use among adolescents is negligible.

1.7.4 Knowledge of HIV/AIDS and other STIs

AIDS has been called a disease of behavior (AIDSCAP, 2000). If people avoided risky sexual behavior-by using condoms or abstaining from sex except within a monogamous relationship they could avoid contracting STIs such as AIDS.

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AIDS is an incurable anti-immune disease, which results from infection with HIV. A special protein called CD4 marks the outsides of some immune system cells, making them different from other immune cells. These controller cells, which are also a type of lymphocyte have been tagged CD4. It is the CD4 cell that are attacked and destroyed by HIV. Thus, throwing the immune system in-to complete destruction and rendering it unable to respond to attacks by various invading organisms (MOH, 2003).

Knowledge of HIV/AIDS and other STIs can be expressed through: knowledge on the mode of transmission of the disease; its symptoms; its effects; behaviors that increase the risk of contracting them; preventive methods (ways); and the relationship between HIV/AIDS and other STIs.

Knowledge of HIV/AIDS: In Ethiopia, knowledge of HIV/AIDS is very high (CSA and ORC Macro, 2001). This knowledge level about HIV/AIDS, however, does not necessarily imply that there is a deep routed knowledge about the disease and brought attitudinal and behavioral changes. In relation to this FGAE (2001) stated that despite high knowledge level on HIV/AIDS, only 62.7% of knowledgeable youth perceived that a healthy looking person could have the HIV. The same source indicated that, according to the reports of AIDS cases submitted to the MOH, 87% of new infections are due to the practice of multiple partner sexual contact. This is an indication that though there is high level of knowledge about HIV/AIDS, risk behaviors are still continued to be practiced by the youth.

Of course, for a healthy behavioral change the presence of knowledge is not enough. Fee, N., and Yossef, M. (1993) identified four prerequisites as a key to health behavioral changes:

1. Building knowledge: Basic knowledge is necessary although this alone is not sufficient for behavioral change.
2. Perception of risk: A major component in motivating behavioral change is to have youth develop the perception that certain behaviors put them at risk.
3. Perception of norms: It is necessary that young people see the desired behavior as acceptable and are convinced that others like them have adopted or are planning to adopt a particular behavior (like postponing sex or using a condom).

4. Feeling of self-efficacy/self-esteem: To be able to change behavior young people need to have confidence, self esteem and the belief that they can determine or change their behavior.

Others also said that reconciling the paradox presented when knowledge does not translate into logical behavioral outcomes can be difficult and frustrating. According to research findings, factors other than knowledge have been identified that are likely to influence preventive health behavior adoption.

To this end, Becker, M.H. (1974)'s Health Belief Model (HBM) and other models are worthwhile to be considered. According to Becker (1974, Cited in ETR, 2003), changes in behavior depend on five factors:

1. **Perceived susceptibility**-this is the belief that one can get a problem (example, HIV/AIDS, STIs, pregnancy problems).
2. **Perceived severity**- one believes that a health problem is serious (example, the consequences of getting STIs, or HIV, or creating a pregnancy are significant enough to try to avoid).
3. **Perceived benefits**-the belief that changing one's behavior will reduce threats (susceptibility) (example, using condoms would protect one from getting STIs or HIV, or creating a pregnancy).
4. **Perceived barriers**-a perception of the obstacles to changing one's behavior (example, using condoms; one may felt too embarrassed to talk his/her partner about using condom).
5. **Self-efficacy**- the belief that one has the ability to change one's behavior.

From the above discussions made, knowledge of HIV/AIDS is not the sole factor for health behavioral change; rather a number of factors are responsible for health behavioral changes that should be given a due attention in HIV/AIDS prevention and control activities.

Knowledge of other STIs and their relationship with HIV/AIDS: There are a number of STIs. However, the well-known STIs are syphilis, gonorrhoea, chancroid, chlamydia, and Trichomoniasis (Yemane, 1994).

HIV/AIDS and other STIs are related in the following manners: both share the same route of transmission; the behavior that puts a person at risk of contracting STI (unprotected sexual contact) puts the same person at risk of contracting HIV infection; a person who has STI with ulcer (open skin) make it easier for HIV to be transmitted to other person; a person who has a weakened immune system due to HIV infection has increased susceptibility to contracting STI, and STI prevention measures reduce the transmission of HIV (MOH, 2003).

Having another STI both make HIV positive persons more infectious and make HIV negative persons more susceptible to infection. Some STIs increase the replication of HIV (Iversen, A., 2002).

The Ethiopian DHS assessed the level of knowledge of the signs and symptoms of STIS among both men and women. It is found that 37% of women and 19% of men had no knowledge of STIs. Lack of knowledge is especially high among the very young (15-19 years old), those who have never married and never had sex, and rural residents (CSA and ORC Macro, 2001). This could be a potential risk factor for the transmission of HIV/AIDS.

1.8 Analytical Framework

In examining the sexual behavior and knowledge of HIV/AIDS of school adolescents, in this study, the socio-demographic characteristics of respondents, family background factors, and peer behavior influence are independent variables. Sexual behavior, and perception on sexual behavior are dependent variables for the analysis.

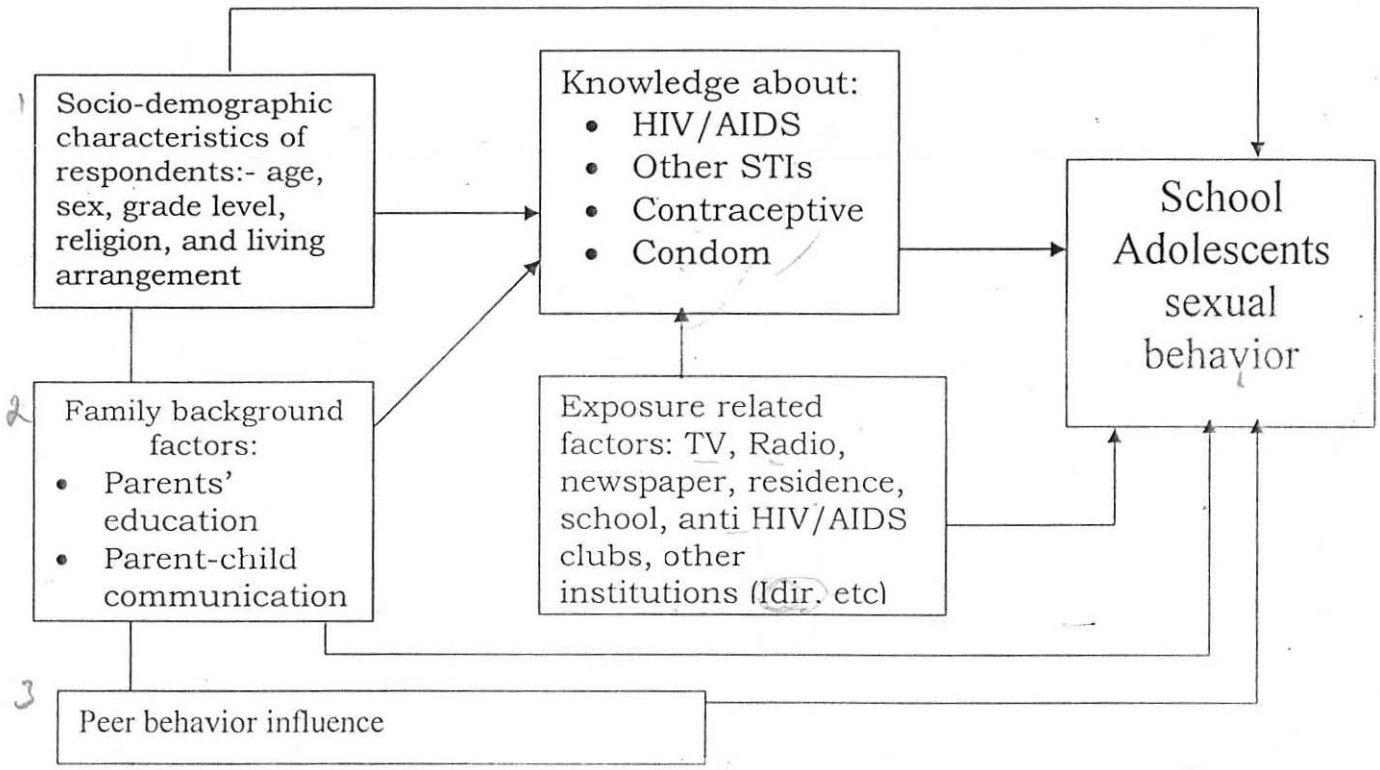

Figure 1.1 Analytical frameworks for the study of the sexual behavior and knowledge of HIV/AIDS among school adolescents *

* = Developed by the author based on relevant literature

1.9 Working Definitions

Adolescence: is typically the period between 10 and 19 years of age (Araoye, M.o, and Fakeye, O.O., 1998). In this study, however, the period between 15-19 years is referred to as adolescence.

Sexual behavior: refers to all those activities and behaviors that produce sexual excitation. It includes solidarity activity (like masturbation) and interpersonal activities, such as kissing, touching, sexual intercourse or oral genital stimulation (Steinberg, L., 1989). However, in this study sexual behavior is limited to the investigation of issues related to sexual intercourse; and also refers to the number of sexual partners within a specified time period, use of contraceptive methods, and the age at which sexual activity commenced.

Sexual intercourse: refers to only heterosexual vaginal penetration.

Sexually experienced: refers to ever having sexual intercourse.

Sexually active: this describes adolescents who had sex at least once within the preceding four weeks.

Risky sexual behavior: is sexual intercourse without regular use of condom.

CHAPTER TWO

DATA SOURCES AND SURVEY METHODOLOGY

2.1 The study area and target population

The study area, Hulet Ejju Enesie district, is located in East Gojjam Zone, Amhara region. It is one of the 15 districts found in the Zone. Currently, the population of the study area is estimated at 279,484, which makes the district the most populous in the Zone; accounts for 12% of the zonal population. Out of the total population of the district 30,063 (10.8%) are adolescents aged 15-19 years (Bureau of Finance and Economic Development, 2004). The district has 40 primaries, one secondary and preparatory school, and one middle level technical and vocational training center; these host more than 40,000 students (District education office, 2004).

Based on the nature and purpose of the research problem, there is a need to define the target population ahead. The target population of the study is the school adolescent aged 15-19. The size of these adolescents is 4,584 (District-education office, 2004).

2.2 Data Sources

Primary data is used for this study. The data for the study was collected through the following instruments:

- **Administering survey questionnaire:** A well – organized and structured questionnaire was prepared in English language and then translated into Amharic language. The questionnaire was pre-coded and pre-tested on 30 high school students and minor amendments were made. Orientation was given to the respondents about the general objective of the study; ethical consideration; and matters of confidentiality and anonymity. At last, the questionnaire was self administered to the respondents.
- **FOCUS Group Discussion (FGD):** To verify, build on and add in-depth to the result of the questionnaire survey, FGD was held with selected volunteer students. Three FGDs were conducted. Each FGDs consisted in 10 volunteer

students selected from the questionnaire respondents. One of the FGD was the female student group (this group discussion was not taped to keep the participants interest). The FGD was taped (except the female group), transcribed and used in the analysis.

- The researcher, together with the assistant and supervisors, presented various open-ended questions to the participants, which enabled them to express their perception and feelings regarding the subject under investigation.
- **In depth interview:-** Was carried out with key informants to generate qualitative data about the topic under investigation. The key informants were two school principals (from high school and preparatory), three senior teachers in the school, three district education office experts, and district police crime prevention and investigation department head.

2.3 Sampling Design

All the three schools of the district that contain the target population of the study were considered in the sampling process. From all sections, half (50%) of the sections were randomly selected from each grade level in all schools. To select the sample students, stratified sampling was used. That is students were stratified by grade and sex.

From each of the stratum students were selected randomly on the basis of probability proportional to size (PPS), size being the number of students in each grade level. Finally from each sampled sections female and male students were randomly taken and have created the sample of the study. This was done by using students' attendance sheet as a sampling frame. The list of few students who are married and above age 19 was cancelled from the sampling frame.

Table 2.1 Target Populations by grade level and sex, Hulet Ejju Enesie, 2005

Grade	Male	Female	Total	Percent	Number of sections
9	1745	1016	2761	60.2	26
10	736	202	938	20.5	10
11	343	51	394	8.6	8
12	388	103	491	10.7	10
Total	3212	1372	4584	100	54

2.4 Sample size Determination

Based on Jit S. Chandan (2003) formula, a sample of 1000 students were selected for responding to the questionnaire. The underlying assumptions were:

- The estimate of population is to be within 0.03, E=0.03
- The desired level of confidence is 0.95, which corresponds to a Z value of 1.96
- Previous study on a similar setting by shabbir et al. (1997) showed that the prevalence of sexual activity among students to be 32%. Then for this study p is taken as 0.32.
- Contingency = 7.5%

The sample size determination formula can be stated as:

$$n = \frac{Z^2 p(1-p)}{E^2}$$ where,

n= the size of the sample

P = the population proportion who were sexually experienced (Taken from similar previous study).

Z = the standard normal value corresponding to the desired level of confidence, 1.96 in this case

E = the maximum acceptable error margin

The required sample size will be

$$n = \frac{(1.96)^2\ 0.32\ (1-0.32)}{(0.03)^2} + 7.5\%$$ of sample selected

n = 929+7.5%=1,000

n= 1,000

Then a sample of 1000 students were selected and distributed to each grade level according to size of students in each grade level for each sex.

Table 2.2 Sampled students' distribution by grade and sex

Grade	Male	Female	Total	Percent	Number of sections
9	380	222	602	60.2	13
10	161	44	205	20.5	5
11	75	11	86	8.6	4
12	84	23	107	10.7	5
Total	700	300	1000	100	27

2.5 Methods of Data Analyses

Data collected from the survey was entered to computer for analysis. Computer software called statistical package for social sciences (SPSS) was used for the analysis.

Before performing the analysis some internal consistency checks including the age data were made to assess the data quality. This is done by cross tabulating various reported events against one another. For example, respondents' age and age at first sexual intercourse was cross tabulated. The results of the internal consistency check showed non-of the response are inconsistent.

The analysis started with univariate presentation (simple description) to summarize data, and data quality was evaluated using frequency distribution. Secondly, bivariate analysis was carried out to explore the relationship between the independent and dependent variables.

The independent variables for the analysis were age, sex, religion, grade level, parent (father) adolescent communication about sexual issues, having sexually experienced friends (peers), discussion about sexuality matters with school friends, knowledge of person living with HIV/AIDS (PLWHA), knowledge of condom use among peers, and

perception of school friends sexual experience. The choice of these explanatory variables was guided by relevant literatures. Multicollinearity was tested and it was found non-of the independent variables were correlated.

Finally, multivariate analysis was carried out to assess simultaneously the relationship of several independent variables with the dependent variable. The dependent variables in this study were sexual experience (either sexually experienced or otherwise) and perception of risky sexual behavior (perceiving as either at risk or otherwise).

To examine the relationship between the dichotomous dependent variable and the independent variables, the logistic regression model is employed as the most appropriate one. The logistic regression predicts the log of odds of the dependent variable as a linear function of the independent variables. The model is expressed as:

$\ln (pi/1-pi)=\beta o+\beta_1 Xi+ \beta 2Xi2+...+\beta kXik$

Where

Pi = chance of the i^{th} adolescent being sexually experienced.

l-Pi = chance of the i^{th} adolescent being sexually inexperienced

(Pi/l-Pi) = is the risk or odds of the i^{th} adolescent being sexually experienced.

X1, X2, X3 ...Xk = represents predictor variables.

Estimates of βi's, the logistic regression coefficients, are obtained by the maximum likelihood ratio method. A positive value of (exp. (βi)) means the value of the factor by which the odds change. (Exp. (βi)) greater than one means an increase in the risk of an event occurring. A negative value of exp. (βi) means the value by which the odds is less than one, indicating a decrease in the risk of an event occurring. A zero value of (exp. (βi)) means the factor by which the odds change is equal to one, which means the odds remains unchanged. The parameters in logistic regression model represent the increase or decrease in log of odds for the category code "one" compared to those of code "zero" holding the effect of all other factors controlled.

2.6 Limitations of the study

1. This study has considered only school adolescents aged 15-19 years, and did not include out-school adolescents as well as adolescents below age 15, which are equally important to be studied.
2. Event if adolescents felt sure that their questionnaire responses were confidential, social norms regarding adolescent sexual behavior are likely to have biased reports of sexual activity. The social norms may have influenced adolescents to write responses they viewed as socially desirable.
3. The multiple choice format, though supported by FGDs and key informant interviews, survey questionnaire responses may have restricted adolescents' ability to express their beliefs and opinions.
4. The study is based on self-reported behaviors, and the data are thus subject to reporting errors of unknown direction and magnitude.

CHAPTER THREE

SELECTED BACKGROUND CHARACTERISTICS OF THE STUDY POPULATION

In this chapter attempts were made to describe some selected background characteristics of school adolescents aged 15 to 19 years (the study population) in Hulet Ejju Enesie district of East Gojjam, Amhara region. The background characteristics include socio-demographic characteristics, family background and peer behavior influence related factors. These characteristics/factors were used for further analyses in the subsequent sections of this study.

3.1 Socio-Demographic Characteristics of the Study Population

Of the total respondents seven hundred (70 percent) were males while three hundred (30 percent) were females. The majority of the respondents (76.7 percent) were in the age group 17-19 years (in late adolescence period) and the remaining 23.3 percent were in the age group 15-16 years (middle adolescence period) (table 3.1). The mean and median ages of the respondents were 18 and 17.4 years respectively (not shown in the table).

As presented in table 3.1, the majority of the respondents (85 percent) were Orthodox Christians, and about 15 percent were Muslims. Some 60.2 percent of the adolescents were from grade 9, and the remaining (39.2 percent) were from grades 10 to 12. A large percentage (68.4 percent) of the study population was from rural areas while 31.6 percent were from urban areas.

Table 3.1 Socio-Demographic Characteristics of School Adolescents, Hulet Ejju Enesie District, 2005

Characteristics	Male		Female		Total	
	Number	Percent	Number	Percent	Number	Percent
Age						
15-16	101	14.4	132	44.0	233	23.3
17-19	599	85.6	168	56.0	767	76.7
Grade						
9	380	54.3	222	74.0	602	60.2
10	161	23.0	44	21.5	205	20.5
11	75	10.7	11	3.7	86	68.0
12	84	12.0	23	7.7	107	10.7
Religion						
Orthodox	603	86.1	248	82.7	851	85.1
Muslim	97	13.9	52	17.3	149	14.9
Residence						
Rural	517	73.9	167	55.7	684	68.4
Urban	183	26.1	133	44.3	316	31.6
Living Arrangement						
Living with both partners	237	33.9	152	50.3	389	38.9
Living with father only	16	2.3	5	1.7	21	2.1
Living with mother only	45	6.4	22	7.3	67	6.7
Living with other family members	22	3.1	16	5.3	38	3.8
Living away from family in rented houses	380	54.3	105	35.0	485	48.5

About 49 percent of the adolescents had lived away from their parents in rented (relatives) houses while 39 percent were living with both parents. The remaining was living either with either of the parents, or other family members.

3.2 Family Background Related Characteristics of Respondents

Parents' level of education and parent-adolescent discussion about sexual issues were some of the family background factors considered here. Some 40.4 percent of the respondents' fathers had no education while 39 percent had primary education Fathers' with secondary and above education were about 10 percent.

The majority (76%) of the respondents' had mothers with no education. Only 18.7 percent of the mothers had primary education while 3.5 percent had attended secondary, and above education (table 3.2).

Table 3.2 Distribution of School Adolescents by Family Background Related Factors

Family Background Related Factors	Male		Female		Total	
	Number	Percent	Number	Percent	Number	Percent
Respondents' Fathers level of Education						
No education	303	43.3	101	33.7	404	40.4
Primary education	275	39.3	115	38.3	390	39.0
Secondary education	25	3.6	20	6.7	45	4.5
Above secondary education	10	1.4	34	11.3	44	4.4
Father not a live	7	12.4	30	10.0	117	11.7
Respondents' Mothers level of Education						
No education	535	76.4	184	61.3	719	71.9
Primary education	114	16.3	73	24.3	187	18.7
Secondary education	7	1.0	6	1.0	13	1.3
Above secondary education	4	0.6	18	6.0	22	2.2
Mother not a live	40	5.7	19	6.3	59	5.9
Discussion about sexual issues: with father						
No	511	73.0	249	83.0	760	76.0
Yes	98	14.0	25	8.3	123	12.3
Father not exist	91	13.0	26	8.7	117	11.7
with mother						
No	573	81.9	243	81.0	816	81.6
Yes	85	21.1	40	13.3	125	12.5
Mother not exist	42	6.0	17	5.7	59	5.9

As one could expect in the Ethiopian context, parent-adolescents communication (discussion) about sexual issues in this study was found rare. The majority (76 percent and 81.6 percent) of the respondents had no discussion/communication about sexual issues with their fathers and mothers respectively.

More males and females had discussed sexual issues with their mothers than with their fathers. This may be due to the fact that most of the mothers are light hearted and democrat than fathers are (table 3.2).

3.3 Peer Behavior Influence Related Factors of Adolescents

The peer behavior influence related factors include the adolescents' discussion about sexual issues with their peers (school friends), and having sexually experienced school friends or not.

Table 3.3 Percent distribution of adolescents by peer behavior influence related factors

Peer behavior influence related factors	Male		Female		Total	
	Number	Percent	Number	Percent	Number	Percent
Discussion about sexual issues with peers (school friends)						
No	517	74.0	96	32.0	613	61.3
Yes	183	26.0	204	68.0	387	38.7
Having sexually experienced friend						
yes	433	61.9	123	41.0	556	55.6
No	267	38.1	177	59.0	444	44.4

As it can be seen from table 3.3, 61.3 percent of adolescents had discussed sexual issues with their school friends (peers) while 38.7 percent of the respondents reported that they did not discuss sexual issues with their peers.

More than half (55.6 percent) of the school adolescents were reported to having sexually experienced school friends. Here, there may be a chance of double counting (reporting), because one sexually experienced school adolescent may be a friend of more than one school adolescents and hence all of his/her friends may refer to that single individual who is their friend and sexually experienced. However, the reported figures seems to disclosed the real situation prevailed in the school as it is proved with the data presented in the subsequent discussions of this study.

The percentage of males who reported to having had sexually experienced friends were higher than the percentage of females (61.9% Vs. 41%). About 44 percent of the respondents reported that they had no sexually experienced school friends (peers) (table 3.3).

CHAPTER FOUR

ADOLESCENT SEXUAL BEHAVIOR AND CORRELATED FACTORS

In this chapter the sexual behavior of school adolescents, which includes sexual activities (experiences), contraceptive use and adolescent perception of their sexuality are presented. The bi-variate analysis result of factors associated with the sexual experience of school adolescents is also dealt with.

4.1 Adolescents Sexual Experience

Data on the sexual experience of adolescents were collected and analyzed. And it was found that a significant proportion of the school adolescents were sexually experienced (ever had sexual contact). Four hundred and two (40.2 percent) of the respondents said they had already had their first sexual experience, while 59.8 percent said they had never had sexual relations (table 4.1).

Table 4.1 Percent distributions of school adolescents by sexual experience status, Hulet Ejju Enesie District, 2005

Sexual experience Status	Number	Percent
Ever had sexual experience	402	40.2
Never had sexual experience	598	59.8
Total	1000	100.0

Of those who had first sexual contact, 75.9 percent were males, and 24.1 percent were females. The study found that the majority (62.7 percent) of the sexually experienced adolescents started sex between age 14 and 16, which is consistent with other studies in the literature (Solomon, 1990). The mean and median ages at first sexual debut were found to be 15.9 and 16 years respectively. The study also revealed that female adolescents initiated sexual intercourse relatively earlier than their male counterparts with a mean age of 15.56 and 16.04 years respectively. The age at first sexual debut ranged from 10 to 19 years (table 4.2).

Table 4.2 Percent distribution of sexually experienced school adolescents by age at first sexual debut

Age at first sexual debut (age group)	Male		Female		Total	
	Number	Percent	Number	Percent	Number	Percent
10-13	6	2.0	14	14.4	20	5.0
14-16	186	61.0	66	68.1	252	62.7
17-19	113	37.0	17	17.5	130	32.3
Total	305	100.0	97	100.0	402	100.0
Mean age	16.04		15.56		15.92	
Median age	16		16		16	

Among the sexually experienced adolescents, 39.1 percent were sexually active, i.e. have had sexual intercourse at least once in the last four weeks before the survey. More females (41.2%) than males (38.4%) were sexually active (table4.3).

Table 4.3 Percent distribution of male and female adolescents by their sexual activities status

Sexual Activity status	Male		Female		Total	
	Number	Percent	Number	Percent	Number	Percent
Active	117	38.4	40	41.2	157	39.1
Not active	188	61.6	57	58.8	245	60.9
Total	305	100.0	97	100.0	402	100.0

Nearly 46% of the adolescents practiced sex with more than one partner in their sexual life. The number of lifetime partners ranged from one to eight. More males than females reported to have had sexual relations with multiple sexual partners (46.9% Vs. 42.3%) The mean number of lifetime sexual partners was 1.71, 1.73 for males & 1.66 for females (table4.4).

Table4.4 Distribution of adolescences by lifetime sexual partners and by sex

Sexual Partner	Male	Female	Total
Single	162(53.1)	56(57.7)	218(54.2)
Multiple	143(46.9)	41(42.3)	184(45.8)
Total	305(100.0)	97(100.0)	402(100.0)
Mean	1.73	1.66	1.71

It is also found that sexual experience varies by residence. More rural (72.6%) than urban respondents reported to having had their sexual intercourse (table not shown).

4.1.1 School adolescent sexual experience and correlated factors: Bi-variate analyses results.

As it can be observed from table 4.5, a number of socio-demographic and peer behavior influence related variables were associated with the sexual experience of school adolescents.

Table 4.5 sexual experience status of school adolescences by selected socio-demographic and peer behavior related variables, Hulet Ejju Enesie district, 2005.

Variables	Sexual experience Status		χ^2 value degree of freedom (df) p-value
	Ever had Sex	Never had Sex	
Sex			χ^2 =10.03 df=1 P<0.001
Male	305 (43.6)	395 (56.4)	
Female	97 (32.3)	203 (67.3)	
Age			χ^2 =31.29 df=1 p<0.001
15-16	57 (24.5)	176 (75.5)	
17-19	345 (45.0)	422 (55)	
Grade level			χ^2 =29.38 df=3 p<0.001
9	207 (34.4)	395 (65.6)	
10	88 (42.9)	117 (57.1)	
11	52 (60.5)	34 (39.5)	
12	55 (51.4)	52 (48.6)	
Residence			χ^2 =5.58 df=1 P<0.05
Rural	292 (42.7)	392 (57.3)	
Urban	110 (34.8)	206 (65.2)	
Existence of father in life			χ^2 =4.84 df=1 P<0.05
Yes	344 (39)	539 (61.0)	
No	58 (49.6)	59 (50.4)	
Adolescents' Perceived knowledge of the use of condom in the school			χ^2 =7.52 df=2 P<0.05
Yes	92 (48.9)	96 (51.1)	
No	180 (37.6)	299 (62.4)	
Don't know	130 (39.0)	203 (61.0)	
Awareness of PLWHA or died from HIV/AIDS			χ^2 =6.12 df=2 P<0.05
Yes	335 (39.7)	508 (60.3)	
No	61 (40.7)	89 (59.3)	
Don't know	6 (85.7)	1 (14.3)	

Table 4.5 (Continued)

Variables	Sexual experience Status		χ^2 value degree of freedom (df) p-value
	Ever had Sex	Never had Sex	
Father level of education			
- No education	144 (36.2)	254 (63.8)	
- primary	171 (43.8)	219 (56.2)	χ^2 =11.38 df=4 P<0.05
- Secondary	16 (35.6)	29 (64.4)	
- above secondary	12 (27.3)	32 (72.7)	
- not alive	59 (50.4)	58 (49.6)	
Discussion about sexual issues with school friends			
Yes	281 (45.8)	332 (54.2)	χ^2 =20.96 df=1 P<0.001
No	121 (31.3)	266 (68.7)	
Having sexually experienced school friends (peers)			
Yes	248 (44.6)	308 (55.4)	χ^2 =10.11 df=1 P<0.001
No	154 (34.7)	290 (65.3)	
Perception of the practice of multiple sexual partner in the school			
Yes	182 (44.3)	229 (55.7)	χ^2 =4.84 df=1 P<0.05
No	220 (37.4)	369 (62.6)	
Discussion about sexual issues with father			
No	305 (40.1)	455 (59.9)	χ^2 =6.55 df=2 P<0.05
Yes	40 (32.5)	83 (67.5)	
Father not alive	57 (48.7)	60 (51.3)	
School friends age at first sex			
10-13	8 (61.5)	5 (38.5)	χ^2 =4.72 df=2 P<0.05
14-16	71 (50.0)	71 (50.0)	
17-19	91 (47.9)	99 (52.1)	

- Figure in parenthesis are percentages

Sex: Among those already sexually experienced, more males than females had sexual contact (43.6% Vs. 32.3%). The chi square test result indicated the existence of a statistically significant association between sex (gender) and sexual experience of

school adolescents (the dependent variable) (χ^2 =10.03; df=1;p<0.001). This is consistent with other studies (Negussie, 1998; Shabir I., 1997; Solomon, 1990).

Age: Age also showed a statistically significant association with sexual experience of school adolescents (χ^2 =31.29; df=1; p<0.001) Forty five percent of the adolescents in the age group 17-19 years were sexually experienced, whereas a lowered percentage (24.5%) of the adolescents were sexually experienced in the age group 15-16 years. This relationship of age and sexual initiation coincides with the usual trend that the higher the age the higher the risk of being sexually experienced.

Existence of father in life: The existence of father in life showed association with the dependent variable (χ^2 =4.84; df=1; p<0.05). More adolescents whose fathers are not alive were sexually experienced than those whose fathers were alive (49.6% Vs. 39%). This may be due to lack of parental supervision as one can expect.

Perceived knowledge of condom use among school friends (peers): The adolescent's perceived knowledge of the condom use (perceiving condom is usual among school friends or otherwise) among school friends had a significant association with the sexual activity of the adolescents (χ^2 =7.53; df=2; p<0.05). More of the adolescents with the perception that condom use is usual among school friends were found sexually experienced (48.9 percent). But, the percentage of sexually experienced adolescent was found low (37.6 percent) among those who had no perception.

Evidence abounds in the literature that adolescents tend to experiment with risky behavior with little awareness of the danger. Even those with the awareness did not avoid risky behavior (Ensminger, M., 1987). Consistent with the above, in this study too, adolescents who believe that their behavior have put them at risk were found more sexually experienced than who did not perceived the risk (58% Vs. 38.1%) (χ^2 =17.86; df = 2; p<001). It is also true that many adolescents are unaware of what constitutes risky sexual behavior (Underwood, C., 2001; Weiss, E. and Roa Gupta 1998).

Effect of peer behavior influence on adolescents' sexual activity: Studies have shown that the sexual behavior of friends' influences adolescent's own sexual behavior (Walter, H., et al., 1992; Kiragu, K. and Zabin, L., 1993).

In this study also it is found that adolescents whose friends were sexually experienced were found more likely sexually experienced than those who had not had sexually experienced friends (χ^2 =10.11; df=1; P<0.001) (table 4.5).

The adolescent's perceived knowledge of the practice of sexual relation with multiple partners among school friends was found to be correlated with the adolescent sexual activity (χ^2 =4.84;df=1;P<0.05). The adolescents with a perceived knowledge of the practice of having sexual intercourse with multiple sexual partners were found more sexually experienced than who didn't have the knowledge.

Age at first sexual debut of school friends (peers) was found to have a statistically significant association with the sexual experience of adolescents (χ^2 =4.72; df =2; P<0.05). Adolescents whose friends were sexually active at earlier age were more likely sexually experienced themselves than adolescents whose friends initiated sexual intercourse relatively at older age (table 4.5). This could be attributed to the matured and somehow logical discussion that may exist among friends who are elder, like discussion about risks of early sexual initiation.

In general the above peer behavior related variables indicated that most adolescents are keenly sensitive to peer opinion and action.

Family Background Variables

Discussion with father about sexual issues: For adolescents, being able to talk about problems, including concerns about sexuality, and to obtain support are important steps to avoiding risk (Green, C., 1997). In this study parent child communication particularly with the father, has been found to have an important effect on adolescent sexual experience. Adolescents who have had discussion with

their fathers were found to be less sexually experienced than those who didn't discuss sexual issues (χ^2 =6.55; df=2; P<0.05). Discussion with father helped adolescents to delay sexual initiation, which is a risk during adolescence.

4.2 Contraceptive use Among School Adolescents

Adolescents were asked about the use of contraceptive (preventive) methods against pregnancy and/or STIs while they had sexual relations. And it was found that out of the sexually experienced adolescents, 39.6 percent of the adolescents used preventive methods during their first sexual debut and 60.4 percent did not use any preventive methods (table 4.6).

Table 4.6 Sexually Experienced Adolescents by Contraceptive use Status during their first, and last (recent) Sexual Activities, Hulet Ejju Enesie district, 2005.

Contraceptive use status	Male		Female		Total	
	Number	Percent	Number	Percent	Number	Percent
During first sexual activity						
Contraceptive was used	124	40.7	35	36.1	159	39.6
Contraceptive was not used	181	59.3	62	63.9	243	60.4
Total	305	100.0	97	100.0	402	100.0
During recent sexual activity						
Contraceptive was Used	127	41.6	43	44.3	170	42.3
Contraceptive was not used	178	58.4	54	56.7	232	57.7
Total	305	100.0	97	100.0	402	100.0

The non-use of contraceptives was relatively higher among the female adolescents (63.9 percent), indicating females were at greater risk of pregnancy and contracting STIs, including HIV/AIDS.

The adolescents who reported they had used preventive methods during their first sexual encounter were further asked the type of method they used. It was reported that 44.7 percent of the adolescent used oral pills, and 37.7 percent used condoms; 17.6 percent used both condom and oral pills for higher safety (table 4.7).

Table 4.7 Percent of adolescents who used contraceptive methods during their first, and recent (last) sexual activities by type of contraceptive method used.

Type of contraceptive method Used	Male		Female		Total	
During first sexual activity	Number	Percent	Number	Percent	Number	Percent
Condom	50	40.3	10	28.6	60	37.7
Oral pills	56	45.2	15	42.8	71	44.7
Condom plus pills	18	14.5	10	28.6	28	17.6
Total	124	100.0	35	100.0	159	100.0
During recent sexual Activity						
Condom	49	38.6	15	34.9	64	37.6
Oral pills	62	48.8	19	44.2	81	47.7
Condom plus oral pills	16	12.6	9	20.9	25	14.7
Total	127	100.0	43	100.0	170	100.0

The use of oral pills was found higher among adolescents indicating the fact that adolescents give a due emphasis for avoiding pregnancy than other issues.

Adolescents were also asked about the use of pregnancy or STI preventing methods during their recent sexual activities. As indicated in table 4.6, the use of preventing methods showed only a slight improvement as compared to the use of methods during first sexual experience (i.e. only from 39.6 percent to 42.3 percent). Specifically when we compare use of condom during the first and recent sexual activities it did not show any improvement.

In general the use of preventive methods by adolescents either during their first, or recent sexual relations was low. The reasons for low use of preventive methods particularly during first sexual experience were investigated in the study (table 4.8).

Table 4.8 Reasons for not using methods of preventing pregnancy or STIs during first sexual experience of Adolescents

Reasons	Responses	
	Number	Percent
Did not know where to get methods	10	4.2
Did not know how to use methods	10	4.2
Did not dare to get methods	12	4.9
Did not know methods	13	5.3
Thought that pregnancy or any STI do not occur by first sexual contact only	45	18.6
Did not dare to tell partner to use methods	65	26.7
Was not planning to have sex	88	35.2
Total	243	100.0

As observed in table 4.8, the important reasons mentioned by most adolescent were: sex was not planned (it was an emotionally decided encounter) (35.2 percent); did not dare to tell partner to use methods (26.7 percent); and thought that pregnancy or any STIs do not occur by first sexual contact only (18.6 percent).

By going further and giving emphasis on the use of condom, which has a dual purpose of preventing pregnancy and STIs, the study gathered information on the extent and consistency of condom use among school adolescents whenever they have sexual relations with their boy/girl friends.

Accordingly, 61.7 percent of the respondents never used condoms while they have had sexual relations with their boy/girl friends. Others use condom with their boy/girl friends inconsistently (26.9 percent reported that they use condoms "sometimes"). Only 11.4 percent of adolescents use condoms "always") (table 4.9).

Table 4.9 Percent of adolescents for condom use frequency

Condom use frequency	Number	Percent
Never used	248	61.7
Used "always"	46	11.4
Used "sometimes"	108	26.9
Total	402	100.0

Compared to other similar studies conducted in the country prevalence of condom use was found very low; kola Diba (39.3 percent) (Shabir I., et al., 1997); Jimma youth (29.3 percent) (FGAE, 1998).

The important reasons mentioned for not using condoms were: fear of reduction of sexual satisfaction (16.9 percent), being faithful to sexual partner (34.3 percent), partner opposition (15.4 Percent), fear of partner reaction (16.5 percent), and simply do not want to use condoms (16.9 Percent). The reasons indicated are consistent with the reasons available in the literature (Morris, I., 1994; Shabir I. et al., 1997).

4.3 Adolescents perception of their sexual behavior

It is stated in literatures that many adolescents, even when they appreciate the risky behaviors, believe, that they are invulnerable (Kirague, k., 2001). Consistent with this in this study it was found that only 11.9 percent of the adolescents felt that they were at risk, even though 55.8 percent felt that their friends were at risk (table 4.10). This indirectly indicates that those who don't perceive the risk are also at risk.

Table 4.10 Percent distribution of adolescents by the perception status of risk sexual behavior, according to their school friends and their own behavior

Perception status of risky behavior	About their school friends sexual behavior			About their own sexual behavior		
	Male	Female	Total	Male	Female	Total
At risk	60.7	44.3	55.8	13.4	8.3	11.9
Not at risk	14.7	14.3	14.6	65.2	67.7	65.9
Don't know	24.6	41.4	29.6	21.4	24.0	22.2
Total	100.0	100.0	100.0	100.0	100.0	100.0

The bi-variate analyses result showed that some socio-demographic variables were associated with the adolescent perception of risk behavior (table 4.11).

As shown in table 4.11, the percentage of adolescents who felt that their own behavior is at risk were higher (33.3 percent) for those who said the behavior of their school friends were at risk than those who said their school friends were not at risk. (χ^2 =7.10; df=2;p<0.05).

Table 4.11 Percent of school adolescents' risk sexual behavior perception status by selected variables, Hulet Ejju Enesie district, 2005

Variables	Risky sexual behavior perception status		χ^2 value df (degree of freedom) p-value
	At Risk (Percent)	Not at Risk (Percent)	
Grade level			
9	36.4	63.6	χ^2 =10.02 df=3 p<0.05
10	24.9	75.1	
11	34.9	65.1	
12	38.3	61.7	
Religion			
Orthodox	35.5	64.5	χ^2 =4.89 df=1 p<0.05
Muslim	26.2	73.8	
Perceived knowledge of the use of condom among school friends			
Yes	43.6	66.7	χ^2 =9.85 df=2 p<0.05
No	30.9	73.3	
Don't know	33.3	66.8	
Perceived knowledge of school friends sexual behavior			
At risk	33.3	66.7	χ^2 =7.10 df=2 P<0.05
Not at risk	26.7	73.3	
Don't know	39.2	66.8	
Know PLWHA or died from AIDS			
Yes	35.3	64.7	χ^2 =14.83 df=2 p<0.001
No	24.7	75.3	
Don't know	85.7	14.3	

Perception of risk and religion was also found significantly associated (χ^2 =4.89; df =1; p <0.05). More of the followers of Orthodox (35.5%) than the Muslims (26.2%) felt that they are at risk.

As observed in other studies grade level showed a significant association with risk perception of adolescents. At higher grades, more adolescents perceive their behaviors were at risk (table 4.11). Perceived knowledge of the use of condom among school friends, and adolescents' knowledge of PLWHA or died from AIDS showed a statistically significant association with risk perception of adolescents (table 4.11).

CHAPTER FIVE

KNOWLEDGE OF HIV/AIDS, OTHER SEXUALLY TRANSMITTED INFECTIONS AND CONTRACEPTIVES AMONG SCHOOL ADOLESCENTS

In this chapter, attempts were made to assess the adolescent's level of awareness about the disease, their knowledge of the modes of transmission, whether they thought it was possible to prevent AIDS and if so how; their knowledge of other sexually transmitted infections (STIs) and the signs and symptoms, and about contraceptives. This helps to compare and contrast the adolescent sexual behavior with this knowledge.

5.1 Knowledge on HIV/AIDS

Data on HIV/AIDS were collected from all the respondents included in the study. Table 5.1 shows the responses of adolescents according to selected characteristics on knowledge of HIV/AIDS. Knowledge on HIV/AIDS is universally widespread. About 97.3 percent (97.6 percent of the male and 96.7 percent of the female) of the respondents reported that they had heard of the fatal disease called HIV/AIDS. This percentage is higher than other reports. The Ethiopian DHS 2000 (CSA and ORC Macro, 2001) reported that 78.9 percent of the adolescents in the age group 15-19 years were aware of HIV/AIDS; among Jimma youth it was 95.4 percent (FGAE, 1998).

Though not substantial as such, variations on the awareness of HIV/AIDS among adolescents are observed across different characteristics (table 5.1). It can be seen that the level of awareness on HIV/AIDS are somehow increased with grade level (95.5 percent for grade 9 Vs. 100 percent for grades 10-12) of adolescents.

Table 5.1 Distribution of adolescents according to HIV/AIDS awareness by selected socio-demographic characteristics

Characteristics	Heard about HIV/AIDS	Not heard about HIV/AIDS	Total (Number)
Sex			
Male	683 (97.6)	17 (2.4)	700
Female	290 (96.7)	10 (3.3)	300
Age			
15-16	226 (97.0)	7 (3.0)	233
17-19	747 (97.4)	20 (2.6)	767
Grade			
9	575 (95.5)	27 (4.5)	602
10	205 (100.0)	-	205
11	86 (100.0)	-	86
12	107 (100.0)	-	107
Religion			
Orthodox	827 (97.2)	24 (2.8)	851
Muslim	146 (98.6)	3 (2.0)	149
Residence			
Rural	663 (96.9)	21 (3.1)	684
Urban	310 (98.1)	6 (1.9)	316
Total	973 (97.3)	27 (2.7)	1000

Figures in the parenthesis are percentages.

The study also revealed that about 84.3 percent of the adolescents knew someone who had acquired the virus or someone died of HIV/AIDS (result not shown). This may enhance the adolescents' knowledge of the fact that HIV/AIDS is a deadly disease.

Another way of examining the knowledge of HIV/AIDS is to assess the knowledge that a healthy-looking person may have the virus in his/her blood. It was evidenced that about 93 percent of the respondents knew the above-mentioned fact. This knowledge of adolescents showed variations across some background characteristics (see table 5.2).

Table 5.2 Percent of adolescents having knowledge on a healthy looking person can have the HIV in his/her blood by selected characteristics

Characteristics	Yes	No	Don't know
Sex			
Male	673 (96.1)	2 (0.3)	25 (3.6)
Female	258 (86.1)	9 (3.0)	33 (11.0)
Age			
15-16	205 (88.4)	7 (3.0)	20 (8.6)
17-19	725 (94.5)	7 (0.5)	38 (5.0)
Grade			
9	549 (91.2)	11 (1.8)	42 (7.0)
10	196 (95.6)	-	9 (4.4)
11	85 (98.8)	-	1 (1.2)
12	101 (94.4)	-	6 (5.6)
Religion			
Orthodox	792 (93.1)	8 (0.9)	51 (6.0)
Muslim	139 (93.3)	3 (2.5)	7 (4.7)
Residence			
Rural	640 (93.6)	3 (0.4)	41 (6.0)
Urban	291 (92.1)	8 (2.5)	17 (5.4)
Total	931 (93.1)	11 (1.1)	58 (5.8)

As it can be seen from table 5.2, more of the males (96 percent) than the females (86 percent) know a healthy-looking person can have the virus (χ^2=36.37;df=2; p<0.001).

The above-mentioned knowledge also varies by age. More of the elder adolescents (94.5 percent) than the younger adolescents (88.4 percent) have had the knowledge of the subject of interest (χ^2 =14.79; df=2;p<0.0001). The association between age and knowledge is statistically highly significant. Grade level and residence of adolescent also showed association with knowledge of adolescents (χ^2=13.30; df=5; p<0.05 and χ^2 =8.80, df=2; p<0.05). Religion has no significant association with adolescents' knowledge of the subject of interest.

The other information about knowledge on HIV/AIDS is that a healthy-looking person who has acquired the virus can pass it on to other person. It is found that 88.3 percent (91 percent of the male and 81.3 percent of the female) of the adolescents knew that a healthy-looking person who has contracted the virus can infect other person. The variables sex, age, and grade level showed a statistically significant association with knowledge of adolescent ($p<0.05$). It is found that adolescents' religion has no association with the knowledge of adolescents towards HIV/AIDS.

The school adolescents were also asked about the curability of HIV/AIDS. They responded that 96 percent of the adolescents knew correctly that HIV/AIDS is incurable. Only 2 percent wrongly perceived that it is curable. The other 2 percent did not know whether it is curable or not (result not shown in the table).

5.1.1 Knowledge on Modes of HIV/AIDS Transmission

To ascertain the depth of knowledge about HIV/AIDS, adolescents were asked whether they knew the modes of HIV/AIDS transmission correctly or not. Table 5.3 presents responses of adolescents by mode of transmission.

Table 5.3 Percentage of Adolescents with Knowledge of the Modes of HIV/AIDS Transmission by gender, Hulet Ejju Enesie distrct, 2005.

Possible modes of HIV/AIDS Transmission	Male	Female	Total
Unprotected sexual intercourse	661 (94.4)	254 (84.6)	915 (91.5)
Blood transfusion	634 (90.6)	216 (72.0)	850 (85.0)
Eating and drinking with a person Living with HIV/AIDS (PLWHA)	10 (1.4)	9 (3.0)	19 (1.9)
Having multiple sexual partner	540 (77.1)	204 (68.0)	744 (74.4)
Shaking hands with PLWHA	6 (0.9)	10 (3.3)	16 (1.6)
Using utensils that have used by PLWHA	21 (3.0)	6 (2.0)	27 (2.7)
Living under one roof with PLWHA	28 (4.0)	7 (2.3)	35 (3.5)
Mosquito bite	69 (9.9)	40 (13.3)	109 (10.9)
Trancplacental	634 (90.6)	232 (77.3)	866 (86.6)
Breast feeding	519 (74.1)	206 (68.7)	725 (72.5)
Common use of toilets with PLWHA	16 (2.3)	9 (3.0)	25 (2.5)
Don't know any mode of transmission	2 (0.3)	4 (1.3)	6 (0.6)
Total	700	300	1000

As presented in table 5.3, except few, most of the adolescents knew correctly the possible modes of HIV/AIDS transmission. The majority of the respondents (91.5 percent) said that unprotected sexual intercourse could be the possible mode of AIDS transmission. More than 70 percent respondents correctly mentioned other modes of transmission. Only less than 4 percent of the adolescent wrongly considered eating and drinking with PLWHA, shaking hands with PLWHA, using utensils that have used by PLWHA, living under one roof with PLWHA, and common use of toilets as modes of transmission. Some 11 percent of the respondents again wrongly perceived being bitten by insects like mosquito as a mode of HIV/AIDS. This is also observed in other studies (Asheti et al., 2001).

It is further revealed that the knowledge of the modes of HIV/ AIDS transmission varies by sex. The percentage of males was higher than females in mentioning the correct modes of transmission of HIV.

5.1.2 Knowledge on HIV/AIDS prevention

Again to further ascertain the depth of knowledge about HIV/AIDS, the district's school adolescents were asked whether there is anything a person can do to avoid getting infected with the virus that causes AIDS and if so, what.

About 96 percent of the respondents believed that there is a way to avoid contracting the disease. Only 3 percent believed that there is no way to avoid getting infected with HIV/AIDS indicating a widespread knowledge of HIV/AIDS prevention (table not shown).

Most respondents (88.9 percent of the male and 76 percent of the female) believed that abstaining from sex (except in monogamous relations) is the most effective way to avoid contracting HIV. This is very high percent compared to other similar studies (Shabir I., 1997; FGAE, 1998). The other way mentioned by about 84 percent (86 percent of the male and 79 percent of the female) of respondents was limiting sexual intercourse with one partner, and use of condom was believed by about 80.6 percent of the respondents (table 5.4).

Table 5.4 Percent of adolescents with knowledge of ways to avoid HIV/AIDS by gender, Hulet Ejju Enesie district, 2005.

Ways to avoid HIV/AIDS	Male	Female	Total
Abstain from sex	88.9	76.0	85.0
Limit sex to one partner (Stay faithful to one partner)	85.7	79.3	83.8
Use of condom	85.8	68.3	80.6
Avoid unclean blood transfusion	84.1	73.3	80.9
Avoid injections with unclean needles	81.0	73.7	78.8
Avoid sharing blades and other sharp objects	82.7	71.0	79.2
Avoid mosquito bites	4.3	6.0	4.8
Don't know specific ways	-	0.6	0.6
Total number	700	300	1000

It was found that more males (88.9 percent) than females (76 percent) responded abstaining from sex for avoiding HIV/AIDS. This corroborates the one stated in the Ethiopian DHS 2000 (CSA and ORC Macro, 2001).

It is interesting that the three most effective way of avoiding HIV/AIDS (abstaining from sex, be faithful to one partner, and use of condoms) were mentioned by more than 80 percent of the adolescents. This knowledge is very important in AIDS prevention interventions.

In general, though more of the male than the female, the majority of the adolescents seems knew correctly the ways of avoiding contracting HIV/AIDS.

To sum up, more males are knowledgeable than females in all indicators used to measure knowledge of HIV/AIDS in this study, which supports the stated hypothesis that more males than females have knowledge of HIV/AIDS.

5.2 Knowledge on other Sexually Transmitted Infections.

Sexually Transmitted Infections (STIs) are important predisposing factors of AIDS transmission. As such, the presence of STIs in a population increases the chance of the occurrence of HIV. In line with this adolescents were asked about STI and related questions to assess the level of awareness of STIs among them and their knowledge of the signs and symptoms of STIs.

In the study 97 percent of the respondents reported they had heard about STIs other than AIDS indicating the presence of a widespread awareness of STIs among the adolescents (table not shown). Adolescent were further asked the types of STI they have known. As presented in table 5.5, the majority of the respondents reported syphilis and gonorrhea. More of the males than the females knew different types of STIs.

Table 5.5 Percent distribution of Respondents with knowledge of the different types of STIs by sex

Type	Male	Female	Total
Syphilis	93.9	60.0	86.0
Gonorrhea	95.4	27.4	86.0
Chancroid	62.4	46.3	57.6
Lymphgranuloma Venereum	71.4	51.3	65.4
Lymphgranuloma Inguinal	36.0	27.0	33.3
Trichomoniasis	4.9	3.3	4.4

In the study adolescents were asked whether they have ever had experienced any of the STIs to know the prevalence of STIs among them. Of the sexually experienced adolescents 38 males (12.5 percent) and 14 females (14.4 percent) were reported that they had experienced STIs at least once in their sexual life indicating a prevalence rate of about 13 percent. One hundred thirty and four (33.3 percent) were unable to state their status; may be due to lack of knowledge on the signs and symptoms of STIs (table not shown).

5.2.1 Knowledge on Signs and symptoms of sexually transmitted infections

To assure the depth of knowledge about STIs, respondents were asked about the signs and symptoms of STIs. Table 5.6 shows the percentage of respondents by number of signs and symptoms they know according to selected background characteristics.

Table 5.6 Percentage of Adolescents with knowledge of signs and symptoms of STIs, by background characteristics.

Background characteristics	Knew no symptom	Knew one symptom	Knew two symptoms	Knew three or more symptoms	Number
Age					
15-16	11.6	16.3	11.6	60.5	233
17-19	8.4	17.6	8.9	56.0	763
Sex					
Male	5.4	16.7	11.6	60.5	700
Female	17.7	18.7	7.3	56.3	300
Grade level					
9	8.5	21.8	13.0	56.8	602
10	13.2	10.7	4.9	71.2	205
11	8.1	8.1	4.7	79.1	86
12	5.7	12.3	2.8	79.2	107
Religion					
Orthodox	8.8	17.9	9.9	63.5	851
Muslim	10.8	14.2	7.4	67.6	149
Residence					
Rural	18.1	18.1	9.4	63.6	684
Urban	15.6	15.6	9.8	65.3	316
Total	9.2	17.3	9.5	64.0	1000

Out of the total respondents, some 64 percent knew three and more symptoms of STIs. Only 9.2 percent didn't know any symptom. More of grade 12 adolescents (79.2 percent) knew more than three symptoms than grade 9 respondents (56.8 percent) indicating a statistically significant association of grade level and knowledge of STIs (χ^2 =55.87; df=3; p<0.001).

5.3 Knowledge of contraceptives

Data on contraceptives knowledge of adolescents were collected in the study. It was found that adolescents had a widespread knowledge of contraceptives. More than 92 percent had heard about the different contraceptives (table not shown).

Table 5.7 percent distribution of adolescents with their knowledge of different contractive methods

Contractive methods	Male	Female	Total
Oral pills	91.9	77.7	87.6
Condom	85.4	68.7	80.4
Injectables	87.0	77.0	84.4
IUD	22.4	13.7	19.8
Female sterilization	69.0	52.3	64.0
Male sterilization	61.9	42.0	55.9
Periodic abstinence	89.3	56.7	79.5
Diaphragm, jelly, foam	71.4	53.0	65.9

As it can be seen from the table 5.7, oral pills, condom, injectables and periodic abstinence were known by 80 percent or more adolescents. In each type of contraceptive method knowledge, the percentage of males was found greater than their female counterparts.

In relation to the contraceptive knowledge of adolescents, they were asked to identify the contraceptive type, which has a dual protection of preventing pregnancy and STIs. About 76 percent (81.9 percent of males and 67.3 percent of females) of the respondents correctly identified condom, which has a dual role of protection. But about 6.9 percent, of all the respondents, of which 11 percent of the females and 5 percent of the males, had wrongly ascribed contraceptives which are given by injections as having a dual role of protection.

CHAPTER SIX

MULTIVARIATE ANALYSES RESULTS ON THE DETERMINANTS OF ADOLESCENT SEXUAL EXPERIENCE AND PERCEPTION OF THEIR SEXUAL BEHAVIOR.

Having examined the statistical association of variables with sexual experience and risk perception of adolescents, multivariate statistical technique was employed to determine the relative importance of each of these independent variables controlling for the effect of other variables.

The dependent variable in the study is dichotomous. That is either sexually experience or not when the dependent variable is sexual experience in model one, at risk or not at risk, when the dependent variable is perception of risky behavior in models two. As a result the logistic regression technique was used as a multivariate method of analysis. In the logistic regression model, the dependent variable is classified as (0,1), "0" is coded for the event not occurring, and "1" for the event occurring. The independent variables are also coded as dummy variables and interpretation is made in comparison with the reference category (Rc). In the model, the coefficient exp.(β) represents the increase or decrease in the log of odds of occurrence of an event associated with a unit change in the independent variable controlling for the possible confounding effects of all other variables.

The term Exp.(β) represents the multiplicative estimates in the odds of an event for a unit change in the independent variable holding the effects of all other predictors constant.

In this chapter assessment is made on the relative importance of each of the independent variables on adolescents' sexual experience and perception of their behavior.

6.1 Determinants of Adolescent Sexual Experience

Among the many socio-demographic, peer behavior influence, and family background variables considered in the study, the following variables were come out to be significant predictors of the sexual experience of adolescents:

1. Peer behavior influence:
    - Having sexually experienced school friends (peers)
    - Having discussion about sexuality with school friends (peers)
2. Socio-demographic variables:
    - Age and grade level of adolescents
3. Family background (family related) variables:
    - Discussion about sexual issues with father

1. Effect of peer Behavior Influence on Adolescents Sexual Experience

As stated earlier adolescents discussion with school friends, having sexually experienced school friends were found to be important predictors of adolescents' sexual experience (table 6.1) .

Table 6.1 Logistic Regression Results on the Relative Effects of Each of the Peer Behavior Influence, Socio-Demographic and Family Factors on Adolescent Sexual Experience.

Variables	β	S.E	Exp (β)
Peer behavior influence factors			
- having sexually experienced friends			
yes (Rc)			1.00
No	-0.86	0.39	0.42*
Discussion with school friends about sexuality			
Yes (Rc)			1.00
No	-0.44	0.20	0.64**
Socio-demographic variables			
Age of Adolescents			
15-16 (Rc)			1.00
17-19	2.29	0.81	9.86*
Grade level			
9 (Rc)			1.00
10	0.22	0.33	1.25
11	0.35	0.34	1.42
12	-0.74	0.40	0.48**
Family factor			
Discussion about sexual issues with father			
Yes (Rc)			1.00
No	0.26	0.28	1.29*
Father not alive	0.97	0.37	2.65**

* Significant at p<0.001; ** Significant at p<0.05

As observed in table 6.1, the adolescent discussion about sexual issues with their school friends facilitated adolescents' sexual commencement. The risk of commencing sex is reduced by a factor of 0.64 for those adolescent who didn't discuss sexual issues with their school friends compared with those who have discussed sexual issues.

Having sexually experienced friends is another predictor factor of sexual experience of school adolescents. The risk of starting sexual intercourse is 0.42 times lowered for

adolescents who haven't had sexually experienced school friends than those who have had sexually experienced friends. This relationship supports the stated hypothesis that adolescents who have sexually experienced friends (peers) are more likely experiencing sex.

1. Effect of Demographic Variable on Adolescent Sexual Experience

Age: The analysis of the effect of age on sexual experience of adolescents showed a statistically significant result ($p<0.001$). The odds of sexual experience were raised by a factor of 9.86 among adolescents aged 17-19 years as compared to adolescents aged 15-16 years.

2. Effect of Family Factors on Adolescent Sexual Experience

The other significant factor in determining adolescent sexual experience is discussion with fathers about sexual issues. Father-child (adolescent) communication found to deter sexual initiation of adolescents. It is observed that adolescents who had no discussion with their fathers about sexual issues were 1.3 times at higher risk of starting sexual contact compared with those adolescents who have had discussion. This effect of communication in delaying sexual initiation could be attributed to proper parental supervision and guidance. This finding corroborates the stated hypothesis that father adolescent communication delays sexual initiation.

6.2 Multivariate Analyses of Variables on Adolescents' Perception of their Sexual Behavior

The variables perceived knowledge of condom use among school friends, perceived knowledge of school friends' sexual behavior, and knowledge of PLWHA or died from AIDS were found to be important predictors of the adolescents' perception of their sexual behavior.

An important step in the prevention and control of AIDS is the use of condom. In line with this, adolescents' perception of their sexual behavior is affected by their perceived

knowledge of condom use among school friends. The chance of perceiving risky sexual behavior is reduced by a factor of 0.53 for those adolescents who perceived condom use among their school friends is not usual compared with those who perceived condom use is usual (table 6.2). This effect is statistically significant.

Table 6.2 Logistic Regression Results on the Relative Effects of Variables on Adolescents Perception of their Sexual Behavior

Variables	β	S.E	Exp (β)
Religion			
Orthodox (RC)			1.00
Muslim	-0.38	0.22	0.69
Perceived knowledge of condom use among school friends			
Condom use is usual (Rc)			1.00
Condom use is not usual	-0.64	0.19	0.53*
Don't know	-0.75	0.21	0.47*
Perception of school friends sexual behavior			
Perceived as risky (Rc)			1.00
Perceived as not risky	-0.60	0.24	0.55**
Don't know	0.34	0.17	1.41
Knowledge of PLWHA or died from AIDS			
Yes (Rc)			1.00
No	-0.64	0.23	0.53*
Don't know	3.38	1.12	29.26*

* Significant at P<0.01 level; ** significant at P<0.05 level

In addition, the perceived knowledge of school friends' sexual behavior has an effect on adolescents' perception of their behavior. Adolescents who perceived as "their school friends are not at risk" were also found less likely perceiving this own sexual

behavior as risky. The odds of risk perception are lowered by a factor of 0.55 for those who perceived as their friends are not at risk compared to those who perceived as "their school friends are at risk."

The adolescent knowledge of PLWHA or someone died of AIDS will strengthen their belief of the existence AIDS. It is also found that this knowledge facilitates the adolescent's understanding and perception of risky sexual behavior. It seems in this understanding that the risk perception of adolescents' is 0.53 times lowered for those who did not have the above knowledge compared to those who have the knowledge.

One thing to be noted here is that the adolescents who said "don't know" which means they are not sure in any aspect seems to have higher perception of risk. But this may be related to the view that "take all actions as risky" without evaluating the behavior.

The religion of respondents did not have a statistically significant effect on the risk perception of adolescents. This nullifies the stated hypotheses that adolescents' perception of risky sexual behavior differs by their religion.

CHAPTER SEVEN

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

This study has provided an insight into the sexual behavior of school adolescents, and their knowledge of HIV/AIDS and other STIs in Hulet Ejju Enesie district of East Gojjam, Amhara National Regional State, Ethiopia. Most of the study subjects (70 percent) were males and 30 percent were females. About 60 percent were in grade nine. The majority (76.8%) of the respondents were in late adolescence period. Nearly 70 percent were from the rural area and some 48.5 percent of them were living away from their family in rented houses. Eighty five percent of the adolescents were Orthodox Christians and about 15 percent were Muslims.

The study has investigated the prevalence of sexual activity among school adolescents. It was found that 40.2 percent of the adolescents had already had their first sexual experience. The mean age of sexual commencement was 15.9 years (median=16 years). The prevalence of sexual engagement in this study group is relatively higher, and started earlier compared to other studies in the country (Shabir I., 1997; FGAE, 1998; 2001; Konjit, 1998).

Consistent with similar studies female adolescents in the study started sexual experience relatively earlier than their male counterparts with a mean age of sexual commencement of 15.56 and 16.04 years respectively. This might be due to the effect of "sugar daddies", the prevalence of early marriage in the society (though weakening), and presence of sexual relations of younger girls with older people as indicated in the FGDs.

As stated in the literature, the earlier the age at first sexual intercourse, the higher the risk of contracting STIs, including HIV/AIDS. Therefore, female adolescents in this study are at higher potential risk, even higher than other female adolescents in other similar study groups. About 39 percent (again more females than males) of the adolescents were sexually active.

In relation to the number of sexual partners, nearly 46 percent of the respondents practiced sex with more than one partner in their sexual life (the figure is almost similar even in the last 12 months). The mean number of sexual partner was 1.71; 1.73 for males and 1.66 for females. The results of key informant interviews as well as FGDs indicated that the practice of sexual relations with multiple sexual partners is common, and considered as a norm and an adventure among adolescents. Therefore, it seems true that the number of sexual partner may be even greater than the reported figure.

The study revealed that more rural (72.6 percent) adolescents than urban counterparts reported to having had sexual experience. The FGD participants highly acknowledged that most rural adolescents are living in rented houses, away from their families with less or no parental supervision and guidance. Thus they are free to engage in sexual activities and they did it.

In this study gender aspect of sexual experience was observed. About 44 percent of the male and 32 percent of the female adolescents had sexual experience. Males' greater involvement in sexual intercourse, though there may be under reporting among females, more likely reflects the real situation. This is because in our society there is a tendency of encouraging pre-marital sexual contact among the male and discouraging among females. This finding is also consistent with other similar study findings (Hailu., 1997; FGAE, 1998; Shabir I., 1997).

Regarding the use of preventive methods, it is evidenced that 39.6 percent of the respondents reported they used preventive methods during their first sexual encounter, whereas the majority (60.4 percent) reported any methods of preventing pregnancy or STIs was not used. Even during their recent sexual experience the majority of the adolescents did not use preventive (contraceptive) methods. In general the contraceptive use among adolescents was low. The important reasons indicated by the adolescents for not using contraceptives were:

1·83 F
2·52 M

- Sexual encounter was not expected (36.2%)
- Did not dare to tell partner to use preventive methods (26.7%); and
- Thought that pregnancy or any STIs could not occur by first sexual contact only (18.5%).

The participants in the FGDs elaborated in detail the reasons for not using preventive methods (contraceptives) as follows:

1. They said that in the first place adolescents engaged in sexual intercourse unexpectedly. That is they may meet each other to "study together"; unexpectedly they start hugging, holding hands, kissing, massaging and rubbing against each other. Then aggressively and emotionally engaged into sexual intercourse without any preventive methods.
2. Adolescents give emphasis on how to approach his/her sexual partner, and perform sex, because they are new comers to sexual life and are unskilled. Therefore, it is not surprising that they don't even think to use contraceptive methods, late alone to use.
3. It is considered as a norm among adolescents to have sex by having flesh to flesh (genital to genital) direct contact especially during first sexual debut. It is highly believed among adolescents that blood should "touch" the male sex organ when a girl is deflowered. Again it is viewed as insulting the girl even to ask her to have sex-using condom during her first sexual debut.

The study further assessed the type of contraceptives used for those who said they have used preventive methods during their first sexual experience. It is found that those who used oral pills were higher (44.7%) than those who used condoms (37.7%). One important reason for this, as mentioned in FGDs, is that adolescents fear the incidence of pregnancy than that of STIs, including HIV/AIDS.

More on the use of condom among adolescents, only 11.4 percent adolescents used condoms consistently whenever they have sexual relations with their boy/girl friends. This prevalence of condom use is very low compared with similar studies. Fear of

reduction of sexual satisfaction, being faithful to sexual partner, partner oppositions, and fear of partner reaction were the most important reasons mentioned by respondents for low condom use. Additional reasons described in FGDs were:

1. The presence of bad reputation and poor image about condoms among adolescents. There is a metaphoric expression among the adolescents to express the bad reputation, which is stated as "Sock is for the leg, not for the sex organ".
2. Embarrassment and reluctant providers stand in the way of obtaining condoms. "There are many condom providers who say "what to do with it?" when we ask condoms. It is obvious that it is not for playing handball, since we are not "kids" after all", said many adolescents in the FGD. All the above mentioned reasons are consistent with reasons mentioned in the literature.

In addition, the low/non use of contraceptives (particularly females), and the extent of their risk can be justified by the following evidences.

1. Both in FGDs and key informant interviews it is stated that there are many school female adolescents who dropped out of school due to pregnancy and its complications.
2. There are adolescents who tried to abort by taking high dose of antibiotics (such as ampiciline, tetracycline, etc) and by having foreign objects in the vagina, resulted in life threatening out comes, even death.
3. The district police crime prevention and investigation department head also indicated that there are evidences collected from an abortionist. The abortionist gave her witness to the police department that she had done abortion for many school adolescents.

On adolescents' perception of their sexual behavior, though the majority of adolescents have practiced unprotected sex with multiple partners, only 11.9 percent of them perceived the risk. The bi-variate analyses revealed some socio-demographic variables are related to adolescents' perception to their sexual behavior. Adolescents

who perceived the risky sexual behavior of their friends also more likely perceived their own risky sexual behavior than those who didn't perceive their friends risk. Adolescents' knowledge of PLWHA or died from AIDS, and use of condoms among their peers were also identified as responsible variables in the context of the perception of risky behavior of adolescents.

As to the knowledge of HIV/AIDS and other STIs, consistent with other reports this study also found that the majority (97 percent) had heard about HIV/AIDS and other STIs, and 96 percent of the respondents acknowledged the incurability of AIDS. Some 84 percent of the respondents knew PLWHA or died from AIDS; and 93 percent knew a healthy-looking person can have the virus in his/her blood.

On sources of information about AIDS and other STIs, consistent with other reports (CSA and ORC Macro, 2001) radio was found the most important source of information. School/Teachers, anti-AIDS clubs and health workers were also important sources. Churches/Mosques, parents, peers/friends, and Idir were found less important sources. However, these institutions were expected to be important sources of information to adolescents.

In relation to knowledge of the modes of HIV/AIDS transmission, more than 90 percent of adolescents appreciated unprotected sexual intercourse is the most important mode of HIV/AIDS transmission. Such appreciations among adolescents can be an important in-put for HIV/AIDS prevention and control strategies. Also the other correct modes of transmission are known by more than 70 percent of the adolescents. However, there are some adolescents who incorrectly perceived certain social relations with PLWHA, and mosquito bites as modes of transmission. This demands certain measures to avoid the misconception, because this misconception is also revealed in other studies (Asheti, 2001).

Concerning the knowledge on ways of AIDS prevention, about 96 percent of the respondents believed that there are ways of avoiding HIV/AIDS. Most of the adolescents acknowledged the three important ways of avoiding HIV/AIDS namely:

abstain from sex, faithful to one partner and use condom, which can be considered as important advance in HIV/AIDS control activities.

Consistent with other findings, in all cases considered examining adolescents' knowledge of AIDS, female adolescents are less knowledgeable than male adolescents. However, female adolescents are at greater risk of AIDS due to biological, social and physiological reasons, indicating an urgent need to reverse the situation.

Regarding to other STIs issues, the study has shown that most adolescents knew the three common STIs; these are syphilis, gonorrhea and chancroid. A prevalence rate of 13 percent (12.4% for males and 14.4% for females) was found in the study group which is, though there may be under reporting, high compared to other similar study (Shabir I. et al., 1997; MOH, 2004). This indicates the need to address adolescents about STIs in a more comprehensive manner, since this is one predisposing factor for HIV infection.

On knowledge of signs and symptoms of STIS, some 64 percent of the study subjects knew three or more symptoms which show that knowledge of STIS is some how good. However, about 9 percent of the respondents did not know any symptom which shows that there is still much to work on the STIS.

As to the issue of contraceptives, the study showed that more than 92 percent of the adolescents are aware of the different types of contraceptives. However, only oral pills, condom, injectables and periodic abstinence were mentioned by the majority. One important issue in relation to contraceptive knowledge is whether adolescents know contraceptive type which has dual protection. It is reported that about 76 percent adolescents (82 percent of males and 67 percent of females) correctly identified condom, which has a dual protection role. But some 7 percent (5 percent of males and 11 percent of females) wrongly ascribed injectables as having a dual protection role. This was also raised by key informant interviewee. This misconception requires prompt consideration of adolescents' contraceptive knowledge.

The study has tried to analyze the determinants of adolescents' sexual experience. Studies in different countries have shown that the sexual behavior of friends influences adolescents own sexual behavior. Consistent with this, in the multivariate analysis of this study friend sexual behavior was found to be a significant predictor of adolescent sexual experience.

The result showed that the risk of commencing sexual intercourse is 0.42 times lower for those adolescents who had no sexually experienced friends compared with those who have had sexually experienced friends. The other predictor variable is discussion with school friends about sexual issues. The risk of commencing sex is higher for those adolescents who had discussed sexual matters with their friends, but it is low for those who did not discuss. As compared with the sexual experience of those who had discussed sexual issues with their friends, the risk is 0.64 times (36%) lower for those who didn't discuss. The above two variables clearly indicate the extent of peer behavior influence on adolescents sexual experience.

Consistent with other findings (Solomon, 1990; FGAE, 1998; 2001; Samson, 1997; Konjit, 1998) age of adolescents was also found to have an effect on the sexual experience of adolescents. It is observed that the risk of starting sex for adolescents aged 17-19 years was 9.6 times higher than for those adolescents aged 15-16 years. Moreover, consistent with findings in the literature, parent adolescent communication, particularly with father was found to have an effect of delaying sexual initiation. The study showed adolescents who didn't discuss sexual issues with their father were 1.3 times at higher risk of having sexual relations when compared with those who had discussion.

To conclude the discussion, about 40.2 percent of the adolescents admitted to being sexually experienced, 46% had sexual relations with multiple partners, and 61.7% did not use condoms even though 76% of the respondents believed the use of condoms can prevent pregnancy and STIs, including HIV/AIDS. Besides, about 66% of them did not perceive their risky sexual behaviors. These results show that our adolescents are at high risk of HIV/AIDS. Thus, there is a strong need of appropriate intervention programmes targeting the adolescents. Accordingly, the following recommendations are made.

1. The study found knowledge of the existence of AIDS, the sexual nature of its transmission and ways of avoiding it is high among adolescents. However, it did not lead many of them to practice safe sex. Therefore, concerned organizations (Governmental, NGOs, and others) in the area of HIV/AIDS prevention and control activities need to acknowledge knowledge about the sexual transmission of HIV-Virus is insufficient/unable to bring about behavioral changes, and have to make efforts accordingly.
2. The study pointed out most adolescents (with respect to those who are sexually experienced) practice risky sexual behavior, which makes them most likely vulnerable to HIV infection. A strategy of changing adolescents' sexual behavior with a view of creating sexual values that reduce the risk of AIDS and others STIs should be aggressively implemented. Institutions such as the family, educational and religious ones, which function as basic socializing agents, need to assume the responsibility of creating desirable sexual values among adolescents. The evidence in this study has revealed that the role of these institutions has been insignificant so far.
3. Parent-adolescent discussion about sexual matters is found to deter sexual initiations. In view of this, much more than what is being done is expected of IEC programs in the way of encouraging parents and/or other older family members to discuss sexual issues with adolescents and influence their sexual behavior.
4. In this study peer behavior is found to have a strong influence on the sexual experience of adolescents. It is likely, therefore, to bring healthy sexual behavior through peer education by properly trained peer educators. Peer education could help to establish standards for acceptable behavior, and will change norms that encourage risky behavior (Kiragu, k., 2001).
5. Most adolescents did not perceive risky behavior though they practice it. Since most individuals consider themselves rationale, there is a need for more specific understanding of adolescents' interpretation of risk to themselves and how they feel they can protect themselves from HIV infection.
6. Adolescents' who deny their personal risk of HIV/AIDS, as many research findings confirmed, may ignore AIDS prevention messages, dismiss their

relevance, or think that they don't bear responsibility for protection. For this reason priority should be given in HIV/AIDS prevention and control activities to help adolescents perceive their personal risk. Otherwise all prevention efforts may be futile.

7. Family life Education should be actively taught in the secondary school curriculum. Moreover, reproductive health services, which are almost non-existent in the area, should be readily available accessible and adolescent friendly. These have also been consistently recommended by several authors (Shabir I., 1997, Shabir I. and Demena M., 1996, Bisrat F., 1992; Manzini, N., 2001), hence, deserve the due attention of the responsible policy makers and implementers.
8. IEC programmes intended to promote safe sexual behavior should be targeting both those who have not started engaging in sex and those who have. With regard to the former, intervention programmes should encourage the delay of sexual initiation by providing adolescents with information about the risks of early sexual initiation. At the same time, adolescents who are already sexually experienced need programmes that will ensure that they practice safe sex.
9. The study found a negative attitude and low condom use among adolescents. Even though condoms do not guarantee absolute protection against STIS/HIV infections, they remain the best protective method available; hence needs to be promoted and the negative attitude should be changed.
10. At last, there is no single magic bullet to control HIV/AIDS. Therefore, all concerned institutions should have to make a concerted effort to combat the spread of HIV/AIDS.
11. Finally, in this study attempts have been made to give an insight about the sexual behavior and knowledge of HIV/AIDS and other STIs among adolescents in Hulet Ejju Enesie district of East Gojjam. However, further studies are needed to augment our knowledge of the district adolescents' sexual behavior, attitudes, and factors that motivate or deter them from having sexual intercourse and using contraceptives (condom), particularly by considering adolescents who are not considered in this study.

BIBLIOGRAPHY

AIDS control and prevention project (AIDSCAP) (1997). Making prevention work: Global lessons learned from the AIDS control and prevention project 1991-1997. Research Triangle park. North Carolina, Family Health International.

_____ (2000). The Female Condom: from Research to the Market place. Arrington, Virginia, Family Health International.

Ainsworth, M. and Over, M. (1997). Confronting AIDS: public priorities in a Global Epidemic. World Bank policy Research project, Washington D.C, Oxford University press.

Ali, K. A. (1996). "Notes on rethinking Masculinities: An Egyptian Case" in: Zeidenstein, S. and Moore, K., eds. Learning about sexuality: A practical Beginning. New York, population council.

Anderson, R. (1996). "The spread of HIV and sexual mixing patterns" in: Mann, J. and Tarantola, D., eds. AIDS in the World II: Global Dimensions, Social Roots, and Responses. New York, Oxford university press.

Ankrah, E.M. and Attika, S.A. (1997). Adopting the Female Condom in Kenya and Brazil: Perspectives of women and Men. Arrington, Virginia, FHI.

Araoye, M.O., and Fakeye, O.O(1998). Sexuality and contraception among Nigerian Adolescents and Youth. Afr J Reprod Health; 2(2): 142-150.

Asheti Negassa et al. (2001). Knowledge, Attitude and practice of Trained Traditional Birth Attendants on HIV/AIDS prevention in Jimma Town, Southwest Ethiopia. Ethiop J Health Sci; 11(2): 123-129.

Ayana Yeneabat and Melaku Eshetu (1998). "Reproductive Tract Diseases (RTDS), and STDs, including HIV/AIDS" In: Seyoum Gebreselassie and Markos Ezra, eds. Hand Book on population Family life Education For secondary school Teachers in Ethiopia. Addis Ababa, ICDR.

Berman, S., and Hein, K. (1999). "Adolescents and STDS" in: Holmes, K, et al. eds. Sexuality Transmitted Diseases 3rd edition. New York, McGraw Hill.

Bisrat F. (1992) Knowledge, Attitude and practice study in Harar town High School Students on Family Planning (Desertation). Addis Ababa, A.A.U.

Boyer, C. and Keggles, S. (1991). AIDS Risk and Prevention among Adolescents. Soc Sci Med; 33 (1):11-23.

Bureau of Finance and Economic Development (2004). Population Estimation 2004, Bahir Dar, Amhara Regional state.

Cates, W., et al. (1997). Primary HIV infection. A public health opportunity. Am J Public Health; 87(12): 1928-1930.

Central Statistics Authority (CSA) and ORC Macro (2001). Ethiopia Demographic and Health Survey 2000. Addis Ababa, Ethiopia and Calverton, Maryland, USA: CSA and ORC Macro.

Chandan, J.S. (2003). Statistics for Business and Economics. Vikas Publishing House PVT LTD, Delhi.

De Vincenzi, I.A. (1994). A longitudinal study of Human Immunodeficiency Virus transmission by Heterosexual partners. Engl J Med; 331 (6):341-346.

Deschampls, M.M. et al. (1996). Heterosexual Transmission of HIV in Haiti. Annals of Internal Medicine; 125 (4):324-330

District Education office (2004). Monthly students' statistics. Hulet Ejju Ensie District education office, Mota.

Donovan, P. (1998). School-Based Sexuality Education. Fam plann perspect; 30(4): 188-193.

Earl, D. (1995). Re-examination of the paradigm of HIV Risk Reduction in Adolescents. J Am Ostet Assoc; 95(12): 725-728.

Ensiminger, M. (1987). "Adolescent sexual Behavior as it relates to other transition behavior in youth" In: Hofferth, S. and Hayes, C. eds. Risking the Future Vol. 2 Washington D.C, Mateonal Research Council

Eshetu Gurmu and Tadesse Alemu (1998). "Adolescent Reproductive Health and other issues in Ethiopia" In: Seyoum Gebreselassie and Markos Ezra, eds. Hand Book on population and Family Life Education for secondary school Teachers in Ethiopia. Addis Ababa, ICDR.

ETR's Resource center for Adolescent pregnancy prevention (2003). Theories and Approaches: Health Belief model. A:/RecApp Theories and Approaches Health Belief model: htm Accessed July 8, 2005.

Evelyn, Unuigbe I. and Osafu, Ogbeide (1999). Sexual Behavior and perception of AIDS Among Adolescent Girls in Benin City, Nigeria. Afr J Reprod Health; 3(1): 39-44.

Family Guidance Association of Ethiopia (FGAE) (1998). A Base line survey on knowledge, Attitude and practice of sexuality and Reproductive Health among Jimma Youth. FGAE, Research and Evaluation unit.

_____ (2001). Base line survey on knowledge, Altitude and practice of sexuality and reproductive Health among Jijiga Youth. FGAE, Research and Evaluation unit.

_____ (1999). Transformation Concept proposal, Addis Ababa.

Fee, N.M (1993). Experiences of peer Approaches in Developing Countries. Geneva, WHO/Global programme on AIDS.

Gage, A (1998). Sexual Activity and Contraceptive use: The components of Decision Making process Stud Fam Plann; 29 (32): 56-58.

Gardner, R. et al. (1999). Closing the condom gap population Reports, series H, No. 9. Baltimore, Johns Hopkins school of Public Health, Population Information Program.

Glover, E. k., et al. (2003). Sexual Health Experiences in three Ghanaian Towns IFPP; 29 (1): 32-40.

Graham, J. et al. (2000). Secular trend in age at menarche in china: A case study of two rural countries Anhui Province. JBS; 31 (2): 257-267.

Green, C. (1997). Young men: The forgotten in Reproductive Health. Washington D.C, pathfinder International.

Hailu M. (1997). Knowledge, Attitude, and practice on sexuality and Reproductive Health Among Harar Adolescents. A Base line survey. Addis Ababa, FGAE.

Harvey, P.D. (1998). Marketing condoms internationally. presented at the 2nd Annual National Symposium on overcoming Barriers to condom use, Los Angeles, Feb 19-20.

International Family Planning Perspectives (IFPP) (2003). Condom Use and the Accuracy of AIDS knowledge in Cote d'Ivoire. 29(1): 41-47.

Iversen, A. (2002). Genital Shedding in Women. AIDS patient care 13(12): 695-701.

Karim, A.M. et al. (2003). Reproductive Health Risks and Protective Factors Among Unmarried Youth. IFPP; 29 (1):14-24.

Keeling, P. (2003). The Global challenge of HIV/AIDS: Briefing Summary. Association of American Colleges and Universities.

Kiragu, K. (2001). Youth and HIV/AIDS: Can we Avoid Catastrophe?. Population Reports, Series L, No. 12. Baltimore, the Johns Hopkins University Bloomberg School of public Health, population Information program.

Kiragu, K. and Zabin, L. (1993). The correlates of pre-marital sexual Activity among school age adolescents in Kenya. IFPP; 19(3): 92-109.

Konjit Kefetew (1998). Socio-Demographic Determinants of Female Adolescent Sexual Behavior in Addis Ababa. M.A thesis, Addis Ababa University (Unpublished).

Laurence, J. (1999). Women and AIDS. AIDS Patient care and STDS; 13(2): 77-79.

Manzini, N. (2001). Sexual Initiation and Childbearing among Adolescents Girls in Kwazulu Natal, South Africa. Reproductive Health Matters; 9(17): 45-51.

Ministry of Health (2002). AIDS in Ethiopia. 4th edition. Addis Ababa, Disease prevention and control Department, MOH.

_____ (2003). Adolescent Reproductive Health: Extension package. Addis Ababa, FDRE, MOH.

_____ (1995). Adolescent Reproductive Health Module: A manual for Adolescent care Takers. Addis Ababa, Family Health Department, MOH.

_____ (2003). National HIV/AIDS counseling Training Manual. Addis Ababa, HIV/AIDS and other STDs prevention and control Team, MOH.

_____ (2004). AIDS in Ethiopia 5th ed: Technical Document for the fifth Report. Addis Ababa, Disease prevention and control Department, MOH.

Morris, L. (1994). Sexual Behavior of Young Adults in Latin America. Advances in population: psychological perspectives 2:231-251.

Moscicki, K. et al (2001). Cervical ectopy in adolescent girls with and without HIV-virus infections. J Infectious Disease; 183 (6): 865-870.

Negussie Taffa (1998). Sexual Activity of out of school youth, and their knowledge and attitude about STDs and HIV/AIDS in Southern Ethiopia. Ethiop J Health Dev; 12 (1): 17-22.

Ntozi, M. and Kirunga, C. (1998). Family Planning and HIV/AIDS in Sub-Saharan Africa: Challenges and Strategies. Afr J Reprod Health; 2(2): 44-56.

Osmond, D.H. (1998). Sexual transmission of HIV. The AIDS knowledge Base. University California (Accessed April 20, 2005).

Pathfinder International (1999). Adolescent Reproductive Health in Africa: Paths into the next Century. A programmatic strategy for Addressing Reproductive Health Needs of Youth people in sub-Saharan Africa:1999-2003. African Regional Office.

_____ (2002). A comprehensive Training course: Reproductive Health Services for Adolescents. Vol. 16. Watertown, MA.

Peterson, A. and Crockett, L. (1986). "Pubertal development and its relations to cognitive and psychological development in adolescent girls: Implications for parenting. In: Lancaster, J. and Hambug, B., eds. School age pregnancy and parenthood. Biosocial dimensions. New York, Aldine De Gruterter.

Royce, R. et al. (1989). Sexual Behavior and Intravenous Drug use. Washington D.C, National Academic Press.

Samson Kassahun (1997). Sexual Behavior, Contraceptive practice and knowledge of AIDS of High School Students. Addis Ababa University. (Unpublished M.sc Thesis).

Saracco, A. et al. (1993). Man to Woman sexual transmission of HIV: longitudinal study of 343 steady partners of infected men. J AIDS; 6(5): 497-502

Shabbir I. et al. (1997). High Risk Sexual Behaviors For STD/HIV, pregnancies and contraception Among High School students in a Rural Town, North Western Ethiopia. Ethiop J Health Dev; 11(1): 29-36.

Shabir I. and Demena M. (1996). Family planning Survey in North Gondar, Ethiopia. Ethiop Med J 34:173-182.

Solomon Gebre (1990). Sexual Behavior and knowledge of AIDS and other STDS: A survey of senior High School Students. Ethiop. J. Health Dev; 4(2): 123-131.

Steinberg, L. (1989). Adolescence. Second Edition. New York. McGraw Hill Publishing Company.

Summola, A.M., et al. (2003). Reproductive knowledge, sexual Behavior and Contraceptive use. Afr Repord Health; 7(1): 37-48.

Turner, C. et al. (1989). AIDS: Sexual Behavior and Intravenous Drug use. Washington, D. C., National Academy press.

UNAIDS (2004). Report on Global AIDS Epidemic. Joint united Nation programe on HIV/AIDS. Geneva.

UNAIDS and W HO (1999). AIDS Epidemic up date: Geneva.

_____(2004). AIDS Epidemic up date. Geneva

United states, National Institutes of Health office of AIDS Research (OAR) et al. (2000). Gender and viral load: Workshop Summary Report. Sanfrancisco, OAR, Jan. 29, 2000 http:/www.nih.gov/od/oar/public/pubs/viralload.htm. Accessed Feb 5,2005).

Underwood, C. (2001). Impact of the HEART Campaign: Findings from the youth surveys in Zambia, 1999 and 2000. Baltimore, Johns Hopkins University. University Center for communication programs.

UNFPA (1998). From challenge to consensus: Adolescent Reproductive Health in Africa. The center for Development and Population Activities. U.S.A, Washington. D.C.

Walter, H. et al. (1992). Factors Associated with AIDS risk Behaviors among High school Students in an AIDS Epicenter. Am J public Health; 82(4): 528-532.

Weiss, E., and Roa Gupta (1998). Bridging the Gap: Addressing Gender and Sexuality in HIV prevention. Washington D.C., International center for Research on Women.

World Bank (2004). Integrating Gender Issues in selected HIV/AIDS projects in the African Region. A Base line Assessment. Washington D.C., Africa Region Human Development working paper series №. 67.

Yemane G. Hiwol (1994). Responsible parenthood. Population Education Monograph. Addis Ababa, ICDR, MOE.

Appendix. 1

Consistency cheek

Current age of adolescents	Age at first sexual experience										
	10	11	12	13	14	15	16	17	18	19	Total
15					7						7
16	1			1	9	20	19				50
17					12	24	42	8			86
18	2	1		2	14	22	56	48	16		161
19	1			1	2	12	24	29	21	8	98
Total	4	1		4	44	78	141	85	37	8	402

Column wise = Age of adolescents (15-19)

Row wise = Age at fist sexual experience (10-19)

Appendix 2

Demographic Training and Research Center
Institute of Development Research
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Title: SEXUAL BEHAVIOR AND KNOWLEDGE OF HIV/AIDS AMONG SCHOOL ADOLESCENTS IN HULET EJJU ENESIE DISTRICT, AMHARA REGION

Students' Questionnaire

Part I: Socio-Demographic Characteristics of Respondents

101. Sex 1. Male 2. Female
102. Age _____
103. Grade _____
104. Religion 1. Orthodox 2. Muslim
3. Other (specify) _____
105. Residence 1. Rural 2. Urban
106. Living arrangement 1. Living with both parents
2. Living with father only
3. Living with mother only
4. Living with other family members
5. Living away from family in rented (relative) house

Part II. Family Background of Respondents

201. Is your father alive?
1. Yes 2. No (go to Q 205)
202. If yes, what is the education status of your father?
1. not able to read and write
2. literate only
3. Primary education (grades 1-8)
4. Secondary education (grades 9-12)
5. above secondary (Diploma, Degree, etc)
203. Do you talk with your father about sexuality issues?
1. No 2. Yes

204. If No, why do you not talk to your father about sexuality issues? (Circle all that apply)
   1. I am embarrassed to talk to him
   2. I prefer to talk to my mother
   3. I am not interested in discussing this issues
   4. this topic upsets him
   5. other (specify) _____

205. Is your mother alive?
   1. Yes 2. No (go to Q 301)

206 If yes, what is her education status?
   1. not able to read and write
   2. literate only
   3. primary education (grades 1-8)
   4. secondary education (grades 9-12)
   5. above secondary (Diploma, Degree, etc)

207. Do you talk with your mother about sexuality issues?
   1. No 2. Yes (go to Q 301)

208. If No, why do you not talk to your mother about sexuality issues? (circle all that apply)
   1. I am embarrassed to talk to her this issue
   2. I prefer to talk to my father
   3. I am not interested in discussing this issue
   4. This topic upsets her
   5. Other (please specify)_____

PART III. Sexual Behavior

301. Do you ever discuss sexual issues with your school friends?
   1. Yes (frequently) 2. Yes (occasionally) 3. No

302. Do you currently have a boyfriend/girlfriend?
   1. Yes 2. No

303. Think of your school friends is there anyone who is sexually experienced?
   1. Yes 2. No

304. If yes, how old was he/she when he/she first started having sex?
   1. Age _____ 2. Can't remember

305. At what age did you first have sexual intercourse?

1. Age _____ 2. Can't remember

3. Never had sex (go to Question 313)

306. The first time you had sex, did you or your partner do anything to prevent pregnancy or sexually transmitted infections (STIs)?

1. No (go to Q 309) 2. Yes

307. If yes, what did you or your partner do or use?

1. Condom 2. Pills 3. Pills plus condom

308. Who initiated the idea of using the preventive method?

1. Myself 2. My partner 3. Both of us 4. Don't remember

309. If you did not do anything to prevent pregnancy or STIs, what was the <u>main reason</u> for you not doing (using) anything the first time you had sexual intercourse? (circle only one answer)

1. was not planning to have sex
2. did not dare to tell partner
3. thought that pregnancy or any STIs do not occur by first sex only.
4. did not dare to get contraceptives
5. does not know methods
6. does not know how to use methods
7. does not know where to get the methods
8. other (please specify) _____

310. Have you had sexual intercourse in the last 12 months

1. Yes 2. No

311. How about in the last 3 months? 1. Yes 2. No

312. How about in the last 4 weeks? 1. Yes 2. No

313. Is it usual among students to have sex with different sexual partners?

1. Yes 2. No

314. How many different sexual partners have you had in the last one year? (please specify the number)

1. _____ 2. Can't remember

315. How many different sexual partners have you had in your lifetime? (please specify the number)

1. _____ 2. Can't remember

316. The last time you had sexual intercourse, did you or your partner do anything to prevent pregnancy or STIs?

1. No (go to Q. 319) 2. Yes

317. If yes, what did you or your partner do or use?

1. Condom 2. Pills 3. Condom plus pills
4. Other (please specify) _____

318. Who decided/proposed to use the method the last time you had sexual intercourse?

1. Myself 2. My partner 3. Both of us

319. If No, what was the main reason for you not using any method to avoid pregnancy or STIs the last time you had sexual intercourse? (circle only one answer)

1. was not planning to have sex
2. embarrassed to talk about using methods
3. though that pregnancy or infection can't occur at this age
4. does not know methods
5. does not know where to get the methods
6. disagreement of partner to use the methods
7. did not dare to get the methods
8. other (please specify) _____

320. Have you ever had sex with any one who you don't know well?

1. No (go to Q. 324) 2. Yes

321. If yes, was a condom used?

1. Yes 2. No

322. Is it usual among your school friends to use condom during sexual intercourse?

1. Yes 2. No 3. Don't know

323. How often do you use condom while having sex with your boyfriend/girlfriend?

1. Never used 2. Always 3. Sometimes

324. If you never use a condom, what is the main reason for not using a condom? (circle only one answer)

1. it reduces sexual satisfaction
2. you are faithful to your lover

3. your partner oppose using a condom
4. you fear your partner reaction
5. simply you don't want to use condom
6. other (please specify) _____

325. Think of the sexual behavior of your school friends, do you think that they are at risk of HIV/AIDS?

1. Yes 2. No 3. Don't know

326. Do you think that your behavior puts you at risk of HIV/AIDS?

1. Yes 2. No

PART IV. Knowledge of HIV/AIDS and other STIs

401. Have you ever heard of the virus HIV or an illness called AIDS?

1. Yes 2. No

402. Do you know someone personally who has the HIV/AIDS or someone who died from AIDS?

1. Yes 2. No

403. Do you think a healthy-looking person can have the AIDS virus?

Yes 2. No 3. Don't know

404. Do you think someone who looks healthy but who has the AIDS virus in the blood can pass it on to other people?

1. Yes 2. No 3. Don't know

405. Which of the following do you think are the <u>possible</u> <u>ways</u> of HIV/AIDS transmission? (circle all that apply)

0. Don't know
1. eating and drinking with someone who has the virus HIV
2. shaking hands with person with HIV/AIDS
3. being bitten by various insects like mosquito
4. using eating and drinking utensils that have used by someone who has the virus
5. Having unsafe sex with someone who has the virus.
6. living under one roof with someone who has the virus in his/her blood
7. through unclean blood transfusion
8. from mother to child during pregnancy
9. through breast feeding a baby from an infected mother

10. through common use of toilets
11. having multiple sexual partner
12. sharing contaminated blades, needles and other sharp objects
13. other (please specify) _____

406. Is there anything (ways) a person can do to avoid getting infected with HIV?
1. No (go to Q. 408) 2. Yes 3. Don't know

407. If yes, what can a person do to avoid getting infected with HIV? (circle all that apply)
0. Don't know
1. Abstain from sex
2. use condoms
3. limit sex to one partner/stay faithful to one partner
4. Avoid unclean blood transfusion
5. Avoid injections with unclean needles
6. Avoid sharing blades and other sharp objects
7. other (please specify) _____

408. Do you think that a person who has acquired HIV/AIDS can be cured?
1. Yes 2. No 3. Don't know

409. Do you know sexually transmitted infections other than AIDS?
1. Yes 2. No (go to Q. 501)

410. If yes, which of the following are STIs? (circle all that apply)
1. Trichomoniasis
2. Gonorrhea
3. Syphilis
4. Chancroid (Genital sores)
5. Lymphgranuloma Venereum
6. Lymphogranulamo inguinal
7. other (please specify) _____

411. In man/women, what signs and symptoms would lead you to think he has STIs? (circle all that apply)
0. Don't know
1. Abdominal pain
2. Genital discharge/dripping
3. foul smelling discharge
4. burning pain on urination

5. Redness/inflammation in genital area
6. swelling in genital area
7. Genital sores/ulcers
8. blood in urine
9. other (please specify) _____

412. Is STI common among your friends?
1. Yes 2. No 3. Don't know

413. Have you ever experienced STIs?
1. Yes 2. No 3. Don't know

414. Do you think STIs can cause serious reproductive health problems if they are not properly treated?
1. Yes 2. No 3. Don't know

415. Do you think that getting infected with STIs could increase the chance of acquiring HIV?
1. Yes 2. No 3. Don't know

416. What causes AIS?
1. Bacteria 2. Virus 3. Parasite 4. Don't know

PART V. Information source

501. Where do you usually get most of your information/news about HIV/AIDS and STIs? (circle all that apply)
1. Radio
2. TV
3. News Paper/Magazine
4. Pamphlets/Posters
5. Church/mosques
6. Family members
7. Peers/friends
8. Schools/Teachers
9. Anti-AIDS clubs
10. Health workers
11. Idir
12. Other (please specify) _____

502. Is there an anti-AIDS club in your school?
1. Yes 2. No 3. Don't know

503. If yes, is it actively functioning?
1. Yes 2. No 3. Don't know

504. In your opinion, is the activity of the club adolescent friendly?
1. Yes 2. No

505. Do you think that the activities of the club have brought behavioral change in the students?
1. Yes 2. No 3. Don't know

506. Is there an HIV/AIDS prevention and control office in the district?
1. Yes 2. No 3. Don't know

507. If yes, do you know what activities it performs?
1. Yes 2. No

508. Are the activities of the office adolescent friendly?
1. Yes 2. No

509. Have you ever participated in the Activities of the club/office?
1. Yes 2. No

PART VI. Knowledge of contraceptives

601. Have ever heard about contraceptive methods?
1. Yes 2. No

602. If yes, what method(s) you heard about (know)? (circle all that apply).
1. Pills
2. Condom
3. IUD
4. Injectables
5. Female sterilization
6. Male sterilization
7. Periodic Abstinence
8. Diaphragm, foam, Jelly
9. Other (Please specify) _____

603. Which one of the contraceptive method has a dual protection of prevention of unintended pregnancy and STIs including AIDS? (circle only one answer)
1. Pills 2. Condom 3. IUD 4. Injectables
5. Female sterilization 6. female sterilization
7. Period Abstinence 8. Diaphragm, foam, Jelly
9. other (please specify) _____

604. If you need a condom today, do you get it?
1. Yes 2. No 3. Don't know

605. Where do you think you could get a condom? (circle all that apply)
1. kiosks/shops
2. pharmacy
3. boy/girl fried
4. health center
5. friends
6. other (specify) _____

Appendix. 3

Demographic Training and Research Center
Institute of Development Research Addis
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Title: SEXUAL BEHAVIOR AND KNOWLEDGE OF HIV/AIDS AMONG SCHOOL ADOLESCENTS IN HULET EJJU ENESIE DISTRICT, AMHARA REGION

Guideline for key Informant Interview

I. Name _____

Responsibility in the school _____

Years of service in the school _____

1. Could you tell me the students discipline and the general teaching-learning situation of the school?
2. How is the education of HIV/AIDS in the school?
3. How do explain the student's knowledge of STIs including HIV/AIDs?
4. How do you express the student's sexual behavior? Please make it detail
5. Do you think the students practice multiple sexual partners?
6. What kinds of student are more sexually experienced?
7. Is there any anti-AIDS club in the school? Please discuss the activities.
8. What do you say about the student's participation in the club?
9. Do you think that the education on AIDS (through media, AIDS club, etc) has achieved its objectives in bringing behavioral change?
10. In your opinion, is the education on AIDS Adolescent friendly? Please discuss in detail
11. Could you tell us the activities of the district HIV/AIDS prevention and control office and its relation with the school?
12. Do you have any suggestion/comment about HIV/AIDS prevention and control activities?
13. Any more you want to say?

Thank you

Appendix. 4

Demographic Training and Research Center
Institute of Development Research Addis
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Title: SEXUAL BEHAVIOR AND KNOWLEDGE OF HIV/AIDS AMONG SCHOOL ADOLESCENTS IN HULET EJJU ENESIE DISTRICT, AMHARA REGION

Questions for Focus Group Discussions (FGDs)

1. What are the health problems presently faced by the society including the youth and Adolescents?
2. What is (are) the source(s) of information regarding health?
3. Is there any health education in your school? Discuss
4. Could you discuss STIs?
5. What do you say about the sexual behavior of students?
6. Do you think most of the students experience sex?
7. At what age do male/female adolescents generally start sexual intercourse?
8. Is it usual among students to have sex with more than one partner?
9. Is it usual among students to use condom during sexual intercourse?
10. Do you think students use any contraceptive method during their 1st sexual experience?
11. How do you explain the knowledge of HIV/AIDS among students in the school?
12. What about other STIs? Do you think there is relationship between HIV/AIDS and other STIs? Could you discuss?
13. Do you think STIs are common among students?
14. How do you see the sexual behavior of school adolescents?
15. Is there any anti-AIDS club in the school? Discuss its activities?
16. Is there any HIV/AIDS prevention and control office in the district? Could you discuss its activities?

Thank you

DECLARATION

I, the undersigned, declare that this thesis is my original work and has not been presented for a degree in any other university and that all source of materials used for the thesis have been dully acknowledged.

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Addis Ababa University, Ethiopia, June, 2005

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