# CHAPTER ONE

## 1.1 INTRODUCTION

Globally hunger is severe and nearly 30 per cent of the world's population is currently suffering from one or more forms of malnutrition, including inadequate caloric consumption, protein deficiency, poor dietary quality, and inadequate concentrations of protein and micronutrients. Globally approximately 840 million people are undernourished or chronically food insecure, and as many as 2.8 million children and 300,000 women die needlessly every year because of malnutrition in developing countries. The situation is particularly grave in Sub-Saharan Africa and South Asia. Many years of empirical evidence point to the negative impact of hunger and malnutrition on labour productivity, health, and education, which ultimately leads to lower levels of overall economic growth. Hunger is thus, as much a cause and as an effect of poverty. Good nutrition is increasingly understood as an investment in human capital that raises output as well as the returns on investments in education and health care. Taken together, these findings provide powerful evidence that public spending in reducing hunger is an investment with high returns and should constitute a top priority for developing countries. A number of recent global initiatives have sought to put a spotlight on the problem of persistence of world hunger. The 1996World Food Summit (WFS), which brought together all member countries of the United Nations, set the goal of halving the number of hungry people in the world by 2015. This goal means moving from the estimated 818 million hungry in 1990 (benchmark period for the WFS) to 410 million by 2015. The UN Millennium Declaration in 2000 set the Millennium Development Goals (MDGs), the first of which is to halve poverty and hunger by 2015. Despite these efforts,

in many parts of the world, trends are either worsening over time, or progress is too slow to meet the targets. According to data from the FAO, if each of the developing regions continues to reduce hunger at the current pace, only South America and the Caribbean will reach the MDG target of cutting the proportion of hungry people by half FAO (2005). None will reach the more ambitious WFS goal of halving the number of hungry people. Further, as detailed by the FAO hunger &malnutrition are major causes of the deprivation & suffering targeted by all of the other MDGs. Without rapid progress in reducing hunger, achieving other MDGs related to poverty reduction, education, child mortality, maternal health, and disease will be difficult, if not impossible (Basudeb Guha &others 2007). In the 21st century, food comes with baggage. Mechanized farming and the increased yields associated with fertilizer & pesticide usage have reduced employment. Accordingly, farmers are relocating to cities in search of work. Market changes associated with biofuels high oil prices and inflation are raising the cost of basic goods, which leads people to seek alternative ways to secure their food. (Mark Redwood2006) Surging global prices of basic foodstuffs raise the risk that the food crisis of 2007-2008 in developing countries will be repeated, and are seen remaining close to levels reached during the 2008 food crisis (FAO 2012) The number of hungry people in the world increased to over 1 billion in 2009 and then declined somewhat in 2010 to 925 million. World food prices have fallen from their 2008 peaks the proportion of people who suffer from hunger in the total population remains highest in sub-Saharan Africa, where one in three people is chronically hungry. Two thirds of the worlds undernourished live in seven countries: Bangladesh, China, DR Congo, Ethiopia, India, Indonesia, and Pakistan. By virtue of their size, China and India combined account for 42% of the chronically hungry people in the developing world.( GFSC2010) There is 160 million people in the Horn of

Africa (Eritrea, Ethiopia, Kenya, Somalia, Sudan and Uganda) with 70 million prone to food shortages and a famine occurring on average every 10 years. Food surpluses and deficits vary widely over the year but in general food insecurity is a result of climate change, low production, poor governance, and weak infrastructure, low investments in the agricultural sector, lack of pro-poor policies, weak farmer organizations, poor health, and political insecurity in Somalia. Agricultural production has the potential to be vastly increased but is currently limited by: Over cultivation of small pieces of farmland due to dense populations. Minimal soil nutrient replenishment resulting in infertile agricultural land over reliance on rain fed agricultural production systems. Limited investment in irrigation, water harvesting, conservation and low surface water use. High fuel prices resulting in high costs of production (GFSC 2011)

At the national level, the Sudanese economy has been growing at an annual rate of 8%, driven mainly by increased oil exports. The per capita gross domestic product increased from US$415 in 2000 to an estimated US$1,080 in 2006. Despite the booming oil economy, much of the country including both urban and rural areas remains poorly developed, as the benefits of this growth have not been evenly distributed Sudan is classified as both a least-developed country and a low-income, food deficit country, The agricultural sector remains the backbone of Sudan's economy. It accounted for 39% of the gross domestic product in 2005. It also remains the main source of employment and household income, especially in the rural areas, where 65% of the population live. About 80% of the labour force is employed in agriculture and related activities, such as agro-industries. (WFP2007)

***Sudanese economic performance****:* since 2000-2007 With the implementation of successive structural adjustments programs since 1997

and assisted by the onset of oil production in the late nineties the Sudanese economy has shown great progress this is shown in the strong growth rates averaging over 8 percent since2001coupled with macroeconomic stability as seen in the containment of budget deficits single digit inflation rates (although this has recently changed with the rapid rise in inflation in the first half of 2008) and stable exchange rates. The strong Sudanese economic performance has been commended in successive IMF report and has augured well for the country (UNDP Sudan 2008). The year 2012 marked a watershed in the economic history of Sudan as the government had to adjust to the new economic reality following the secession of South Sudan and the consequent loss of about 75% of revenue: real gross domestic product (GDP) is estimated to have contracted by 0.6% and is projected to grow by 2.2% in 2013. Inflation was 36.0% in 2012, up from 20.0% in 2011. Natural resources (mainly oil and gold) underpin medium-term economic growth but the civil wars in Darfur and the border states of South Kordofan and Blue Nile could impair growth prospects. Post-secession Sudan has yet to produce comprehensive, reliable and up-to-date macroeconomic data that meet international standards. This note continues to use macroeconomic data based on estimates provided by the 2013 budget document for 2012 and 2013 together with historical data provided by the authorities and the IMF Staff Monitored Programme . The year 2012 was significant for Sudan, reflecting the adjustment of the economy to the new economic reality following the secession of South Sudan in July 2011 and the resultant loss of about 75% of the county's oil resources. The first military skirmish with South Sudan temporarily brought oil production to a halt in Hegleig, which provides about 50% of the country's oil supply. Furthermore escalation of fighting in the border states of South Kordofan and Blue Nile and the unbudgeted spending on repairing Hegleig infrastructure further exacerbated the unfolding fiscal crisis. The policy

measures adopted in the aftermath of the secession have not been effective in mitigating the effects of adjusting to the severe and lasting external and internal shock. Consequently, real GDP contracted by 0.6% in 2012 down from 2.7% for 2011; nonetheless, it is projected to grow by 2.2% in 2013. The economy is expected to recover gradually in 2013 on the back of a sound revival of agriculture, an increase in oil production, a strong performance of gold exports and robust absorptive capacity. Headline inflation in 2012 approached the threshold of chronic inflation (period average 36%), about 11 percentage points up from the budget projection of 2012 reflecting the combined effects of inflationary financing, the depreciation of the exchange rate, and the continued removal of subsidies, as well as high food and energy prices.(African Development Bank Group 2013). Despite continuing austerity the overall budget deficit increased from 1.0% of GDP in 2011 to an estimated 4.4% for 2012 and is projected to rise respectively to 4.8% and 5.1% in 2013 and 2014. The current account deficit is estimated at 10.2% of GDP in 2012, up from 0.5% in 2011 mainly due to a sharp drop in exports (-52% year on year). The current account deficit is projected to decline to 8.9% in 2013. Medium-term economic growth is expected to be driven by natural resources, mainly oil and gold. However, making the most beneficial use of natural resources (a key driver of the country's historic civil wars) would require a credible strategy to resolve all conflicts, strong commitment to maintaining macroeconomic stability and a clear diversification plan to promote the non-minerals sector by improving the business environment, rehabilitating decaying infrastructure and emphasizing inclusive growth. However, the continued deterioration in the value of the Sudanese pound (SDG) poses grave downside risks to already soaring inflation. This, coupled with the economic slowdown, presents serious challenges to the implementation of the approved Interim Poverty Reduction Strategy Paper (IMF African

economic outlook 2013). Sudan has had one of the highest growth rates amongst Sub-Saharan African countries and a rapidly rising per capita income, with per capita GDP of US$1,500. Nonetheless, the country's human development outcomes remain weak. Sudan ranks 154 out of 169 countries in UNDP's 2010 Human Development Index, especially relative to the fact that income per capita GDP exceeded $1,500 or roughly 25 percent higher than the Sub-Saharan Africa (SSA) average. In 2009, Sudan was the third largest producer of crude oil in SSA, behind Nigeria and Angola, although Sudan's production was only about 30 percent of Angola's. Despite the rising per capita income, the incidence of poverty is high, with 46.5 percent of the population is below the poverty line. There is also significant variation in the incidence of poverty between urban and rural areas as well as between states in the Federation. The incidence of poverty in Khartoum state is 26.0 percent and 69.4 percent in North Darfur. (IMF Country Report No. 13/318).

Population growth is at 3-4% therefore to sustain the status quo production needs to increase by future. Therefore the 60-70% required increase in crop production is attributed to changing diets and non food uses. A recent study by NGOs say that only 1% increase in production is needed to ensure food security for the 13% of population. (Leila McElvenney2012) Despite continued economic growth around the world, food insecurity remains a pressing problem in many parts of Africa (Mougeot, 2005) Day after day, hunger occurs where food is readily available except when circumstances are special, for example in times of war or during serious climatic setbacks and other natural disasters, all of which lead to serious food crises. Agricultural production is a risky business. Farmers face a variety of price, yield and resource risks that make their incomes unstable and unpredictable from year to year. People develop

their livelihood activities according to the situation they face. They use their assets, such as livestock or savings, and they use social capital to handle or overcome critical situations. Provide insight into the patterns of livelihood, food security and vulnerability as developing over time. Investigate the influence of ecological, demographic, and cultural and sociopolitical factors on livelihood secure as they develop over time. Investigate the factors affecting household livelihood and food security generation, the household plays role in agricultural production processes in developing countries, especially in food production. (Ahmed 2005) p: 168. There are international influences such as geopolitical factors and regime-related perceptions that may factor into donor distribution decisions; there are internal country-level factors such as internal politics, ethnic strife, and civil wars; there are environmental and climate factors; and there are cultural factors such as material education, women's status, and use of breastfeeding.(Tina 2009) p:4 Household food insecurity is highly prevalent, particularly in developing countries FAO (2006), J.D hamadani (2009). Improved public understanding of human rights in general and the right to food in particular helps individuals and communities to participate in making decisions that affect their food security situation. (FAO2006)

The recent study conducted that household ability to achieve food security in urban area is derived from the household's human, material, and institutional resource bases, which are often collectively referred in the literature as "food security factors." These factors include the educational and employment status, household demographics, urban agriculture, assets, saving, formal social assistance or direct transfer, informal social networks, access to clean water and sanitation and cost of living. The study of urban livelihoods and Food Security in Greater Accra, Ghana indicated that household food availability is a function of food prices, household

demographics and household tastes and preferences. (Girma 2012) Since the 1990s there had been a decline in per capita food production in (80%) Africa south of Sahara .This is not surprising since Africa is the only continent in the world experiencing a decline in food production per person over the last four decades. (Idris and ali 2007). Improving agricultural productivity is essential for ensuring long-term food security and promoting poverty reduction. Adequate food supply is a fundamental prerequisite for food security, especially as the global population is projected to reach 9 billion by 2050. Bolstering farm productivity through better technology and efficiency can help increase food production. Historically, agricultural productivity has played an important role in poverty reduction (Asian Development Bank 2012). Countries of Sub-Saharan Africa have the capacity to produce enough food to meet their domestic needs, or to increase their agricultural exports and generate sufficient foreign exchange to enable them to import food. At the end of colonialism, emphasis was put on industrialization financed by taxation on exports of cash crops like coffee and cotton. Therefore, poverty alleviation programs will only succeed if access to food is secured. First, this extension would require determining the size of the different population groups. As a first approximation, agricultural population could be identified by rural and non-agricultural by urban population surveys. Estimating the proportion of land owners will be more difficult but data on the distribution of access to land could give some indication (Llull 2008p:7-15). The main causes of food shortage and poverty crisis date back to the colonial era when Africa was exploited as a source of row materials, the food policy and African economics have not been changed. It is widely accepted that without using adaptable technology and improved Food sources, per capita food production is likely to continue declining in Africa. (Idris and Ali 2007). Both arable land and arable land squared are significant predictors

of food security, suggesting an increase in food security with arable land as a percentage of land area, but at a declining rate, as anticipated. The sign and significance level of variables such as fertilizer use irrigated land and tractor use per hectare of arable land imply that using intensive agricultural practices are food security enhancing. However, the fixed effects estimates display a stronger impact of irrigation on food security, as do the random effects estimates for tractor per hectare of arable land. The sign on the rural population density and population growth variables is negative, it was theorized that high population density may have either a positive or negative impact on food security depending on how the agricultural sector is affected. This result suggests that having more people per square kilometer in the rural areas tends to make developing countries more food insecure. As expected, the sign and the significance level of the coefficients on population growth imply that countries with rapid population growth face more difficult challenges ensuring food security. (Jeanty2006). However in continuous coping with extreme weather events and climatic variability farmers having harsh environments, in the region of Africa Asia and Latin America have developed or inherited complex farming systems. That has potential to bring solutions. These systems have been managed indigenous ways allowing small farming families to meet their subsistence needs in the midst of environment variability without depending much on modern agricultural technologies. Although many of these systems have collapsed or disappeared in many parts of the world, the stubborn persistence of millions of hectares under traditional farming is living proof of successful indigenous agricultural strategy and constitutes of tribute to creditively of small farmers throughout the developing world. Until today well to the first decade of 21$^{st}$ century there are in the world millions of smallholders family farmers and indigenous people practicing resource conserving which testament to the remarkable resilience of agro

ecosystems in the face of continuous environmental and economic change. While contributing substantially of food security at local regional and international levels (Netting1993, migual, koohafkan2008 p: 10-11) these farmers need to achieve sustainable increases in productivity but are hindered by lack of infrastructure, access to markets, and modern technologies. Investments in agricultural and rural development hold the greatest potential to reduce poverty rapidly. The good news is the knowledge, technologies, skills, and financial resources to build a sustainable future exist. More food can be produced, more sustainably, and can get to those who need it most. (Juan 2010).

### 1.2.1 Statement of the problem:

The food security condition of households in study area suffers from fluctuating and low crop production, due to sand encroachment which reduces soil fertility and changes the structure of arable land. **(**H. R. J. Davies 1985**)**

This study designed to assess the income generations activities and wage-earners situation of livelihood and food security.

The low productivity has a substantial effect on the improvement and the sustainability of the household food security.

Most of farmers derive some income generation from non-farm activities and casual labouring.

Most farmers' cultivation of seasonal crops, the growing fodder crops, and some pulses, or growing different vegetables, but does not grow cereal crops.

Low and unstable production and productivity for cereal crops in the area.

Low usage of cereal crops production enhancing inputs such as fertilizer, improved seeds, agrochemicals because high cost.

### 1.2.2 Research objectives:

The main objectives of the study are:-

To assess the status quo of livelihood and food production of households

To assess the obstacles and barriers to improving food production in farmers in the study area.

To evaluate the role of technology transfer for agricultural extension service and its effectiveness to improving food production system.

### 1.2.3 Research questions:

Does the household head sex have effect on the most frequent diseases?

Does the household head age have effect on the crop production and productivity?

Does the household head marital status have effect on the number of meals per day?

Does the household size have effect on the annual income?

Does the household head education level have effect on the technology transfer?

Does the household head main occupation have affect on the income sources?

### 1.2.4 Research hypotheses:

Household head sex has not affect on the most frequent diseases

Household head age has not affect on the crop production and productivity

Household head marital status has not affect on the number of meals per day. Household size does not affect on the annual income

Household head education level do not affect on the technology transfer

Household head main occupation has not affect on the income sources

### 1.2.5 Research variables:

| Independent variables | Dependent variables |
|---|---|
| Household head sex | Most frequent disease |
| Household head age | Source of water |
| Household head marital status | Source of electricity |
| Household size | Soil preparing |
| Household head education level | Main crops |
| Household head main occupation | Extension services |
| Transportation network | Income sources |
| Health centers | Number of meal per day |
| Primary Schools | Annual income |
| Farm size | Technology transfer |

### 1.2.6 Data collection and analysis:

For this study a descriptive quantitative approaches were used:

To pursue the objectives of this study, field surveys were used to provide the primary data. The study was carried out in rural of Jommueya areas. A random stratified sampling method was used to draw representative samples from10 villages in Jommueya areas Omdurman locality in which structured questionnaire was prepared and administered to the sampled respondents by face to face interviews. In addition, interviews were held with local government actors in the study areas.

Collection of secondary data from governmental reports and records working papers and published and unpublished field surveys. These sources were collected from the ministries, research centers, Universities, and NGOs. These secondary data sources are useful for providing background information. Using a widely available and well-tested package program Statistical Package for the Social Sciences (SPSS 16.0 for Windows).

### 1.2.7 Significance of the Study:

As means of achieving sustainable livelihood and Food security can be vulnerable to households into becoming trapped in the vicious cycle of overly, the significance of this study was to find out similar situations among the population of Jommueya area. The study was to find out from existing rural infrastructure and livelihood requirements such as water supply, health care, food security, education, road networks, sources of daily incomes and use agricultural extension system in the introduction of technological transfers and new agricultural inputs.

### 1.2.8 Organization of the Study:

This study was organized into five major chapters following this project will outline:

Chapter 1: Introduction of the study Statement of problem, Research Objectives, Research Questions, Research hypotheses, Research variables, Organization of the Study.

Chapter 2: Literature Review: provides in-depth literature review on required:-definitions of key concepts, concepts and definitions of livelihoods, livelihood assets and activities. Literature review covered as well the livelihood contexts, protecting and replacing productive assets, material assistances during certain circumstances, literature review included the definition of households in different selected developing countries and classification of households.

Chapter 3: Research Methodology: explains and justifies choices of methodology that will be use in order to conduct data collection this project.

Chapter 4: Data Analysis: outlines the date analysis, Significance of the Study and results &Discussion about findings.

Chapter 5: Summary, Conclusions, Recommendations, References and Appendices.

# CHAPTER TWO

# 2. LITERATURE REVIEW

## 2.1 Definitions of key concepts:

This study presents a review of the literature as well as the definitions of the concepts used. A concept is presented at the end of the study based upon existing literature, in which household, livelihood and food security perspective.

The major concepts used in this study are: household, livelihood, food security situation, vulnerability, household income generation activity, decision-making. These concepts are discussed and defined below.

### 2.1.1 Concepts and definitions of livelihood:

There are many different definitions of livelihoods and below is one of them.

A livelihood comprises the capabilities assets (including both material and social resources) and activities required for a means of living. But a sustainable livelihood allows people to cope with and to recover from stress and shocks. To maintain or enhance their capabilities and assets and to provide sustainable livelihood opportunities for the next generation, it also contributes net benefits to other livelihood at the local and global and levels and in the long and short terms. (Chambers & Conway 1992).

The concept of livelihoods has gained wide acceptance as a valuable means of understanding the factors that influence people's lives and well being, particularly the lives of the poor people in the developing world.

It has been embraced by a number of development agencies with UNDP the first to do so fully for the department of international Development

(DFID) adopting it as central to its strategy for meeting the goals set out in its (1997).

Livelihoods has a number of meanings and there are number of definitions for the term clarity and rigour are therefore, needed if the approach is to achieve its full livelihoods has a number of meanings and there are number of potential as a basis for robust development initiatives that are in tune with the realities or what is and is not possible on the ground.

One of the challenges involved is the presentation of a generic livelihood Process model which is inclusive enough of wide variety of empirical material diversity of local circumstances being an acknowledged reality but clear enough to provide a heuristic device for public discussion. (UNDP 2000) In the aptly titled adoptable livelihoods the studies provides a detailed: Understanding of the dynamics of the livelihoods of the poor in relation to food as they respond to highly variable conditions (natural and human) that confront them. (Chambers & Conway 1992).

In order to better understand how people develop and maintain livelihoods, the UK Department for International Development (DFID), building on the work of practitioners and academics, developed the Sustainable Livelihoods Framework (SLF). This framework is an analysis tool, useful for understanding the many factors that affect a person's livelihood and how those factors interact with each other. The SLF views livelihoods as systems and provides a way to understand:

- The assets people draw upon.
- The strategies they develop to make a living.
- The context within which a livelihood is developed.

And those factors that make a livelihood more or less vulnerable to shocks and stresses.

### 2.1.2 Livelihood assets:

Assets may be tangible, such as food stores and cash savings, as well as trees, land, Livestock, tools, and other resources. Assets may also be intangible such as claims.

One can make for food, work, and assistance as well as access to materials,

information, education, health services and employment opportunities. Another way of understanding the assets, or capitals, that people draw upon to make a living is to categorize them into the following five groups: human, social, natural, physical, financial, and political capitals.

### 2.1.3 Livelihood activities:

Are the sets of actions through which households gain their means of survival . These are conventionally divided into two categories:-

***Production activities:*** Those activities that produce goods and services that contribute to income (the value of goods and service that actually or potentially tradable).

***Reproduction activities:*** There are same times called household maintenance activities and are those activities, such as childcare cooking and cleaning are not tradable but which are nevertheless essential for the well-being of household members and the reproduction of the conditions through which a family services survives.

***Livelihood assets:*** Are the means of production available to given individual household or group that can be used in their livelihood activities these assets are the basis on which livelihoods are built an in the asset base the higher and more durable the level of social security suggests that there are five dominant forms of livelihood assets arranged in a pentagon.

***National capital:*** The national resource stock from which resource flows useful to livelihood are drive.

***Social political capital:*** The horizontal and vertical social resources (networks, membership of groups, relationships of trust, access to wider institutions of society). Upon which people draw in pursuit of their livelihood.

***Human capital:*** The skills knowledge, ability to labor and good health important to the ability to pursue livelihood strategies.

***Physical capital:*** The basic infrastructure (transport, shelter, water, energy, and communication) and production, equipment and means which enable people to pursue their livelihood.

***Financial capital:*** The financial capital resources which are available to people whether savings supplies of credit, or regular remittances or pensions) and which provide them with different livelihood option.

**2.1.4 Livelihood Contexts:**

***Social relations:*** The way in which gender, ethnicity, culture, history, religion and kinship affect the livelihoods of different groups within a community.

***Social and political organization:*** Decision-making processes, civic bodies, social rules and norms, democracy, leadership, power and authority, rent-seeking behavior.

***Governance:*** The form and quality of government systems including structure, power, efficiency and effectiveness, rights and representation.

***Service delivery:*** The effectiveness and responsiveness of state and private sector

Agencies engaged in delivery of services such as education, health, water and sanitation.

***Resource access institutions:*** The social norms, customs and behaviors (or 'rules of the game') that define people's access to resources.

***Policy and policy processes:*** The processes by which policy and legislation is determined and implemented and their effects on people's livelihoods. Livelihoods are also shaped by the changing natural environment. The quality of soil, air and water; the climatic and geographic conditions; the availability of fauna and flora; and the frequency and intensity of natural hazards all influence livelihood decisions.

### 2.1.5 Protecting and replacing productive assets:

The first step towards building self-reliance and a sustainable livelihood is re-establishing the necessary assets to generate income. Without an income, individuals and households are obliged to rely on friends, family, and available assistance to meet their most basic needs of food and shelter. Where help is limited, many are forced to resort to adverse coping mechanisms, such as cutting down on meals or selling off any remaining productive assets. Without assets, earning opportunities decrease and many are forced to migrate for menial work or take on overwhelming debt. To prevent this spiraling cycle of vulnerability, it is imperative to act swiftly to protect the assets people have salvaged and replace or rebuild those that have been lost.

## 2.2 Material assistance:

Material assistance may be more suitable when there is an urgent need to replace crucial assets that are not immediately available in local markets. One example of this, is the distribution of seed to farmers who need to immediately plant their crops to avoid losing a season's harvest with limited time to replant for the next harvest and high levels of salt contaminating the soil, the Asia Agricultural Service, in partnership with

the International Rice Research Institute (IRRI), provided flood and salt-tolerant strains of rice from the IRRIs seed banks (IRRI, 2008).

### 2.2.1 Material assistance may also be advantageous in the following situations:

When an injection of cash might cause significant inflation, if the possession of cash endangers physical security, if it is difficult to target grants to appropriate beneficiaries; or When there is evidence of considerable corruption (although materials assistance is by no means corruption proof).Direct material distribution appears to have greater success when beneficiaries either participate in the selection of materials, or lead the process altogether. (UNDP, ISDR, IRP 2005)

### 2.3 Definition of household in selected group of developing countries:

The concept of household applies to a person or group of persons who occupy the same dwelling and do not have a usual place of residence elsewhere in Canada or abroad. The dwelling may be either a collective dwelling or a private dwelling. The household may consist of a family group such as a census family, of two or more families sharing a dwelling, of a group of unrelated persons or of a person living alone. Household members who are temporarily absent during reference day (e.g., temporary residents elsewhere) are considered part of their usual household. The household universe is divided into two sub-universes on the basis of whether or not the household is occupying a collective dwelling or a private dwelling. The former is identified as a collective household while the latter is a private household. (www.statcan.gc.ca )

### 2.3.1 Country Definition of household:

***Brazil:*** A household is defined as the person or collection of persons, whether related or not, that habitually live in the same private dwelling, occupying it in part or in whole, and that tend to their life needs together.

***China:*** A household members were defined to include "all the people who normally live and eat their meals together in this dwelling." Those who were absent more than nine of the last twelve months were excluded, except for the head of household.

***Ghana:*** A household was defined as a group of people who have usually slept in the same dwelling and taken their meals together for at least 9 of the 12 months preceding the interview.

***India:*** A household is defined as a group of people who normally live and eat their meals together. For the purposes of this survey, "normally" is taken to mean that the person concerned has lived in the household for at least 3 of the past 12 months.

***Jamaica:*** A household consists of one person who lives alone or a group of persons, who, as a unit, jointly occupy the whole or part of a dwelling unit, who have common arrangements for housekeeping, and who generally share at least one meal. The household may be composed of related persons only, of unrelated persons, or of a combination of both.

***Morocco:*** A household is defined to include all those individuals for whom the household is their primary residence, and who are economically dependent on the household. Household members also include: individuals who are not physically present but whose absence has been for less than one month.

***Peru:*** The household is defined as the person or collection of persons, whether related or not, that habitually live in the same private dwelling, occupying it in part or in whole, and that tend to their life needs together.

***South Africa:*** The first definition of the household comprises individuals who: (1) Live under this 'roof' or within the same compound, homestead, stand at least 15 days out of the past year, and (2) When they are together they share food from a common source (i.e. they cook and eat together); and (3) Contribute to or share in, a common resource pool (i.e. they contribute to the household through wages and salaries or other cash and in-kind income or they may be benefiting from this income but not contributing to it, e.g. children, and other non-economically active people in the household. Visitors were excluded from this definition.

The second definition of the household includes only those members who had lived "under this roof for more than 15 days of the last 30 days". This definition was derived to eliminate double-counting of individuals.

***Vietnam:*** A household members were defined generally to include “all people who normally live and eat their meals together in this house and have done so for 6 or more months out of the past year” which is the same as in 1992-93. However, specific cases to include as members or exclude as non-members differ slightly from 1992-93 and are listed in the questionnaire.

***Zambia:*** A household is defined as a group of persons who normally eat and live together. These people may or may not be related by blood, but more common provision for food or other essential living, and they have only one person whom they all regard as the head of household. A household may comprise several members and in some cases may have only one member.

***Usual Member of the household:*** The de jure approach was adopted for collecting data on household composition. It relies on the concept of usual residence. A usual member of household was considered to be one who had been living with a household for at least 6 months. Newly married couples were regarded as usual members of the household even if one or both of them had been in the household for less than 6 months. Newly born babies of usual members were also considered as usual members of the household. Members of the household who were at boarding schools or temporarily away from the household, e.g. away on seasonal work, in hospital, away to give birth, visiting relatives of friends, but who normally live and eat together, were included in the list of usual members of the household (Wye Group 2007).

### 2.3.2 Classification of households:

Number of persons per household (household size) refers to the number of persons residing in private households. Household factors are 7 variables as number of facility items which measured Lifestyle. For example, households which have more facility items have to use less Land for agriculture because agricultural work seems to be a toilsome task facility items variable is calculated by indoor facilities which give household members convenience in daily routine. Age of household head is measured by generation of household head that is divided into 4 age groups, lowest through 39 years old, 40 through 49, 50 through 59, and 60 years old through oldest. Measurements of dependency on agriculture sector are percentage of agricultural occupation, land tenure, and percentage of agricultural machines. (Mahidol University, 2006).

***Household size:*** Poverty and household size are positively related, and larger households tend to be poorer than small families. In eastern African countries, for instance, only about 8% of households with up to three

members are poor, but 47% of those with 10-12 members are poor. Similarly, in western African countries, 27% of all households with up to three members are poor, while poverty affects 75% of families with more than 13 members. (IFAD 2001 p: 17).

***Power and Decision-making with in the Household:*** The significance of power and decision-making roles within the household for predicting outcomes of development programmes is based on three hypotheses:

1. Households do not pool income; rather, expenditures are determined by bargaining and by each person's role within the household.
2. Mothers, for a variety of cultural and biological reasons, are more likely allocate money to the immediate food and health needs of children than are fathers.
3. Women who are income-earners may have more power in decision-making than women who are not income-earners. They may also have more self-confidence and be more assertive, under some working conditions (PATRICE L. ENGLE 1990).

***Household head:*** The sex of the household head is an important factor in poverty. The probability that a household is poor is much higher when a man heads the household than when a woman does. Contrary to conventional wisdom, available data consistently show that the poverty incidence among woman-headed households is lower than among man-headed ones. In western Africa, for instance, households headed by a woman represent 8% of all households. Of these, 55% are poor against 64% of man-headed families. A priority, two reasons may be assumed:

(i) women household heads can make their own decisions, have better access to resources than if they were married spouses, and use these more productively than man household heads:

(ii) In cases where women are de facto household heads, some transfer income from husbands may raise the total household income. From an overview of 19 SSA countries, in nine the incidence of poverty is lower among woman-headed households than among man-headed ones. (IFAD 2001).

### 2.3.3 Estimated Numbers of People in Potential Target Groups:

Because the sample for the 2006-07 Annual Needs and Livelihoods Assessment was designed to be representative of the rural population of each of the states and areas surveyed, the proportions of the sample population that fall into different categories represent the best estimates of the proportions of the rural population falling into these categories. It is also possible to calculate confidence intervals for these estimated proportions. By multiplying the estimated proportions for each state by the estimated rural population, estimates of numbers of people within the different categories can be calculated. (WFP 2007) .The tables below set out estimates of the numbers of people falling within different categories that might be used for targeting within each if the states. The focus is on observable household characteristics that might be associated with increased vulnerability to food insecurity. Female-headed households may have more limited access to income-generating and production activities than male-headed households, although in some cases they may receive remittances income from non-resident spouses. Internally displaced households may have more limited access to land and employment and more limited asset holdings than residents in the same area. Finally, returnees and newly arrived migrants may be more vulnerable than resident households for a certain period after their arrival, until they have addressed their housing needs and re-established their livelihoods. Evidence regarding the actual situations of the different groups is addressed elsewhere in the

text. Female-headed households were found in all of the states, but were least common in Red Sea and Blue Nile states and most common in Southern Kordofan, Northern Kordofan, and Abyei (Table 2.1). This apparent difference may have been influenced by cultural practices; for example, female-headed households were likely to combine with related households or to identify a male relative whether resident or not as household head, obscuring the actual number of female-headed households.

**Table (2.1) Estimated numbers of female-headed households, by state or area:**

**No. of female-headed households Confidence interval**

| **State/area** | **Projected** | **lower** | **Upper** |
|---|---|---|---|
| Red Sea | 2,849 | 1,556 | 5,089 |
| Kassala | 18,838 | 13,244 | 26,499 |
| White Nile | 17,069 | 11,999 | 24,013 |
| Blue Nile | 8,333 | 5,405 | 12,685 |
| Northern Kordofan | 45,199 | 35,314 | 57,199 |
| Southern Kordofan | 57,186 | 43,600 | 74,175 |
| Abyei | 24,379 | 18,717 | 31,392 |
| TOTAL | 179,825 | 134,566 | 238,390 |

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Table 2.2 sets out estimates of the numbers of members of female-headed households within the different states and areas, taking into account differences in household size across states.

**Table (2.2): Estimated numbers of members of female-headed households, by state or area:**

**No. of household members Confidence interval**

| State/area | Projected | Lower | Upper |
|---|---|---|---|
| Red Sea | 12,710 | 6,940 | 22,705 |
| Kassala | 96,139 | 67,589 | 135,238 |
| White Nile | 97,705 | 68,686 | 137,452 |
| Blue Nile | 42,081 | 27,296 | 64,059 |
| Northern kordofan | 218,018 | 170,336 | 275,900 |
| Southern Kordofan | 380,413 | 290,034 | 493,426 |
| Abyei | 153,890 | 118,151 | 198,163 |
| TOTAL | 1,000,956 | 749,032 | 1,326,943 |

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**Table (2.3): Economic activities and income sources, Blue Nile:**

| Economic activity income source | An income source No % | | Main income source No % | |
|---|---|---|---|---|
| Sale of cereals | 233 | 77.7 | 140 | 53.23 |
| Sale of other crops | 22 | 7.3 | 3 | 1.14 |
| Sale of livestock | 70 | 23.3 | 13 | 4.94 |
| Sale of fish | 16 | 5.3 | 1 | 0.38 |
| Gold mining | 24 | 8.0 | 1 | 0.38 |
| Wage labour | 155 | 51.7 | 49 | 18.63 |
| Salaried work | 14 | 4.7 | 3 | 1.14 |
| Sale of hand crafts | 52 | 17.3 | 14 | 5.32 |
| Sale of faire wood/ charcoal/ grass | 97 | 32.3 | 23 | 8.75 |
| Patty trade | 69 | 23.0 | 13 | 4.94 |
| Remittances | 14 | 4.7 | 1 | 0.38 |
| Begging | 7 | 2.3 | 0 | 0.00 |
| Gifts | 24 | 8.0 | 2 | 0.76 |
| Sale of food aid | 3 | 1.0 | 0 | 0.00 |

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The sale of cereals was reported to be the main activity by more than half of the sample households, while more than 18% identified wage labour as their main income source. Among the other activities listed, only sales of firewood, charcoal, and grass 8.75% and handicrafts 5.32% were reported as the main income source by more than 5% of households**.**

**2.3.4 Household livelihood and income generation activity**:

In sum, geographic location matters for the characteristics of the poor, the types of deprivation they face, and for designing appropriate policy responses. There are significant differences among the poor depending on where they live. Labor market characteristics, sources of income, ways in which they cope with shocks, and access to infrastructure vary with geographical location. This makes the rural distinction useful for policy-driven analysis. The regional dimension is also very important, and rural poverty rates are in fact more closely correlated within regions than across regions (e.g. South vs North). Moreover, inequality can be high within urban and rural areas, and even within specific neighborhoods. Understanding these patterns is important to designing an effective poverty reduction strategy. World Bank (2005) long term income growth, productivity, and poverty reduction. The poor suffer the consequences of low labor productivity and lack opportunities to move to higher productivity employment, which limits their potential for income growth. In urban areas, real wages for the poor have declined since 1991, and even though pay levels have recovered since 1996, the improvement was not sufficient enough by 2003 to regain the value lost since 1991; the share of self-employed who work without any own capital (informal, salaried workers without own capital, IWOC) has increased. In rural areas, lack of sufficient dynamism in the agricultural sector, particularly in small-scale farms, concentration of growth in the more commercial sector, and limited

access to high-return jobs in the RNF sector are key factors in explaining stagnant income growth for the rural poor. Slow productivity growth is a general problem for the Mexican economy and is the main factor behind the slow growth in labor earnings. Slow productivity growth affects Mexico's ability to compete internationally, especially in the US, affecting both the poor and the non-poor.World Bank (2005). Women have made important contributions in almost every aspects of our society from the time immemorial. About half of the population many of countries is women among them and half percent are associated with the farming community.

(1) Historically the work of women in Africa was mostly confined to the homestead due to the culture, religion and social restrictions. However, with the great declining of the socio-economic situation of the country the women are breaking through the traditional norms and coming forward to participate in the development activities outside their homestead. Currently, women in Bangladesh have an anchoring role in the management of their families as well as equal participation in different EAs like crop production, post-harvest activities, poultry rearing, management of livestock and fisheries, pisciculture and miscellaneous income generating activities..

(2) Especially in the rural areas resource poor households' women's participation in income generating activities is high because these households have higher number of family members in compare to lower number of capable male earning members. They are intimately involved in all phases of agricultural activities: from sowing seeds to harvesting and processing of crops. They are also involved in different EAs like sewing dress, making baskets, making papers, flower vases, rearing of poultry, livestock and in different small scale business. Even women from the

poorest households sometimes work outside the home as paid laborers for their family survival. *Journal of social science- by mahmuda & Yoshihito (July 2008)* .

The current I.G.A. (Income Generating Activities) microcredit model within the small projects is the outcome of four years of endeavors, which have lead to a micro financing organization able to match the main goal of the project: supporting the families hosting orphans. The model is still dynamic and opened to improvements. After having spent five months in group working together with the organizations involved in the Rainbow microcredit scheme,. The study had describe the group microcredit model, on the other to evaluate the impact of the programme on the families involved through some statistic data. The study to find out the practical guidelines followed by the microcredit operators, and to explain the reasons why the current methods are preferred to the many possible others. The survey may therefore be useful to whoever is willing to implement this microcredit model outside the group operative area, without the chance to spend some months in some countries. It is also interesting to know the real impact of IGA on the livelihood of the people financed. By collecting some data through a field research, it was possible to draw a statistic profile of the participants to the programme, and to compare it to the situation of the clients who completed the programme. The comparison gives an evaluation of the benefits that IGA are taking into the families involved. *http://www.gdrc.org/icm/wind/wind-unicef-wp.html.*

**2.4 The group selection criteria**

The implementation of an I.G.A. (Income Generating Activity) is usually preceded by other activities: in the compounds in which IGAs are scheduled to begin, there are usually active initiatives such as listening centers, nutritional centers, community schools or awareness groups often

already present. Awareness groups (A.G.) are the core cells on which IGA groups are organized. They are formed by the so called "children guardians", the formal definition for the people committed to look after the O.V.C. (Orphans and Vulnerable Children) in their compounds, on the behalf of the groups. The members of the A.G. are mainly women to whom OVC are entrusted, according to the extended family social system commonly in use in east Africa. The A.G. meet weekly, with the aim of identifying the problems of the O.V.C. in their adoptive families, supplying the basic needs of these families, and pointing out OVC unsolved situations in the compound. Awareness groups, in which a group operator must always be present, provide the groups programme with a precise idea over the OVC conditions in the compounds.

As already mentioned, IGA groups are formed on the basis of the awareness groups, of which only one is present per compound, thus furnishing a first selection criterion in that the people who belong to an IGA group must come from the same compound. This facilitates the monitoring activity by the group's operator; since the operator in charge of following the group usually dwells in the same area as the women empowered.

Another feature is the presence of orphans living in the families of the IGA participants which becomes an indirect way of helping the children, and in fact the Rainbow project represents a model for OVC care. The profits deriving from an IGA transaction is then used to assure the families a sufficient income to provide for their basic needs.

The wide majority of the IGA participants are women. There are several reasons which justify this choice:

Reliability: women are the people who are most involved in managing the home economy of the families. They know the necessary requirements for

their families and usually decide independently how to spend the family income. Women, more than men, are willing to allocate economic resources for the maintenance of children, both for fostered orphans and their own children. This sort of attitude is held in high consideration in a project like that of groups, deals with assistance to orphans.

Dynamism: the African countries involvement in micro business and informal activities is recent. The some African countries have always been used to subordinate employment first in companies run by English settlers, and then by a socialist government after national independence. The introduction of capitalism and the difficult economic crisis are affecting African men much more than women. Nowadays many women are running informal activities which often turn out to be the only family revenue. Several possible clients in the IGA programme already have a micro business which financed by a soft loan. Female emancipation: informal activities have not yet been recognized in the African countries society as a real economic activity. When married women were asked about the job of their husband, they qualified the partner as unemployed, even if he was working informally. Micro activities, which are usually done by women, have no social official acknowledgement. The women themselves do not show any particular interest for their businesses which are carried out only from necessity. Microcredit aims to make these women more self confident and improve the skills already achieved through the management of their activities.

*http://www.fao.org/docrep/X5206E/X5206e03.htm*

The selection of the participants for an IGA group is guided by two principles apparently in contrast with one another: IGA is a business, not just a handout. People who are selected should be able to complete the programme; younger women are therefore preferred to older ones. Health

status is also important and those who are already running a business receive higher loans compared to those with no previous business experience.

IGA is a form of social dignity restitution. Loans may be granted to those who do not completely fulfill the normal standard requirements for a micro-credit programme (good health, previous business experiences, etc.), but is wholly committed in participating to the programme. The aim of IGA does not only consist in the economic rehabilitation of the participant, but also and more especially, in building up self confidence in people, by giving them responsibility. By becoming the protagonists of project of a project of their own, the prospective clients face the psychological challenge of a more active approach to life. How can the two principles be made to agree, or in other words how can IGA efficiency be ensured to without excluding the weaker elements? The operator in charge of selecting the group must consider the two requirements, creating heterogeneous groups capable of supporting members in dire straits. This will lead to an easier process of aggregation and consolidation of the group; problems affecting single participants are tackled through solidarity and mutual assistance, these devices being fostered by the operators.

Thus the positive outcome of a project will depend on the correct mixing of the group which should include people from different social extractions, personal situations and types of occupations. All this however, belongs to the phase which follows the selection and does not explain how the groups can be formed and still respect the two principles stated above. The most important criterion used in IGA programmes to obtain an efficient selection is the process of auto select Alessandro Tedesco: tede26@hotmail.com p. 4-8)

Rural households in the developing world are involved in a variety of economic activities, as part of complex livelihood strategies. Agriculture, while remaining important, is not the sole nor, in some cases, necessarily the principal activity of the poor. The Rural Income Generating Activities (RIGA) project aims at promoting the understanding of the role of such activities for poverty reduction and development through: An innovative database on sources of income, with 32 surveys covering 18 countries in Africa, Asia, Eastern Europe and Latin America.

Recent studies investigating key policy research issues based on the RIGA data.

Each dataset in the RIGA database can be easily linked with the other RIGA datasets, as well as with its corresponding source data. The public release of the RIGA database thus aims to promote the use of our cross-country comparable income indicators to inform further policy-relevant analyses.

To date work with the RIGA database has allowed researchers to undertake analyses on subjects such as:

- Patterns of rural income diversification.
- Assets, activities and rural income generation.
- The impact of high food prices on urban and rural households
- Rural wage employment.
- Urban agriculture.
- Gender and rural employment.
- Livestock for poverty alleviation.
- Agricultural policy modeling.

*The RIGA project is a collaborative effort of* FAO*, the* World Bank *and* American University.2010.

### 2.4.1 Vulnerabilities:

The food price and the financial and economic crises revealed that different groups of poor people are particularly vulnerable to the impact of crisis situations. These include the nearly half a billion small-scale food producers and millions of waged agricultural workers (usually employed as casual labourers) who help produce the food on which we all depend, as well as poor people in urban areas whose purchasing power also depends on their ability to earn an income. Vulnerabilities are particularly pronounced in countries experiencing (or recovering from) breakdowns in political systems, civil strife or warfare. (UN HLTF 2010).

There are clear obstacles to the adaptation and development of Food Sovereignty in an East African context taking account of differences in economic structure, political culture, land tenure and institutions of government. In order to identify two things need to be understood and acknowledged in the approach it adopts. First, contemporary famines in East Africa are too complex to be explained by a single factor. Their occurrence in Sudan, Somalia, Kenya and Ethiopia, for example, do not share one single root cause. It will be shown that the underlying causes are essentially political rather than simply market failures or environmental factors. Second, there is a clear need to establish a separation between trigger factors, such as drought, over-grazing or over-population, and vulnerability factors linked to structures and processes such as the weak or corrupt government, civil conflict and neo-liberal economic policies. It is these vulnerability factors that are of central importance in this discussion both in how they relate to causation but more importantly how they can be reduced by the adoption of Food Sovereignty as a guiding and enshrined

principle. Vulnerability can be understood at many different levels with regard to famine; it maybe political, economic, governmental, geographical, social, gendered and so forth, further emphasing the complexity of the topic and the need for clarity in approach. ( Michelle 2012) P: 18.

### 2.4.2 Groups most vulnerable to food insecurity and malnutrition:

Broadly speaking, those who are nutritionally insecure share common socio-economic, agro-ecological, demographic and educational characteristics. Usually these vulnerability factors operate simultaneously in combination to increase the risk. For example, rural and urban households vulnerable to malnutrition insecurity are precisely those most vulnerable to environmental degradation, poor sanitation, pollution, overpopulation and disentitlement to education, training and employment opportunities needed to improve their nutritional situation in the long term. With regional and local variations, the following types of household are likely to be most vulnerable to food insecurity and malnutrition: subsistence farmers who produce marginal or inadequate amounts of food; Landless wage earners lacking adequate resources to produce food or income to obtain to food; households headed by women; households with a large number of dependents; Households situated on marginal lands (e.g. drought-prone areas or steep slopes adversely affected by erosion); Households with insufficient income to enable continued access to adequate supplies of safe and good-quality food. Among these households the most vulnerable groups are children under five years of age and women of child-bearing age. Their risk is increased by inadequate access to health services and by unstable environmental and political factors. (FAO, 1997).

### 2.4.3 Indicators of a household's social vulnerability:

(Compiled by villagers, highlands of Madagascar).

Households are particularly vulnerable when they:

- Have less than 0.2 ha of cropland per person.
- Have only limited access to irrigation water.
- Have rice self-sufficiency for less than 4 months per year.
- Have less than US$ 160 cash income per year.
- Permanently lack a labour force.
- Are socially marginalized.
- Are regularly in debt.
- Have no livestock.
- Lack secure tenure or guaranteed long-term rights of land use.
- Consist of elderly people, widows and divorced women.
- Or young couples.

www.sdc.admin.ch.under countries 2007).

**2.5 Risks that threaten food security:**

- Droughts – floods.
- Epidemics.
- Political and social unrest - armed conflicts.
- Lack of diversity in production.
- Fluctuating market prices and loss of currency value.
- Good organization of households, communities and space plays a key role in ensuring food security.
-The right information at the right time is a priceless advantage.

-Well-organized information flow – here a community radio studio is a vital necessity for vulnerable groups. (The SDC in Madagascar: www.sdc.admin.ch.under countries 2007).

### 2.5.1 Causes of food insecurity and current situation and future risk:

In the last two decades many countries have successfully promoted food security with in some cases discernible improvements in the nutritional status of vulnerable people. However, the two crises have confirmed inadequacies in the structure and functioning of food systems that prevented these from withstanding the impact of successive shocks and from improving food security in a sustainable manner. This reflects (a) increasing inequalities in access to and control over productive resources, in particular land and water; (b) policies that undermine smallholder tenure security; (c) decades of under-investment in agriculture (particularly smallholder-based production and processing systems), rural development and infrastructure; (d) inconsistent attention to the effective operation of markets for food, and trading systems; and (e) lack of support for safety nets and social protection systems.(United nations 2010).

**2.5.2 Two crisis and their impacts affecting food security 2008-2010.**
The (FAO- WFP) reported in their 2009 publication "The State of Food Insecurity in the World" (SOFI 2009) that for the first time since 1970 more than one billion people (around one-sixth of all of humanity) are hungry and undernourished worldwide. At the same time, as many as two billion people suffer from a range of micronutrient deficiencies, including vitamin A, iron and iodine deficiencies. Several factors converged to make 2009 particularly damaging to people at risk of food insecurity.

i) The world was faced by two crises at the same time. The first was a food crisis that in 2006–2008 pushed the prices of basic staples beyond the reach of millions of poor people. This strained the already

limited ability of poor households to buy food. Many families were especially vulnerable to the rising prices as they were net food buyers. The rise in food prices did not always translate into an increase in farmers' incomes due to ill-functioning markets.

ii) Higher food prices can be beneficial for smallholders. They increase incentives for long-term investments in agriculture. At the same time, smallholders, landless laborers and other poor households use much of their income to purchase food. The 2008 spikes pushed food prices beyond the purchasing power of many: high prices forced many poor families to sell assets or make sacrifices in health care, education and/or food consumption just to stay afloat. Although prices have retreated from their mid-2008 highs, they remain elevated by recent historical standards, and they are volatile. In mid-2009, domestic staple food prices were, on average, 19 percent higher in real terms than three years earlier.

iii) The second crisis was a breakdown of world financial systems in 2009 that affected all nations and reduced the capacity of developing country finance ministers to act in ways reflecting the needs of their poorer populations.

With their resources stretched to breaking point, households found it difficult to ride out the economic storm.

The financial and economic crisis was not easy to handle because of its magnitude and spread, which affected large parts of the world simultaneously.

iv) An impact of these crises is the resulting damage to the economies of nations that are financially and commercially dependent on the world economy. They experienced the effects of economic contraction, with

an associated cut-back in export markets and a shortage of credit. Many countries experienced across-the-board drops in their trade and financial inflows, and saw falls in their export earnings, inward investment by foreign enterprises, receipts of development aid, remittances from citizens living abroad and income from taxes.

v) ((http:/www.wto.org/English/tratop_e/agricboxes_e.html))

Faced with the effects of economic contraction, households have had to make undesirable but often unavoidable compromises such as replacing more-nutritious with less-nutritious food, selling productive assets, withdrawing children from school, forgoing health care or education, skipping meals and eating less. Based on direct interviews with people who are most affected by food insecurity, country case studies conducted by WFP have revealed how households are affected by the fall in remittances and other impacts of the economic downturn. The case studies also show how governments are responding to the crisis by investing in agriculture and infrastructure and expanding both social protection schemes and safety nets for those in distress. Food prices are also projected to ease only gradually in the short-term, but a more substantial easing is expected in the medium term. Expectations of better harvests in 2008–09 have already led to significant easing in wheat prices, and some other prices have also eased from recent peaks. Nevertheless, the recent price surge is expected to take longer than usual to unwind, as rising biofuels production in the United States and the European Union and continued strong demand from emerging and developing economies will likely sustain robust consumption growth. The supply response to this higher growth is likely to be gradual, but not as protracted as in the oil sector, and depend on improved policy frameworks to encourage lasting increases in yields and overall acreage for planting. (http:/www.IMF.org/external/np/pp/eng /2008 063008 PDF.

### 2.5.3 Lessons learned since the 2008 food crisis:

Show that secure and equitable access to land and control over it mitigates the impact of food price volatility for poor rural households. Hence, beyond the need to ensure emergency food assistance and safety nets, land and other natural resources should be acknowledged as primary assets in household food production and as key to preventing social and economic exclusion, especially in times of crisis. In urban areas, reliable employment and access to essential services, especially water, health, and sanitation, are critical. The challenges facing women in urban areas must be better understood and factored into programmes. Emergency food assistance programmes should, as far as possible, be self-targeted and use local food resources to support local agricultural development and facilitate acceptability of distributed emergency foods. (UNHLTGFC2010).

### 2.5.4 Future risks:

Within many developing countries, anxiety about high food prices and intense competition over land, water and transport capacity has already increased the risks of civil unrest, political instability, displacement of people and migration across borders. Unstable energy prices, continued food price volatility, and lack of infrastructure for market access create a context in which farmers find it difficult to operate profitably and meet their own food security needs. Increased global demands for food (due to population growth) within the context of limited land, water and other natural resources, combined with the impact of climate change on agricultural production and food systems, will increase the risks of food insecurity for smallholder households. Those unable to access land or employment are at greatest risk and should be prioritized for protection, especially during times of crisis.

### 2.5.5 Sources of risks on household food insecurity and affected populations:

Agricultural trade (disruption of exports or imports) smallholders who are highly specialized in export crop small-scale pastoralists poor households that are highly dependent on imported food (Urban poor). Crop production (pests, drought, etc.) smallholders with little income diversification and limited access to improved technology (e.g.) improved seeds, fertilizer, irrigation, pest control Landless term labourers.

Food prices(large, sudden price rises) poor net food purchasing households

Employment Wage-earning households, informal-sector employees in pert-urban areas Informal-sector employees in rural areas when there is a sudden crop production failure. Health Infectious diseases, for example, resulting in labour productivity decline Entire communities, but especially those households that cannot afford preventive or curative care and vulnerable members of those households politics and policy failure households in war zones and areas of civil unrest, households in low-potential areas that are not connected to growth centers via infrastructure. Demography Individual risks affecting large groups) women, especially when they have little or no access to education**,** female-headed households**,** children at weaning age**,** the elderly. Households may suffer from transitory food insecurity as a result of unpredictable circumstances such as sudden price rises. They may suffer from seasonal food insecurity when there is a regular pattern in the recurrence of inadequate access to food. Chronic food insecurity, by contrast, occurs when households run a continual risk of being unable to meet the food needs of all the household members. In practice, of course, chronic and transitory insecurity are linked. Recurrent exposure to temporary but severe stress may increase the vulnerability of the household to chronic food insecurity. (UNHLTGFC 2010).

### 2.5.6 The impact of conflict on agricultural production and household food security in Somalia:

In 1991, Somalia was badly affected. A large proportion of the population was displaced to Mogadishu and Kismayo and to refugee camps in northeastern Kenya. From 1993 onwards, people started to return to their villages. However, the effects of previous displacement, the prevailing insecurity and low-level conflict continued to hamper people's ability to cultivate and produce sufficient food. Production levels for the main harvest in 1995 were estimated to be 40 to 50 percent less than pre-war levels. When families returned to their land, it was overgrown with bushes. Clearing the land was time-consuming and difficult, so the land area that could be planted in the first year was reduced. Farmers planted closer to their villages for fear that they might be attacked and looted, and they were unable to take advantage of the different types of land in the area.

Many of the flood-control systems and canals in the area were destroyed and looted or fell into disrepair. Some repair work was done by the World Food Programme and (NGOs), but this was limited. This meant that the Juba River was no longer controlled and crops in many places were destroyed either by a lack or an excess of water. There was also limited access to tools and seeds. Extension advice and inputs previously provided by the Ministry of Agriculture were no longer avail.

Many of the grinding mills in the area prior to the war were stolen, looted or damaged, and in many villages several families now shared one grinding stone. This was one of the factors that had contributed to an increase in women's workload. Opportunities for off-farm employment and income generation used to be available on banana plantations and in packing factories in the area, but following the collapse of the irrigation system the banana trees died, and larger landowners in the south Somalia have not

been able to re-establish their plantations. Loss of transport and insecurity has reduced access to markets in Kismayo town as well. Purchasing power within the town was also low. (Source: FAO,1996)

The relationship between food security, hunger and conflict is very evident in developing countries. The recent financial crisis which has resulted in:

More difficulties for institutions to find resources resulting in, for example, delays in infrastructure development. Lack of remittances from abroad to the general population. Less credit for farmers and the population in general. Reduced demand for certain commodities with resultant loss of income and jobs. Floods and droughts are becoming increasingly common, causing reductions in crop production, destruction to infrastructure and increasing food price volatility. Water resources:

Decline in per capita irrigated area in many parts of the world. Cost of new irrigation developments is high. Instability of water delivery for irrigators due to demands of other users and climatic variability. International and national collaborations need to address the managing and sharing of water resources. Agricultural yield is much higher on demonstration farms than the national average. In addition, global average crop yields are increasingly below the15 year average particularly for maize and soybeans. This is due to:

Poor technology and management skills. Inadequate farm inputs High fuel and fertilizer costs. Insufficient public funding for production research Lengthy lag times for research investments (5-15 years for crops) Weak institutional linkages including: Poor marketing and distribution systems. Absence of strong retail capacity. Lack of access to credit and insurance schemes. Lack of property rights and clear land tenure so lack of collateral,. High transaction costs, Exploitative intermediaries. Varying levels of needs

and capacity across countries. Farming is done primarily by women and they need to be involved in the solutions.

(Www/ Global Food Security Conference, 2009)

### 2.5.7 Famine typology:

Generally speaking, scientifically in the field differentiates between four basic types of famine. These famines typologies have different key causal elements essentially affecting different groups of people. Famines have tended to be categorized as Pastoral, Agrarian Smallholder, Class based Occupational, War time. The first type, pastoral, mainly affects herders, can be relatively short term and caused by drought that depletes pasture and availability of water. The longer-term cause is permanent disintegration of land and severe restriction on nomadic lifestyles as has occurred in Northern Kenya, Somalia and Southern Ethiopia in recent decades. In this situation coping strategies are as important as the distribution of aid; for example, state assistance in guaranteeing price of livestock and supply of credit or a neighbouring country's willingness to allow pastoralists to graze animals within their borders. Type two, agrarian, has frequently been described as the 'paradigmatic African famine' these are often drought related but equally the result of land expulsion and exploitation. Though initially localized, they can result in distress migration (or forced migration, as opposed to voluntary economic migration), the countries of Ethiopia, Kenya and Sudan offer recent examples of this type of famine. The third type, class or occupational based famines may be considered the paradigmatic Asian famine. These rapid onset famines often affect whole classes of people farm labourers, fishermen or artisans, for example, are rendered destitute due to a collapse in demand for their labour. In these situations local coping strategies are less suitable and state intervention is needed such as grain price controls and employment guarantee schemes.

The Irish famines of the 1840's fit within this famine framework, as they affected those dependent on a single crop, i.e. the potato and so would the 1943 Bengal famine, which mainly affected labourers in rural districts. It is worth noting that State intervention, in terms of employment guarantee systems, is an ongoing feature of India's anti-famine policies. The fourth and last category of famine, according to this typology, is that caused by war, which can result in rapid catastrophic collapse as happened in Rwanda in the 1990s or may take years to develop such as in Ethiopia, Eritrea or Southern Sudan. Belligerents may prevent all relief strategies and victims may be highly visible or purposely kept hidden. The Ethiopian famines in the 1980's are considered a classic example of this type of famine. (Michelle Spring field 2012) P: 30-31.

**2.6 Food security definitions:**

Food security may have different meaning for different people. The international conference on nutrition (ICN) held in Rome in (1992) defined food security as "access by all people at all times to the food needed for healthy life" (FAO/WHO. 1992) essentially in order to achieve food security.

The 1996 World Food Summit adopted a still more complex definition:

Food security exists when all people at all times have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.FAO Special Programme for Food Security http://www.fao.org/spfs/1996.

"Food security, at the individual, household, national, regional and global levels [is achieved] when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary

needs and food preferences for an active and healthy life. This definition is again refined in the State of Food Insecurity 2001: "Food security [is] a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life"(FAO 2003) P:28

Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life. Food insecurity exists when people do not have adequate physical, social or economic access to food as defined above. Food security therefore covers availability, access, utilization and stability issues, and because of its focus on the attributes of individuals also embraces their energy, protein and nutrient needs for life, activity, pregnancy, growth and long-term capabilities. (www.fao.org/cfs/en2010

***Life science research office:***

Food security is defined as access by all people at all times to enough food for an active healthy life includes at a minimum:

A) The ready availability of nutritionally adequate and safe foods and

B) The assured ability to acquire acceptable food in socially acceptable ways (e.g. without resorting to emergency food supplies scavenging, stealing, and other coping strategies).

(http://www.lsro.org/frames_lsro.html; 2005).

***Ontario public health association:***

Community food security is a strategy for ensuring secure access to adequate amounts of safe nutritious culturally appropriate food for

everyone produced in an environmentally sustainable way, and provided in a manner that promotes human dignity. (Opha, 2002).

***Public health association of British Colombia:***

Community food security exists when all citizens obtain a safe personally acceptable nutritious diet through a sustainable food system that maximizes healthy choices community self reliance and equal access for everyone (Phabc2004).

### 2.6.1 Food security:

Has long been regarded as a matter of balancing supply with demand. In the past, policies were limited to increasing agricultural production and slowing population growth. This perspective has fundamentally changed, as the definition above indicates. Food security is based on four pillars:

*Access:* this refers to the ability to produce one's own food or buy it, which implies having the purchasing power to do so.

*Availability:* Still a problem in areas where food production does not meet population needs, thus raising the question does our planet have the capacity to feed the growing millions whose consumption habits are on the rise?

*Food quality:* From a nutritional, sanitary, sensory and socio-cultural point of view. Food security integrates the notion of food safety.

*Stability***:** in terms of availability, accessibility and quality. This fourth pillar incorporates issues of price stability and securing incomes for vulnerable populations. Improving competitiveness of farm production and incomes of farmers and other agri-food sector actors (quality improvement, cost reduction).

### 2.6.2 Rural economies as the keystone of food security:

The topics of hunger, poverty, and food security dominate the headlines as the Committee for World Food Security meets in Rome this week leading up to World Food Day on October 16. Last month, world leaders met at the United Nations Summit on the Millennium Development Goals (MDGs) in New York to discuss progress made since these were set 10 years ago. At the top of the list is the ambition to end hunger and poverty around the world by 2015. But an important question still needs to be answered — how do we achieve food security within the limits of our planet? Despite discussions and efforts over the years, nearly one billion people go to bed hungry and the mega trends of a growing world population to an expected 9 billion by 2050, changing consumption patterns, and climate change, do not make the journey any easier.( *Juan 2010)*

### 2.6.3 The majority of farmers growing food which they cannot afford to eat.

The best solutions will require a system where increases in production will play an important part, but will be constrained as never before by the finite resources provided by Earth's land, water, and biodiversity. Importantly, this system must be inclusive and recognize the rural economies around the world that – in the end – are the keystone of food security. But the reality is that more than three-quarters of poor and hungry people live in rural areas . Think about it - the majority of farmers growing food cannot afford to eat it. These farmers need to achieve sustainable increases in productivity but are hindered by lack of infrastructure, access to markets, and modern technologies. Investments in agricultural and rural development hold the greatest potential to reduce poverty rapidly.

The good news is the knowledge, technologies, skills, and financial resources to build a sustainable future exist. More food can be produced, more sustainably, and can get to those who need it most. *Juan (2010)*

**2.6.4 Stages of food security and problems facing:**

***Natural resource:*** shortage of land, unsure tenure, land of low fertility, shortage of water, long distance from home.

***Clearing the land:*** too few adults in the household, lack of hand tools.

***Crop production:*** limited crops diversity, cash crops instead of food crops lack of seeds and planting materials, poor quality of seeds and planting material

***Seeds are eaten*:** inadequate awareness of crops that give better nutritional and other benefits, wrong cultural practices, wrong spacing, poor seed distribution,

pests and weeds infestation, limited inputs ,extension workers does not visit households often. Women do not receive extension advices.

***Harvesting:*** pests damage, post harvest losses.

***Storing food:*** lack of proper storage vessels, not enough food is stored, lack of knowledge about proper storage.

***Food distribution and marketing:*** markets far from production area, poor road and transport systems, food sold at harvest, inadequate home storage.

***Buying:*** lack of money, fresh food difficult to obtain, foods are expensive.

***Food processing and preparation:*** lack of proper processing, milling equipment,

Lack of fuel wood, lack of mother's time for food preparation, lack of proper storage vessels, lack of knowledge in preparation of the right kinds of food, lack of knowledge of proper food preparation, low prestige attached to vegetables, Vegetables cooked too long.

***Sharing within the family:*** children without adequate food share, too many family members to feed, taboos on certain foods for some family members, lack of information on needs of different age groups.

***Eating:*** loss of appetite because of illness, food too bulky for small children, Mother stops breastfeeding at 12 months, children receive only 2 meals a day.

***Health and sanitation:*** poor food hygiene, lack of clean water, water well far away, children are frequently sick, mother does not attend monthly growth monitoring and promotion sessions.

Source: Adapted from FAO, 1999. Field programme management food, nutrition and development. (Rome - Italy.)

***Agricultural production:*** increasing agricultural production (genetic improvement, disease control, improved cropping systems, minimization of losses, etc.)(FAO, 1990, 22-23).

**2.6.5 Diverse factors affecting food security:**

The factors affecting food security in developing country include decline in productivity and incomes from traditional crops, global food price surge, increase in poverty and growing incidence of food related diseases. Dependence on imported food also attributed to the factors affecting food security in developing country. Due to non-availability of cold storages, inappropriate handlings are responsible for loss of 10 percent grains, 40 percent of fruits and vegetables across the country, about 10-15 percent of water loss could be minimized through the watercourse improvement project, in which lining of water resources would be carried out.

(Razi Syed, 2010). The main causes of food shortage and poverty crisis date back to the colonial era when Africa was exploited as a source of row materials, the food policy and African economics have not been changed.

It is widely accepted that without using adaptable technology and improved Food sources, per capita food production is likely to continue declining in Africa. (Idris and Ali 2007).

### 2.7 The role of agriculture and small farms in food security:

The direct contributions of the agriculture sector (crops, livestock, forestry, and usually fisheries) to the functioning of the national food security. Are reflected by its increasing production, and contributions make up the traditional roles of agriculture. The development literature before half century is now viewed as generally pessimistic with respect to the sector's potential for productivity and export growth .There was a presumption that the sector was insensitive to incentives, and there was the agricultural growth was a low priority.

Agricultural growth needs to be broad based (or equitable) so that it is increased purchasing power into the hands of the rural masses, and not just a privileged few. This work showing that small and medium-sized farms are typically more efficient producers than large farms in low-income countries and have better consumption and investment patterns for stimulating growth in the nonfarm economy. Broad-based agricultural development in turn requires equitable access to land, modern farm inputs, credit, and markets.

Adequate levels of public investment in rural infrastructure are essential for promoting growth of the rural towns as well as agriculture, and for strengthening rural urban demand linkages. (UHLT2010).

#### 2.7.1 The agriculture is an important for food security:

Before the Green Revolution, agriculture was widely seen as a stagnant, low-productivity, and residual sector that could be plundered of its labor and capital for use in industry. But that view was swept by the dynamism

of the Green Revolution. Agriculture came to be seen as a growth sector that could:

Generate more food and raw materials at lower prices;

Free up foreign exchange for the importation of strategic industrial and capital goods; Provide growing amounts of capital and labor for industrial development; With rising rural incomes, provide a growing domestic market for nascent national industries; and reduce poverty by increasing labor productivity and employment in rural areas, by generating more remunerative opportunities for rural-urban migration, and by lowering food prices for all. (IFPRI 2005) Promoting rural development can contribute substantially to poverty reduction and food security. A majority of the region's poor live in rural areas and this often poses a dilemma for national policymakers when choosing policies to stabilize food prices and/or protect the agricultural sector. For example, protectionism to sustain high food prices is a popular tool to support farm income. But such policies do not always yield the desired result if farmers are themselves poor. Sustained low agricultural productivity brought about by limited global competition reduces food production and small-scale farmers may end up not being able to produce enough food for their own demand, let alone the market's. High food prices can also reduce the farmer's own purchasing power, crowding out spending on seeds and fertilizers, thus further reducing food production. Rural economic growth and stable food prices, therefore, should be intrinsic components of any food security strategy. (IFPRI 2005).

The most effective approach in tackling both poverty and food insecurity is through a rural-based growth strategy. In Asia, the Green Revolution provided a dual-track route for successful poverty reduction and food security by directly increasing farmer incomes and lowering food prices. Asia's experience shows conclusively that rural development and growth

can help reduce poverty most effectively. A new growth paradigm should focus on support for agriculture, increasing rural income opportunities on par with the urban sector. Doing so will stem the excess labor migration from rural to urban centers that accompanies structural transformation. Rural incomes should also be diversified to improve stability, while urban-rural integration needs to be scaled up. The rural economic base can be diversified by introducing new value-adding activities, including the transformation of agricultural wastes into energy sources (IFPRI 2005.).

Multiple indicators are used to assess the degree of food security situation in developing country these are: Food production this refers to the average level of staple of crop production over a number of years. Income this refers to the income level of a typical household, which can be approximated by per capita GDP level of indicator. Total expenditure this refers to the total amount of spending of a typical household on goods and services. Food expenditure this refers to the amount of spending of a typical household on staple food. Share of expenditure on food this refers to the percentage of spending of a typical household on food relative to the total spending of the household. Calorie consumption this refers to the daily per capita calorie consumption of an individual in a typical household. Nutritional status this refers to the under nutrition level of an individual of a typical household as detected by Required Food Intake Chart. (Idris and Ali 2007).

Agronomic research has traditionally been conducted at plot scale over a growing season or perhaps a few years, but many of the issues related to regional production operate at larger spatial and temporal scales. Aware of the need for better links between agronomic research on crop productivity at plot scale and regional production, especially over time, the last decade

or so has seen agronomists beginning to establish trials at landscape scale. (John & Irving 2011).

Value-adding agro-processing of food commodities increases food security in four major ways; namely: Reduction of post-harvest losses which are currently estimated by several organizations (FAO, CIRAD, NRI and UNIDO) to be as high as 30% in cereals, 50% in roots and tubers, and up to 70% in fruits and vegetables.

Extending the shelf-life of food, making most food especially perishables tradable and easier to move over long distances from areas with surplus to areas with deficits. Enhance incomes and creation of employment along the food chain from production to marketing; and Improving the quality and safety of foods through appropriate certification, traceability systems and harmonization of standards, thus improving access to markets. (EAC food security plan 2011- 2015).

As in many developing countries, food security assessments in Ethiopia have traditionally focused on rural areas, where the majority of the total population as well as the poorest and most food insecure segments of the population lives. Nevertheless, the global increase of cereal and pulses price and the global financial crisis has put challenges on and increases food insecurity in urban areas of the country. This further driven by unemployment, underemployment, lack of sanitation, rising cost of living, reduced inter-dependency among urban households, household composition, low asset ownership, low level of education, high dependency on the informal sector, (Girma 2012) p:160

### 2.7.2 Agriculture as an engine for development:

There is now a trend towards investing in agriculture as an engine for economic development. This approach strongly fostered, within Africa, by

the African Union, usually involves increased government spending on agriculture, infrastructure (for inputs and marketing) and the encouragement of private investments, including foreign direct investment in food production, post-harvest storage, processing and marketing. It also includes investment in food and agricultural science, technology and knowledge development and transfer, in ways that take account of, and respond to, the needs of smallholder farmers. It encourages the organization of smallholder farmers and agriculture workers in the elaboration and implementation of national plan for food and nutrition security so they can better participate in the new investments. In this context, policies enhancing secure and equitable access to ownership of productive resources (especially land, water and seeds) are key for unleashing the full potential of smallholder farming and other artisanal food production systems, such as small-scale fishing and livestock. Comprehensive African Agriculture Development Programme (CAADP), under the coordination of African Union Commission (AUC), CAADP's main objective is to assist African countries accelerate economic growth through agriculture-led development, which eliminates hunger, reduces poverty and enhances food security as well as growth in exports.

The following main principles and targets define (IFAD2010)

(i) Agriculture-led growth as a main strategy to achieve targets on food security and poverty alleviation consistent with the Millennium Development Goal of reducing hunger and halving poverty by 2015; (MDG-1).

(ii) Pursuit of a 6 percent average annual sector growth rate at the national level

(iii) Allocation of at least 10 percent of national budgets to the agricultural sector

(iv) Exploitation of regional complementarities and cooperation to boost growth.

(v) Application of principles of policy efficiency, dialogue, review, and accountability.

(vi) Use of partnerships and alliances including farmers, agribusiness, and civil society.

(vii) Assigning roles and responsibility of program implementation to individual countries, coordination CAADP directs investments to four mutually reinforcing 'Pillars' for improving Africa's agriculture with two crosscutting ones. The four main CAADP Pillars are:

*Pillar 1:* sustainable land and water management;

*Pillar 2:* improving rural infrastructure and trade related capacities for market accesses;

*Pillar 3:* increasing food supply, increased nutrition, reducing hunger, and improving responses to food crises; and

*Pillar 4:* improving agricultural research, technology dissemination, and adoption. The two cross cutting areas are: Academic and Professional Training in Agriculture; and Knowledge Systems, Peer Review, and Policy Dialogue. The case for addressing issues of Forestry, Livestock and Fisheries has been highlighted.

To this end, it is evident that the existence of an enabling policy and institutional environment is important to generate desired results under CAADP, in addition to the creation of structures and systems for effective delivery of services. Some of the identified areas that require further effort are:

(a) Lack of sufficient engagement of political and technical leadership at regional and national levels for effective translation of CAADP investment plans into bankable programs and implementable projects.

(b) Limited mobilization of Regional Economic Communities and Member States for compliance to AU Decisions pertaining to the advancement of the CAADP agenda.

(c) Limited engagement with financial and technical partners to raise resources for implementing CAADP investment plans.

Source: (50 CAADP of the African union or convergence matrix of programs and activities on the implementation of food security of ASEAN)

(Source: vol. 7, NO. 9, September 2012 Journal of Agricultural and Biological Science).

**2.8 The African Challenges:**

Although agriculture-led growth played an important role in the economic transformation of much of Asia and Latin America and helped slash poverty in those regions, the strategy has not yet worked in Africa. Most African countries have not met the requirements for a successful agricultural revolution, and factor productivity in African agriculture seriously lags behind the rest of the world. As a result, many African countries still face severe national food constraints, remain heavily dependent on traditional agricultural export markets (with declining and volatile prices) for most of their foreign exchange earnings, and have such small domestic markets for nonagricultural goods and services that their industries remain at an early and inefficient stage and are not yet ready to compete in liberalized markets. Poverty and food insecurity remain and continue to worsen.

The lessons from Asia and elsewhere seem clear. Africa needs a concerted effort to Accelerate smallholder-led agricultural development, including increased and sustained investments in agricultural research, institutional and human capital, and rural infrastructure; and more effective service provision for farmers, including modern inputs, credit, and marketing services to launch an agricultural revolution on the scale required to accelerate economic growth and slash poverty. Africa still has much lower densities of rural infrastructure than Asia. Africa has weak institutions for rural development. Perhaps one of the bigger challenges facing Africa today is overcoming growing skepticism in the international development community about agriculture's relevance to growth and poverty reduction in the modern world. Despite the successes achieved in Asia and elsewhere, the development community seems to have tired of agriculture and is now trying to impose a post - agricultural revolution strategy on Africa before its own agricultural revolution has happened. High hopes are being placed on market liberalization, privatization, agricultural diversification, and good governance, while at the same time public spending on the basic investments needed for agricultural and rural economic development has stagnated or declined (Fan, Zhang, and Rao 2004 *et al* ODI 2005). As the impacts of globalization and trade liberalization are felt around the world and as many countries have grown out of low-income status, there is a growing sense that the role of agriculture must also change and that this has important implications for agricultural development strategy, even in Africa. Here are some of the key positions promoted by a new breed of agricultural "skeptics". With cheap and plentiful food imports available, African countries can leapfrog the need for agricultural development and proceed directly to industrialization.

Increases in rural-urban integration, migration, and rural income diversification have made agriculture largely irrelevant for the rural poor. Most small farms are not viable in today's markets and hence should not be prioritized in future agricultural investment strategies. With low world cereal prices, agricultural development should now focus on high-value commodities and value-added processing rather than food staples production. The public sector has a relatively minor role ot play in Africa's agricultural development, while the private sector should be in the driving seat. Overseas Development Institute (ODI) Imperial College, London UK 2005.

The challenges Africa faces in building food security include physical factors such as climate, geography, and poor resource endowments, political factors such as lack of sound governance, infrastructure and inefficient public private partnership arrangements and the need for political reform to enable the poor to secure land and other necessary resources, and also socioeconomic factors such as diseases, poverty and hunger. Hunger and poverty persist even in the face of economic growth. The numbers are alarming and it is noted that ninety percent of the world's hungry people live in South Asia and Africa, and more than 50 percent of them engage in producing food for the world. In a year during which the world registered an overall economic growth rate of about 8 percent, the number of unemployed people increased by nearly 2 percent (IFPRI, 2007), thus poverty and both chronic and acute hunger were more evident. Economic growth in many developing countries has only a limited impact on the livelihoods of extremely poor and food-insecure people. One billion people in the world live on less than one dollar a day, and about 800 million go hungry every day. Hunger reduction has been slow in most regions and has not decreased at rates corresponding to economic growth

and the poorest of the poor are increasingly being left behind, with incomes falling farther and farther below the absolute poverty line and below national averages. Even if the first Millennium Development Goal to halve the proportion of extremely poor people and hungry by 2015 is achieved, hundreds of millions of people will continue to live in extreme poverty (IFPRI, 2007). A food secure household is generally described as one that can reliably obtain food of adequate quality and quantity to support a healthy and active life for all members of the household (IFPRI, 2005). The five A's, (availability accessibility, affordably, adaptability and acceptability) are all essential components of food security, and are influenced by multiple natural resources whose efficient management is essential for the public good. By 2015-2020 well over half of the world's population will be living in urban and pre - urban areas. If present trends hold, the vast majority of these people will be living in irregular settlements without access to decent food, shelter, water and sanitation (UN-HABITAT, 2004).

**2.9 Smallholder farming, pastoral and environmental sustainability:**

There is a need for urgent attention to ways in which agriculture can contribute to environmental sustainability and mitigate climate change through new patterns of agricultural and livestock development. Long-term food security policies need to recognize that smallholder farmers who are currently food insecure, are likely to be hard hit by climate change and other environmental shocks, because they farm and rear on marginalized land and depend on erratic rainfall. Hence nations are investing in policies for disaster risk reduction and climate change adaptation to help those at risk increase the resilience of their cropping and livestock systems. The latter tend to keep their flocks on marginal lands, earn their livelihoods through livestock rearing, and are particularly vulnerable to climatic shocks

(droughts and floods), mobility restrictions and limited access to scarce resources (water and grazing land). (UNHLTGFC2010).

**2.10 A global partnership for agriculture and food was proposed at the high-level conference on world food security:**

In 2009, the World Summit on Food Security in Rome adopted the Five Rome Principles for Sustainable Global Food Security:-

*Principle 1:* Invest in country-owned plans, aimed at channeling resources to well-designed and results-based programmes and partnerships.

*Principle 2:* Foster strategic coordination at national, regional and global level to improve governance, promote better allocation of resources, avoid duplication of efforts and identify response gaps.

*Principle 3:* Strive for a comprehensive twin-track approach to food security that consists of: (1) direct action to immediately tackle hunger for the most vulnerable and (2) medium- and long-term sustainable agricultural, food security, nutrition and rural development programmes to eliminate the root causes of hunger and poverty, including the progressive realization of the right to adequate food.

*Principle 4:* Ensure a strong role for the multilateral system by sustained improvements in efficiency, responsiveness, coordination and effectiveness of multilateral institutions.

*Principle 5:* Ensure sustained and substantial commitment by all partners to investment in agriculture and food and nutrition security, with the provision of necessary resources in a timely and reliable fashion, aimed at multi-year plans and programmes. These serve as a basis for turning political commitments into action and outcomes at community level. (G8 Summit 2009).

### 2.10.1 Changing governance of food security:

Member States of the United Nations are reforming the CFS so that it can serve as the foremost international and intergovernmental platform at the heart of the Global Partnership for Agriculture, Food Security and Nutrition (GPAFSN). Strengthened by greater inclusiveness and continuous action, the reformed CFS is to (a) coordinate a global approach to food security, (b) promote policy convergence, (c) support, advise and coordinate actions at national and regional levels, (d) promote accountability and the sharing of best practices, (e) receive scientific guidance from the High Level Panel of Experts (HLPE) on Food Security and Nutrition and (f) develop a Global Strategic Framework (GSF) for food security and nutrition. Member States expect similar attention to the revitalized governance of national food and nutrition systems, both to ensure food -high – level conference on world food security the challenges of climate change and bioenergy Rome,2008 security of their citizens and to participate in the changing global governance of food security.

### 2.10.2 Private sector action to reduce food insecurity:

In November 2009, representatives of private entities committed to food security attended a side event held as part of the preparation for the World Summit on Food Security. They emphasized their desire to help increase farmer productivity and their wish to help smallholders derive benefit from quality improvements, processing and marketing. Over the last 12 months consumer industry partners of the World Economic Forum (WEF) have contributed through regional consultations in Africa and Asia to develop a "New Vision for Agriculture". With this initiative they seek to enhance public-private partnerships to accelerate growth of sustainable agriculture calling on collaboration among national governments, farmers and intergovernmental bodies. This initiative receives advisory support from

the Global Agenda Council for Food and Nutrition Security chaired by the President of the (IFAD).

### 2.10.3 Sustained increases in food availability through growth in farmer food production:

Ensure that the macroeconomic, budget, trade and sector policy framework provides incentives for sustainable increases in smallholder production Stimulate private investment in agriculture with focus on small-scale farming Enhance secure and equitable access to natural resources, invest in agricultural research.

Improve rural infrastructure, insure sustained access to competitive, transparent and private-sector-led markets for food produce and quality inputs support development of, and strengthen producer organizations with the participation of women strengthen access of smallholders and other food value chain actors to financial and risk management instruments improve animal production services. (UNHLTGFC2010)

### 2.11 To achieve these outcomes, actions must simultaneously occur at local, national, regional and global levels:

Social and agricultural inputs made available to local farmers and other vulnerable populations must be complemented by macroeconomic actions to ensure sustainability. Thus, the outcomes presented below embrace the "spectrum" of actions needed to improve the availability, access and consumption of sufficient, safe and nutritious food, both in quantity and quality to meet nutritional needs. It is understood that actions will be adapted to and local conditions, take into account poverty reduction initiatives and include coordinated efforts by key stakeholders, particularly national governments, civil society and the private sector.

## 2.12 The Food Aid Convention:

Current patterns of international food assistance are governed through the Food Aid Convention (FAC), which sets standards for quality and delivery, urges member countries to procure food aid locally and to respect local habits and nutritional needs. It enshrines a practical collective response based on a shared responsibility to tackle hunger regardless of prices. Under this convention, FAC members commit to minimal levels of food aid, agreeing to target vulnerable groups with timely assistance. Some FAC stakeholders have proposed transforming the FAC into a Food Assistance Convention (which includes the use of cash transfers and vouchers to increase the quantity or quality of food consumed).

These stakeholders also propose a greater emphasis on the problems being addressed (households needing assistance rather than food to be donated); and the tailoring of responses to specific problems (e.g. responses to nutritional needs, improving market access, ensuring adequate food quality) with the involvement of recipients in the design, conduct, monitoring and evaluation of immediate responses to food and nutrition insecurity. For more information see http://www.foodaidconvention.org.

## 2.13 Improve linkages between sectors and actors:

For example, employment guarantee programmes that engage the unemployed can help rehabilitate or create small-scale infrastructure and agricultural assets that provide lasting benefits for the community. Similarly, Food cash for training can assist people in adopting skills, re-entering the labour market and moving towards self-sufficiency. School feeding, an effective incentive to improve school enrolment and attendance, is a valuable tool for improving nutrition among children, especially girls. This can be enhanced by introducing food and nutrition education and school gardening into the school curriculum. While governments are

primarily responsible for ensuring social protection, encouraging the participation of NGOs and other stakeholders may be especially important in building awareness about patterns of vulnerability among different sections of the population, as well as helping monitor the reach and efficacy of programmes. Other forms of complementing public sector efforts are also possible: the private sector can be given incentives for local production of nutritionally rich foods. (FAO, IFAD-2010).

**2.14 Promote research and development knowledge exchange and capacity building:**

On biofuel production pathways that limit competition with food, contribute to local development and are environmentally sustainable. HLTF members, including FAO, IFAD, OECD, UNCTAD, UNDP, UNEP and the World Bank, have carried out useful research and work on this issue, including: Supporting international initiatives and dialogue to establish sustainability criteria for bioenergy at policy and project levels, providing technical expertise and analysis; Conducting in-depth analysis of effects of biofuel policies; assessing impact of biofuel growth on agricultural commodity markets; quantitative analysis of impact of fuel and food prices on inflation and on food and nutrition security; Working with major biofuel consumers and producers to eliminate subsidies to allow biofuels to be produced by most efficient producers; Supporting research into second generation biofuels which could have much lower impacts on food production; Developing operational toolbox to assist policy makers design to bioenergy strategies; Assisting developing countries in assessing the viability of their biofuels potential and minimizing the trade-offs with food security, especially for small farmers; Assisting countries in designing bio-energy strategies that take into account opportunities and trade-offs; Investing in policy and analytical work on biofuels, trade, subsidies, gender

impact, nutrition impacts; Conducting analytical and policy work on trade-off between food and biofuels; Assessing the environmental impact of biofuels; Understanding the possible linkages between biofuel boost and land concentration potential. Under the Global Bioenergy Partnership (GBEP), a number of governments and UN agencies are working on science-based, relevant, practical and voluntary sustainability criteria and indicators to guide analysis of bioenergy, and inform decision-making at a national level. To assist decision makers in governments in developing robust bioenergy policy and strategy, a step-wise guidance document has been developed by FAO and UNEP under the framework of UN Energy. (FAO-UNEP 2010) This should comprise: ensuring sustainable use of natural resources, particularly land and water, safeguarding biodiversity; reducing greenhouse gas emissions; generating benefits for local communities; promoting food and nutrition security; and undertaking stakeholder consultation in the preparation of biofuels investments. These include ex-ante assessments of the impacts of policies or commercial activities that use food crops as feedstock, or change land ownership and use, as well as assessments of impacts of biofuel production on food prices at national levels.

**2.15 Brazil to fund food purchasing in five African countries:**

21 February 2012, Rome – The Government of Brazil is providing $2 375 000 for a new local food purchase programme to be set up by FAO and the World Food Programme (WFP) to benefit farmers and vulnerable populations in five African countries – Ethiopia, Malawi, Mozambique, Niger and Senegal. (FAO/ WFP 2012).

**2.16 Sudan UN agency funds farming improvement projects in Africa:**

The 2012 a new initiative aimed at improving food security in Sudan will provide the country's smallholder farmers with improved seeds and soil to

fight the threat of drought, the United Nations fund tasked with promoting rural development has announced. The (IFAD) will provide a $10.7 million dollar grant to help Sudanese farmers increase productivity through the use of certified seeds, improved soil and water conservation techniques, with young people and women given priority. The agricultural sector is Sudan's most important as it employs 80 per cent of the active population and contributes 39 per cent to the country's gross domestic product (GDP). The country's land area, however, is predominantly arid and as a result most of the country's farms remain reliant on rainfall for water, leaving them particularly susceptible to the ravages of drought. According to the new plan, IFAD will improve food security, incomes and resilience to environmental shocks among the smallholder producers in areas reliant on rainfall. In addition, the project will promote the public-private partnership for the supply and production of seeds. More than 108,000 smallholder farmers and 1,280 seed growers in the Sudanese states of Northern Kordofan and Southern Kordofan are expected to benefit from the plan. (IFAD 2012).

**Table (2-4) Population projections for the period1993 -2006**

| Year | Female | Male | Total |
|---|---|---|---|
| 1993 | 12717 | 12871 | 25588 |
| 2003 | 16696 | 16952 | 33569 |
| 2004 | 17122 | 17390 | 34441 |
| 2005 | 17559 | 17838 | 35397 |
| 2006 | 18004 | 18292 | 36297 |

Source**:** Central Bureau of Statistics.

### 2.16.1 Sudan strategy for food security:

Continuity of the country in producing enough of maize crop purpose for consumption and food security, but not to lift the surplus available from about 761 thousand tons in the period before green mobilization up to 6.5 million tons of maize by the end of the fifth year of plan to be available for the development of fodder industry livestock and poultry for export in addition to its contribution in building strategic stocks it must be noted here the important fact that this surplus will be possible in rainy seasons and the use of technologies recommended and therefore become a strategic stock imperative for the stability of corn-based industries. Increased wheat production from about 421 tons, which covers only 25% of the country's needs before green mobilization to reach 860 thousand tons in the base year (season 2006 / 2007) to cover about 50% of the consumption needs of the country and increase gradually until there is sufficient Territories in the fifth year of aversion ( 2.56 million tons). High proportion of rice self-sufficiency from 23% before green mobilization to achieve a surplus of the country issued the equivalent of 136%.

Increase millet surplus production from about 84 tons before green mobilization up to 812 tons by the end of the fifth year of aversion. As in the case of corn, this surplus will be available in the rainy seasons. Increase oilseed production to meet the needs of the local factory with an estimated amount for export. (Annual report of food security 2008).

### 2.16.2 Food security program:

Ministry of Agriculture and Forestry adopted five-year plan (2007-2011) Aiming to development the agricultural sector the main objective of the plan achievement of food security in Sudan. The food security programme must consider the following: Provide food through local production or foreign trade.

Access to food and dependent on the availability of resources, the security of the individual and family. Provide sufficient strategic stocks of staple food commodities. Stabilizing commodity supply of food throughout the year.

Ability to take advantage of available food, which depends on the quantity and quality of food and health situation of the individual methods and nutrition.

Food safety provide food through local production in Sudan has dominated advanced in plans and policies of the government, and Sudan has been self-sufficient in many food crops (maize, millet, pulses, fruits, vegetables and others), but the challenge now is the increase of imports of wheat crop, (one of main food Sudanese population).

### 2.16.3 Production of food commodities in year 2006:

Sudan is considered as one of the most important Arab countries which have agricultural and natural resources that could play a prominent role in achieving Arab food security strategy. The estimated planted Land is 39 million feddans, including about 4 million feddans in irrigated sector and 35 million feddans in rain fed sector, and there are still about 160 million feddans suitable for Agricultural development.

### 2.16.4 Production and productivity of major food commodities:

Achieving a positive growth in agricultural products is one of the important positive indicators of agricultural development. The planted areas and productivity are the main factors that affecting the quantities of production.

Table (2-5) show that the total planted area of cereal crops is increased to 39 million feddans in season 2005/2006, with an increase rate of 30% compared with season 2004/2005.

***Sorghum:*** Sorghum is one of the most important food security and economical crop in Sudan, as it is the main food for the majority of population. It grown in both irrigated and rain fed sectors. The cultivated area of sorghum represents 40% of the total cultivated areas in Sudan. The production of Sorghum in 2005/2006 season is about 4 million tons, with an increase rate of (53%) compared with season 2004/2005. this is due to good rainy season in terms of quantity and distribution, in addition to the efforts that have been made such as providing improved seeds and fertilizers.

***Millet:*** Millet is the most important grain crops in western Sudan. The cultivated areas in Western States represent about 95% of the total cultivated areas of millet in Sudan. Table (2-6) show that the production of millet in 2005/2006 season is around 675 thousands tones, with an increase rate of about 141%.compared with season 2004/2005.

***Wheat:*** Wheat is one of the main food security crops in Sudan, since it's the main food of most of the population of Northern states and center region. it grown in Gezira scheme, New Halfa scheme, White Nile state, River Nile state and Northern State .The government had adopted the policy of rehabilitation of wheat through increasing the planted areas and transfer of modern agricultural technologies particular in River Nile, Northern states, West and South Darfur states which result increasing the production rate of wheat by 14% in season 2005/2006 compared with season 2004/2005, Tables (2-6), (2-7).

***Maize:*** Maize is one of the major grain crops in the world, but it considered as a secondary crop in Sudan. It grown in small areas, however, it is main food crop in southern Sudan. This crop can play rule in achieving food security and increase the country's earnings of foreign exchange in future.

Table (2-7) reflects the positive development in the production of maize in seasons 2004/2005 and 2005/2006 despite of low productivity, as a result of marked increase in the planted areas by (203%).

***Rice:*** It is the second important food crop in the world after wheat. Table (2-6) show that the rate of change in production of rice is weak despite of increase in productivity in seasons 2004/2005 and 2005/2006; this is due to the minor increase in the planted area which is estimated to about (6%). The achievement of food security remained and will remain a major concern for many countries in the face of limited resources and increasing demand for food, especially in developing countries. The concept of food security, which was until recently associated with his concept of self-sufficient in food development often is linked to the issues more in-depth and comprehensive, such as poverty reduction and employment and income distribution, and in Sudan that the vast majority live in rural areas and depend on agriculture plant and animal in her pension, the achievement of food security is closely linked to the development of the agricultural sector to improve the traditional simple farm income.

**Table (2.5) the contribution of the agricultural sector in GDP in period 2004 /2008:**

| Year | Irrigated Sub-Sector | Rainfed-sector | Semi-Mechanized Sector | Traditional rainfed sector | Animal resource | Forestry |
|---|---|---|---|---|---|---|
| 2004 | 40.0 | 11.0 | 0.9 | 4.5 | 20.9 | 2.7 |
| 2005 | 39.6 | 10.9 | 1.4 | 5.4 | 19.4 | 2.5 |
| 2006 | 35.9 | 11.5 | 1.2 | 6.9 | 17.0 | 2.3 |
| 2007 | 33.6 | 9.9 | 0.9 | 4.7 | 16.0 | 2.1 |
| 2008 | 36.2 | 11 | 1 | 5.2 | 16.7 | 2.3 |

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Seen from the table that the contribution of the agricultural sector in GDP during the period 2004 -2007 to decline continuously. Where (40% - 39.6% - 35.9% - 33.6%) in a row but he is expected to see domestic debt increased in 2008 to 36.2%. One of the main reasons for the low contribution of the agricultural sector weakness of agricultural finance in spite of increase in quantity in recent years with the beginning of the Implementation of programs of agricultural development. Also note that the contribution of the irrigated sector in GDP has decreased from (11.5) in 2006 to (9.9) in the year 2007 and is expected to have climbed to about (11%) in the year 2008, as well as for both the rainfed mechanized and traditional expected to inform the about (1%) (5.2%) respectively for the same year.

**Table ( 2.6) Planted areas, production and productivity of cereal crops during the period 2004 – 2006.**

**Area (in 000'fed.) - Production (in 000'tons) - productivity (in kg / fed).**

| Crop | 2004/2005 | | | 2005/2006 | | |
|---|---|---|---|---|---|---|
| | Productivity | Production | planted area | Productivity | Production | planted area |
| Sorghum | 274 | 4327 | 20453 | 265 | 2619 | 15282 |
| Wheat | 976 | 416 | 433 | 953 | 364 | 407 |
| Millet | 88 | 675 | 10892 | 74 | 280 | 6996 |
| Maize | 436 | 109 | 277 | 806 | 25 | 36 |
| Rice | 1500 | 26 | 18 | 1400 | 20 | 17 |

Source: Department of agricultural statistics.

**Table (2.7) Production and rate of change in production of main food crops for the period 2004 – 2006.**

| Crop | 2004/2005 | 2005/2006 | Rate of change |
|---|---|---|---|
| | Production (in tons) | Production (in tons) | |
| sorghum | 2619 | 4327 | 66 |
| Wheat | 364 | 416 | 14 |
| Millet | 280 | 675 | 141 |
| Maize | 25 | 109 | 336 |
| Rice | 20 | 26 | 30 |

Source: Department of Agricultural statistic

### 2.16.5 Development of sect oral shares for the main Sectors of the Sudanese

**Table (2.8) Economy in Constant (1981/82 prices), 1981/82-2003**

| year | Agriculture% | Industry% | Services % | Total |
|---|---|---|---|---|
| 1981/82 | 38.7 | 15.4 | 46.0 | 100.0 |
| 1982/83 | 34.7 | 17.1 | 48.3 | 100.0 |
| 1983/84 | 34.1 | 16.5 | 49.4 | 100.0 |
| 1984/85 | 31.8 | 17.6 | 50.6 | 100.0 |
| 1985/86 | 34.9 | 15.4 | 49.7 | 100.0 |
| 1986/87 | 33.2 | 15.7 | 51.1 | 100.0 |
| 1987/88 | 30.1 | 16.5 | 53.5 | 100.0 |
| 1988/89 | 35.5 | 14.4 | 50.0 | 100.0 |
| 1989/90 | 29.8 | 15.2 | 55.1 | 100.0 |
| 1990/91 | 27.5 | 16.8 | 55.7 | 100.0 |
| 1991/92 | 32.4 | 15.7 | 51.9 | 100.0 |
| 1992/93 | 31.6 | 16.2 | 52.2 | 100.0 |
| 1993/94 | 29.8 | 15.1 | 55.0 | 100.0 |
| 1994/95 | 29.8 | 15.1 | 55.0 | 100.0 |
| 1995/96 | 38.5 | 14.5 | 47.0 | 100.0 |
| 1996/97 | 39.8 | 14.1 | 46.1 | 100.0 |
| 1997/98 | 39.4 | 16.7 | 43.9 | 100.0 |
| 1998/99 | 39.2 | 14.7 | 46.1 | 100.0 |
| 1999/00 | 36.9 | 19.5 | 43.7 | 100.0 |
| 2000/01 | 36.9 | 20.1 | 43.1 | 100.0 |
| 2001/02 | 37.0 | 20.5 | 424 | 100.0 |
| 2002/03 | 37.4 | 20.8 | 41.9 | 100.0 |

Source: Central Bureau of Statistics

**Table (2.9) Contribution of main sectors in GDP during the period (2001-2006)**

| Sector/year | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | Average |
|---|---|---|---|---|---|---|---|
| Agricultural sector | 46 | 46 | 45.6 | 39.8 | 39.4 | 38.9 | 42.6 |
| Industrial sector | 23 | 23.2 | 24.1 | 28.5 | 28.4 | 28.9 | 27.6 |
| Service sector | 32 | 30.9 | 30.3 | 31.7 | 32.1 | 32.2 | 31.5 |

Source: Ministry of Finance and National Economy.

**Table (2.10) Expenditure on the agriculture sector**

| Item | 2005 | 2006 |
|---|---|---|
| Expenditure on the agricultural sector | 74.77 | 120.1 |

Source: Ministry of Finance and National Economy

**Table (2.11) Growth rate of national GDP during the period 2004 – 2008**

| Year | Growth rate% |
|---|---|
| 2004 | 7.2 |
| 2005 | 8.0 |
| 2006 | 10.0 |
| 2007 | 10.5 |
| 2008 | 8 |

Source: Ministry of Finance and National

***Economy:*** Statistical data presented by the table we can see that the rate of growth of gross domestic product has seen a gradual increase of about (7.2%) in 2004 to about (10.5) in 2007, while an estimated (8%) in 2008, a decrease of (2.5%).

**Table (2.12) Distribution of population in Sudan periods 2004 - 2008**

| State | 2004 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|
| Northern | 625 | 634 | 644 | 654 | 664 |
| Nile rive r | 973 | 989 | 1007 | 1025 | 1044 |
| Khartoum | 5540 | 5757 | 5985 | 6223 | 6470 |
| Gazira | 3802 | 3903 | 4012 | 4124 | 4239 |
| Sinar | 3803 | 1334 | 1368 | 1402 | 1438 |
| Blue nile | 1636 | 737 | 758 | 781 | 803 |
| White nile | 1301 | 1676 | 1718 | 1760 | 1804 |
| Gadarif | 1682 | 1727 | 1783 | 1839 | 1898 |
| Kassala | 1624 | 1666 | 1708 | 1750 | 1794 |
| Red sea | 736 | 736 | 738 | 741 | 743 |
| North kordofan | 1578 | 2345 | 2381 | 2417 | 2454 |
| South kordofan | 1563 | 1666 | 1689 | 1713 | 1736 |
| North Darfur | 1655 | 1707 | 1733 | 1760 | 1786 |
| South Darfur | 3171 | 3279 | 3391 | 3507 | 3626 |
| West Darfur | - | 1775 | 1817 | 1860 | 1904 |
| Southern state | 5285 | 5447 | 5580 | 5715 | 5854 |
| Sudan | 34436 | 35379 | 36311 | 37270 | 38258 |

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The continuous increase of the numbers of the population in all states of Sudan, to varying degrees also note the continued increase in the population of Khartoum state during the years 2004-2008 where the total (5540 -5757 -5985 -6223-6470) people, respectively, which indicates an increase in the rate of migration from rural to urban areas, The mandate of the island comes in second place followed by the state of Gedaref and Sennar state mandates and notes Achammaip recorded at least an increase in population during the years 2004 - 2008 which indicates the low infrastructure in the region and increase the rate of the large immigration in the state, and expected a steady increase in population in the Northern State as an inevitable result after the establishment of Meroe Dam Project.

Represents the number of the urban population of about 34.8% of the volume of the total population, and rural population the proportion of 65.2% of the population size of 2002 has been estimated size of the manpower of about 56.1% of those of working age, the rate of economic participation rate of 52% and the unemployment rate reached 15.1% in the year 2002.

### 2.16.6 National achieving for food security:

There are a number of ways to attain food security. However, in countries where a certain section of the population does not have adequate means to satisfy its food needs, these countries may need to raise the level of both demand and supply. (shazali 2009).

## 2.17 Current Challenges to Food Security:

Rapid population growth and changing diets are increasing the demand for food. According to the FAO, 70% more food will be needed by 2050.

In addition to the one billion people who are hungry, there are another one billion that are malnourished and one-third billion who are obese. Both obesity and malnutrition have negative health and developmental effects, particularly to children, and will pose serious health care costs for society in the long term.

The majority of the poor are small holder farmers who live in rural areas that are often isolated from roads, infrastructure and services, and are therefore difficult to reach. Food prices are still very high in many regions. Although there is a significant transmission of the price spike to consumers in rural areas, there is little transmission to producers. In addition, prices of food and inputs continue to be very volatile.

## 2.18 Desert encroachment in Sudan:

Sudan is the largest (2.5 million $km^2$) and most seriously affected country by desertification in Africa. The arid and semi-arid lands cover an area of 1.78 million $km^2$, which represents about 72% of the total area of the country. These large-scale arid lands prompted the elaboration of a National Action Programme (NAP) state-wise i.e. a plan for each affected state. Sudan has been severely affected by recurrent drought spells (1973/74-1984/85). Sudan is a poor county and there is a need for significant amount of external assistance to achieve the national development objectives. The convention underlined the principle of

integrating strategies for poverty alleviation programmes and projects through efforts of combating desertification. The population in the rural areas relies heavily on natural resources for subsistence (cultivation of marginal lands, reliance on wood-fuel, range lands …etc). The county should capitalize and build on existing relevant successful projects, and make provisions for the new features presented by United Nations Convention to combat desertification (UNCCD) to make the projects sustainable. Sudan should make full use of existing international interventions and synergies between relevant core conventions such as the Convention on Biological Diversity (CBD) and United Nations Framework Convention on Climate Change (UNFCCC).Sudan national action programme (SNAP 2006) Khartoum-Sudan

# CHAPTER THREE

# 3 RESEARCH METHODOLOGY

## 3.1 Introduction:

The arid and semi-arid lands cover an area of 1.78 million $km^2$, which represents about 72% of the total area of the country.

## 3.2 Description of the research area:

***Khartoum State:***

***Khartoum*** is one of the 15 states of Sudan, after the succession of South Sudan it has an area of **8.451 ml sq - 22,122 $km^2$** and an estimated population of approximately **7,152,102** (census, 2008). Khartoum, is the national capital of Sudan, and the capital of the Khartoum State.

Most of the Khartoum state lies in the climatic semi-desert region, while northern areas lie in desert zones. The climate of the state is ranging from hot to very hot. The weather is rainy in summer, cold and dry in winter. Average rainfall reaches 100–200 mm in the north-eastern areas and 300–200 mm in the north western areas.

According to 2008 population census, the population of Khartoum state is a mixture of tribes of the Sudan. If we want to define the tribes living in Khartoum state in some details and specificity, we find the peripheries of the cities and rural areas are inhabited by distinguished tribes. In the areas of Omdurman and the rural South, we find the tribe of Jommueya as we find the Kordofani tribes displaced to these areas as the drought and desertification that hit their areas in the past years (early and mid-eighties) where you will find in these areas tribes of Kababish and the Kawahla. In the northern countryside of Karari province, we find the tribe of Shiheinat, in Khartoum North there are the tribes of Abdallab and Batahin. In the East Nile, there are the tribes of Abu Dileig, Batahin, and Kawahla with the

tribe of Iseilat in Um-Dowan. As to the activity of the population of Khartoum state, it can be said that most of the population are workers and personnel in the State chambers, the private sector and banks. Also, there is a large segment of capitalists dealing in trade and another segment represented by migrants and displaced people working in marginal activities. As to countrymen, they are engaged in agriculture, grazing and thus supply the capital, Khartoum, with vegetables, fruits and dairy. There are also some residents who live on the banks of the river engaged in the river-related works such as pottery, bricks and fishing.

### 3.3 Research Design:

The study was conducted using social survey methodology that use quantitative approaches to research. The choice of this design was due to the need of intensive investigations of the relationship between the means of achieving sustainable livelihood and food security of Jommueya area performance in the study area. Its main purposes were to provide numerical descriptions of some parts of the population and to describe and explain events using a comprehensive questionnaire including some social services, education, economic activities, health, water, electricity services transportation and sources of food security in the study area as well as views of its inhabitants and how they secure their food supplies.

### 3.4 Jommueya area:

Jommueya area falls between longitudes 22 – 32 and latitudes 12.5 – 15, 15 – 24.5. It is bordered by west of White Nile, from Jabal Awlia southwards, to Omdurman town northwards. This area is a poor savannah and semi desert with scarce rainfall, which ranges between 100 -150 mm per year and average temperature is 39C.

The main vegetation is desert plants, shrubs and grasses. Crop production and livestock raising is limited due to low production and high costs, so the majority of population in the area works as casual laborers

### 3.4.1 Economic activities:

Besides fishing in the White Nile, some small farmers grow forages, and some have green houses and dairy farms.

There are small workshops for making iron doors, windows and shelters beside black smith work and welding. Some of the people are working as merchants and traders. There are also institutions such as schools, hospitals, and mosques in the area.

### 3.4.2 Jommueya Agricultural Scheme:

It lies 25km to the south of Omdurman and 9km to the north of jebal awlia dam. The area of the Scheme is 7,380 feddans,175 feddans are irrigated outside the scheme known as el suleymania extension, and 3000 feddans are under preparations.

This scheme was started in 1970 with the aim of changing the economic and social life style in the area. In 1971, the scheme was registered as a co-operative society. The source of irrigation is the White Nile river.

### 3.4.3 Seasonal cropping:

Crops are grown throughout the year. In Autumn , they grow vegetables such as okra, cucumber and in the Winter they grow cereal crops, vegetables, pulses, and in Summer they grow forages.

### 3.4.4 Soils:

Soils of jommueya may be classified as follows:-

1) Clay soil of White Nile region (Gurair) (silt).
2) Alluvial sandy clay plains.

3) Sandy clay exposed to erosion at banks of valleys.

4) Gravel soil in mountain areas.

The soil in this area was affected by desert encroachment and hence sand dunes were formed in most of geological components. These components are distinguished by high permeability of rainwater and hence become rich in artesian water. Some areas are covered by basement complex which are without artesian water.

### 3.4.5 Topography:

The area Southwest Omdurman may be described as flat plain with natural elevation towards east north or west to east in the same area. This is noticed in valleys running in the area.

### 3.4.6 Valleys:

There are several valleys in the area .The most important valleys are:-

1) Al mansurab which is considered to be the biggest one.

2) Al Hamraa.

3) Seyal (alrawakeeb).

4) Abu hashim.

### 3.4.7 Natural vegetation:

This area falls within the semi - desert climate with scarce rainfall and desert plants and shrubs spread.

### 3.4.8 Herbs:

These are:

Indigfera hocgstetteri (sharaya).

Colocynthesis vulgaris (Handal).

Bracharia comate (Dafra).

Syn Dinebra retroflexa.

Ipomea rotschyana.

Syn mitracarbus villosis (khantot).

Corchorus depressus (suteih).

Corchorus spp (khudra).

Zaleya pentandra (Rab, aa).

Tribulus terrestris (Deressa).

**3.4.9 Plants:**

Due to the drought, removal of trees and uncontrolled eradication of plants cover, forests control measures were established with the planting of parosups trees in Al kamonab, Al sandodab, Baraka algharbiya, Goz – ibraheem, Goz –dahlob, Um muaika,Umalquraa, Alko,a, Abu hasheem, wadi al rawaakeeb, Id abu zaid, and Al hafeer.

There are some open forests in some villages at banks of the valleys or khors in addition to some shrubs spreading with the prevailing trees in the area.

1- Acacia nilotica
2- Acacia tortilis
3- Acacia albida
4- Acacia nubica
5- Acacia seyal
6- Balanitis aegyptica
7- Cadaba farinose
8- Stereospermum kunthianum

9- Ziziphus abasynia

10- Prosupis chilensis

### 3.5 The research methods used in the study area:

To pursue the objectives of this study, the rationale of the methodology used lies in the following approaches: Firstly, the literature review of the food security and food system is used to compare the current challenges, opportunities and approaches for achieving sustainable livelihood in the local communities. Secondly, the use of case study approach is availing the current livelihood situation in the study area. Lastly, the findings of the study are expected to provide effective recommendations solutions and actions for the benefit of the study area and other communities. A widely available and well-tested package program Statistical Package for the Social Sciences (SPSS version16.0 for Windows) was used in the study.

#### 3.5.1 Population and sampling:

***Population:***

The study of means of achieving sustainable livelihood and food security of Jommueya area was conducted from April 2010 to August 2011. The sample was selected from about 67 villages, with total of households of 120 thousands. The sample was selected from 10 villages and the sample size was supposed to be 375 but was reduce to 300 households due to financial problems. Selected randomly data was collected by visiting the area within ten months period, through structured schedules:

**Table (3.1) village and the size of the sample for each village**

| Villages | No of HH | Sample size |
|---|---|---|
| Al-hajab | 700 | 35 |
| Al hafeer | 340 | 17 |
| Fetasha | 475 | 24 |
| Gos- dahlob | 240 | 13 |
| ALJamarab | 450 | 22 |
| Samra haj taher | 980 | 49 |
| AL-galee,a | 565 | 28 |
| Baraka shati | 300 | 15 |
| Al miqdab | 950 | 47 |
| Serewa | 1000 | 50 |
| Total | **6000** | **300** |

### 3.5.2 Data collection and analysis:

Two methods of data collection were used primary data which were collected from the respondents and the participants during the survey using questionnaire through structured schedules. The data was collected with the help of three graduates. The data collected was analyzed using SPSS version 16.0 windows with frequency distribution and percentage and Chi-Square.

# CHAPTER FOUR

## 4. Data analysis and discussion:

This chapter presents data analysis and discussion of the main findings of the study. The first part of this chapter deals with the frequency distribution and percentage of services and infrastructure which are (water supplies, electricity services, healthcare, education, transportation, public services, and extension services).

The second part discusses the results of chi- square used in the analysis.

**Table(4.1.1)Frequency distribution and percentage of households headed by gender**

| Gender | Frequency | Percent |
|---|---|---|
| Male | 243 | 81.0 |
| Female | 57 | 19.0 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.1 shows that the percentage of males headed households were more than females headed households, where the gender percentages are 81%, 19%, respectively.

**Table (4.1.2) Frequency distribution and percentage of ages of the respondents**

| Ages | Frequency | Percent |
|---|---|---|
| 18-25 year | 13 | 4.3 |
| 26-35 year | 81 | 27.0 |
| 36-45 year | 89 | 29.7 |
| 46-55 year | 57 | 19.0 |
| 56 - 60 year | 60 | 20.0 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table4.1. 2 reveals that the majority of the respondents of the study area were of productive ages 18-60, this means that the agricultural production in the study area can be increased if the problems facing the farmers are solved.

**Table (4.1.3) Frequency distribution and percentage of the marital status of the respondents**

| Marital status | Frequency | Percent |
|---|---|---|
| married | 256 | 85.3 |
| single | 24 | 8.0 |
| divorce | 2 | .7 |
| widow | 18 | 6.0 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1. 3 states that the majority of the respondents of the area were married. This means that the marital status in the area was stable and makes family labour available.

**Table (4.1.4) Frequency distribution and percentage of household size of the respondents**

| Household size | Frequency | Percent |
|---|---|---|
| 2-5 person | 106 | 35.3 |
| 6-10 person | 173 | 57.7 |
| 11-15 person | 18 | 6.0 |
| 16 and more than | 3 | 1.0 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.4 illuminates that the majority of the household's size were (6-10) persons, 57.7%. This means that the households can depend on family labour in the agricultural production.

**Table (4.1.5) Frequency distribution and percentage of the educational level of the respondents**

| Educational level | Frequency | Percent |
|---|---|---|
| Illiterate | 112 | 37.3 |
| Khalwa | 51 | 17.0 |
| Secondary | 82 | 27.3 |
| University | 55 | 18.3 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.5 demonstrates that the majority of the respondents in the study area were illiterate which represent 37.3%. This requires raising the level of education of the respondents.

**Table (4.1.6) Frequency distribution and percentage of the occupations of the respondents**

| Main occupations | Frequency | Percent |
|---|---|---|
| Farmer | 81 | 27.0 |
| Petty trade | 34 | 11.3 |
| Herder | 18 | 6.0 |
| Fisher | 7 | 2.3 |
| Casual laborers | 160 | 53.3 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.6 shows that the majority of the respondents work in different jobs, so as to raise their incomes to meet their living expenses. This indicates that most of the respondents in the study area work as casual laborers.

**Table (4.1.7) Frequency distribution and percentage by work according to gender in the households**

| Gender work | Frequency | Percent |
|---|---|---|
| Only males | 182 | 60.7 |
| Only females | 13 | 4.3 |
| Male and females | 105 | 35.0 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.7 shows clearly that the bulk of the work in the households in the study area were carried by males and male and female represent 60.7%, 35% respectively.

**Table (4.1.8) Frequency distribution and percentage of the respondents by water sources**

| Water sources | Frequency | Percent |
|---|---|---|
| White Nile | 2 | .7 |
| Artesian wells | 297 | 99.0 |
| others | 1 | .3 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.8 illustrates that the main source of drinking water in the study area was Artesian wells which represent 99%. This demonstrates that water used in the study area is safe.

**Table (4.1.9) Frequency distribution & percentage of the household by means of getting water**

| Means of getting water | Frequency | Percent |
|---|---|---|
| Donkey carts | 130 | 43.3 |
| Khuruj(using donkeys) | 3 | 1.0 |
| Water tapes | 167 | 55.7 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.9 reveals that the main means of getting water from the wells were water tapes and donkey carts which represent 55.7%. 43.3%, respectively.

**Table (4.1.10): Frequency distribution and percentage of water related problems facing the respondents**

| Water related problems | Frequency | Percent |
|---|---|---|
| Water shortage | 154 | 51.3 |
| Water pollution | 21 | 7.0 |
| High cost of water | 93 | 31.0 |
| Long distance of water source | 32 | 10.7 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.10 clarifies that the majority of the respondents in the study area were facing problem of water shortage which represents 51.3%.This means that this problem can be solved by provision of more artesian wells and distribution points.

**Table (4.1.11) Frequency distribution and percentage by electricity source of the respondents**

| Electricity Source | Frequency | Percent |
|---|---|---|
| Public electricity | 185 | 61.7 |
| Special Generator | 10 | 3.3 |
| Business Generator | 34 | 11.3 |
| Others | 4 | 1.3 |
| | 233 | 77.7 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.11 explains that the majority of the respondents in the study area get their electricity from public electricity corporation which is 61.7%. This means that the respondents of the study area are benefiting from the electricity corporation.

**Table (4.1.12) Frequency distribution and percentage by duration of electricity services**

| Time of electricity services | Frequency | Percent |
|---|---|---|
| 24 hours | 145 | 48.3 |
| 12 hours | 22 | 7.3 |
| 6 hours | 27 | 9.0 |
| 3 hours | 24 | 8.0 |
| One hour only | 12 | 4.0 |
| | 230 | 76.7 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.12 shows that the majority of the respondents get electricity services 24 hours daily. This is indicates good electricity services provision in the study area.

**Table (4.1.13) Frequency distribution and percentage of obstacles of electricity services**

| Obstacles & Barriers | Frequency | Percent |
|---|---|---|
| Power cut-off | 68 | 22.7 |
| High cost | 16 | 5.3 |
| Irregularity | 119 | 39.7 |
| Others | 28 | 9.3 |
| | 231 | 77.0 |
| Total | 300 | |

* Source: field study, 2011

Table 4.1.13 shows that the majority of the respondents reported that the irregularity of electricity supply as the main obstacle in study area. This needs more electricity stations for the distribution in the study area.

**Table (4.1.14) Frequency distribution and percentage of network roads in the area**

| Network roads | Frequency | Percent |
|---|---|---|
| Rough roads | 80 | 26.7 |
| Earth fill roads | 24 | 8.0 |
| Paved road | 170 | 56.7 |
| Others | 20 | 6.7 |
| | 294 | 98.0 |
| Total | | 300 |

* Source: field study, 2011

Table 4.1.14 shows that the majority of the respondents use paved roads network in the study area which presents 56.7% .This indicates improved network roads which help much in easy transportation in the study area.

**Table (4.1.15) Frequency distribution and percentage of the respondents transportation type**

| Transportation type | Frequency | Percent |
|---|---|---|
| Buses | 6 | 2.0 |
| Mini bus | 176 | 58.7 |
| Hillux | 117 | 39.0 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.15 shows that most of the respondents in the study area use mini-buses which represents 58.7%. This means a faster means of transportation in order to save times and give more comfort.

**Table (4.1.16) Frequency distribution and percentage of the transportation problems**

| Transportation problem | Frequency | Percent |
|---|---|---|
| Bridges crowded | 47 | 15.7 |
| long distance | 176 | 58.7 |
| rough roads | 58 | 19.3 |
| others | 19 | 6.3 |
| Total | 300 | 100.0 |

* Source: field study, 2011

A Table 4.1.16 shows that the transportation problem faced by the respondents in the study area is that long distances represent 58.7%. This needs continuous efforts for improvement in construction of more bridges along the White Nile.

**Table (4.1.17) Frequency distribution and percentage of respondents attending health clinic centers**

| Health clinic centers | Frequency | Percent |
|---|---|---|
| Attended | 190 | 63.3 |
| Not attended | 110 | 36.7 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.17 shows that the majority of the respondents attend health clinic centers which are 63.3%. This indicates that the respondents have health awareness in the study area.

**Table (4.1.18) Frequency distribution and percentage of the health-clinic working time**

| Health-clinic work time | Frequency | Percent |
|---|---|---|
| 24 hours | 35 | 11.7 |
| 12 hours | 70 | 23.3 |
| 6 hours | 70 | 23.3 |
| 3hours | 41 | 13.7 |
| | 216 | 72.0 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.18 shows that the health clinic centers work for 12 hours daily. This means that the there is need to make more services for 24 hours / daily in the study area.

**Table (4.1.19) Frequency distribution and percentage of maternal and child vaccination services**

| Maternal and child vaccination | Frequency | Percent |
|---|---|---|
| Attended | 266 | 88.7 |
| Not attended | 20 | 6.7 |
| | 286 | 95.3 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.19 illustrates that the majority of the respondents in study area attend maternal and child vaccinations which represent 89% .This indicates high health awareness among the respondents in the study area.

**Table (4.1.20) Frequency distribution and percentage of vaccination time**

| Vaccination time | Frequency | Percent |
|---|---|---|
| Every two months | 145 | 48.3 |
| Every three months | 40 | 13.3 |
| Every six months | 48 | 16.0 |
| Every nine months | 6 | 2.0 |
| Every year | 10 | 3.3 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.20 reveals that the majority of the respondents in the study area attend vaccination centres every two months which represents 48.3% .This means an existence of health awareness among the respondents in the study area.

**Table (4.1.21) Frequency distribution and percentage of the main diseases of the area**

| Main diseases | Frequency | Percent |
|---|---|---|
| Malaria | 154 | 51.3 |
| T.B | 2 | .7 |
| Hepatitis | 26 | 8.7 |
| Schistosomaisis | 11 | 3.7 |
| Others | 87 | 29.0 |
| | 280 | 93.3 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.21 exposes that the majority of the respondents reported malaria as the main diseases in the study area which represent 51.3%. This needs more programs for malaria preventive measures and awareness in the study area.

**Table (4.1.22) Frequency distribution and percentage of school services**

| School services | Frequency | Percent |
|---|---|---|
| Yes | 298 | 99.3 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.22 illustrates that the majority of the respondents reported that most of children attend schools which represent 99.3%.This means a clear positive response to policy: that every child should attend school and in agreement with the (MDGs).

**Table (4.1.23) Frequency distribution and percentage of obstacles facing the respondents**

| Obstacles & barriers schools | Frequency | Percent |
|---|---|---|
| No enough class | 182 | 60.7 |
| Without wall school | 20 | 6.7 |
| Pupil absence daily | 18 | 6.0 |
| No enough teachers | 62 | 20.7 |
| High cost of school books | 6 | 2.0 |
| Others | 11 | 3.7 |
| Total | 300 | 100.0 |

* Source field study 2011

Table 4.1.23 explains that the respondents in study area reported that the main obstacles facing them are lack of enough classes and teachers which represents 60.7%, 20.7% respectively. This illustrates the scarcity of teachers due to low salaries, transportations and accommodation problems for the married women teachers.

**Table (4.1.24) Frequency distribution and percentage of the respondents farm size**

| Family farm size | Frequency | Percent |
|---|---|---|
| 0 - less 5 feddans | 91 | 30.3 |
| 5 -10 feddans | 56 | 18.7 |
| and more than 10 feddans | 26 | 8.7 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.24 clarifies that the majority of the respondents in study area had farm size 0 –less 5 feddan is 30.3%, 5-10 feddan is 18.7 % respectively. This means that the majority of the respondents in the study area are small farmers.

**Table (4.1.25) Frequency distribution and percentage of land tenure type**

| Land tenure type | Frequency | Percent |
|---|---|---|
| Tenure land | 105 | 35.0 |
| Rent land | 8 | 2.7 |
| Inheritance | 30 | 10.0 |
| Grant temporary | 15 | 5.0 |
| Others | 2 | .7 |
| | 140 | 46.7 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.25 shows that most of the respondents in study area are land tenures which represents 45%. This helps in income generation and intensive cultivation.

**Table (4.1.26) Frequency distribution and percentage of cropping way**

| Cropping ways | Frequency | Percent |
|---|---|---|
| Traditional ways | 156 | 52.0 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.26 illustrates that the majority of the respondents in the study area, use the traditional ways which represents 52.0%. This needs more extension programs to increase the awareness of the farmers and innovation in new techniques.

**Table (4.1.27) Frequency distribution and percentage of soil preparation**

| Soil preparation system | Frequency | Percent |
|---|---|---|
| Zero tillage | 65 | 21.7 |
| Animal machinery | 13 | 4.3 |
| Tractors | 77 | 25.7 |
| Total | 300 | 100.0 |

* Source field study 2011

Table 4.1.27 reveals that the majority of the respondents in the study area have the soil prepared traditional ways which represent 26%. This means that the farmers can have decreasing high cost of tractors for soil preparing to increase their production.

**Table (4.1.28) Frequency distribution and percentage of main crops of the households**

| Main crops of the households | Frequency | Percent |
|---|---|---|
| Cereal crops | 72 | 24.0 |
| Vegetable crops | 18 | 6.0 |
| Fruit crops | 3 | 1.0 |
| Forage crops | 58 | 19.3 |
| Others | 2 | .7 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.28 demonstrates that the majorities of the respondents of the study area grow cereal crops and forage crops which represents 24.0% and 19.3 % respectively.

**Table (4.1.29) Frequency distribution and percentage of technology users of the respondents**

| User technology | Frequency | Percent |
|---|---|---|
| Agricultural machinery | 96 | 32.0 |
| Improved seeds | 10 | 3.3 |
| Chemical fertilizer | 24 | 8.0 |
| Pest side | 11 | 3.7 |
| Total | 100.0 | 300 |

* Source: field study, 2011

Table 4.1.29 reveals that the majority of the respondents of the study area use agricultural machinery which represents 32.0%. This needs more extension services to raise the farmer's awareness.

**Table (4.1.30) Frequency distribution and percentage of sheep / farm**

| Sheep farm | Frequency | Percent |
|---|---|---|
| 10 Head of sheep | 72 | 24.0 |
| 20 Head of sheep | 31 | 10.3 |
| 30 Head of sheep | 4 | 1.3 |
| 40 Head of sheep | 4 | 1.3 |
| 50 Head and more than | 6 | 2.0 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.30 illuminates that the majority of the respondents in the study area have 10 heads of sheep which represents 24.0%.This means the respondents of the area needs more farm animals.

**Table (4.1.31) Frequency distribution and percentage of animal types**

| Animal types | Frequency | Percent |
|---|---|---|
| Camel | 3 | 1.0 |
| Cattle | 17 | 5.7 |
| Sheep | 46 | 15.3 |
| Goat | 49 | 16.3 |
| Donkey | 5 | 1.7 |
| poultry | 11 | 3.7 |
| Other | 2 | .7 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.31 shows that the majority of the respondents in the study area, they had goats and sheep which represents 16.3%, 15.3 %, respectively

**Table (4.1.32) Frequency distribution and percentage of way of husbandry**

| Ways of husbandry | Frequency | Percent |
|---|---|---|
| Traditional | 139 | 46.3 |
| Modern | 2 | .7 |
| Other | 4 | 1.3 |
| | 145 | 48.3 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.32 exposes that the majority of the respondents in the study area, raise animal husbandry in traditional ways which represents 46.3%. This needs more awareness by extension training programs.

**Table (4.1.33) Frequency distribution and percentage of purpose of herder**

| Purpose of animal herder | Frequency | Percent |
|---|---|---|
| Meat purpose | 18 | 6.0 |
| Milk purpose | 97 | 32.3 |
| Egg purpose | 11 | 3.7 |
| Wool purpose | 4 | 1.3 |
| Other purpose | 9 | 3.0 |
| Total | 300 | 100.0 |

* Source field study 2011

Table 4.1.33 accentuates that the majority of the respondents in the study area the herder is for animal milk purposes which represents 32.3% .This means this helps source of income generation in the study area.

**Table (4.1. 34) Frequency distribution and percentage of obstacles facing farmers**

| Obstacles &barriers | Frequency | Percent |
|---|---|---|
| Poor production | 68 | 22.7 |
| High cost | 72 | 24.0 |
| Other | 10 | 3.3 |
| | 150 | 50.0 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.34 shows that the respondents of the study area are facing obstacles and barriers is high costs and poor production which represents 24.0% , 22.7% respectively. This means this in one of the reasons of why respondents in the study area to change their works from farmer to casual laborer.

**Table (4.1.35) Frequency distribution and percentage of technology use for animal production**

| Technology use for animal production | Frequency | Percent |
|---|---|---|
| Preambles | 3 | 1.0 |
| Drugs | 75 | 25.0 |
| Milking machine | 1 | .3 |
| wool cutting machine | 15 | 5.0 |
| Other | 10 | 3.3 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.35 illustrates that the majority of the respondents use medical drugs which represent 25.0%. This needs more of technological use to improve more production.

**Table (4.1.36) Frequency distribution and percentage of the respondents by role of technology transfer and agricultural extension services**

| Role of technology transfer | Frequency | Percent |
|---|---|---|
| Poor | 138 | 46.0 |
| Medium | 52 | 17.3 |
| | 190 | 63.3 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.36 exposes that the majority of the respondents in the study area reported the role of technology transfer and agricultural extension services, is poor and medium which represents 46.0%, and 17.3% respectively.

**Table (4.1.37) Frequency distribution and percentage of intensive visits**

| Intensive visit | Frequency | Percent |
|---|---|---|
| One time a week | 11 | 3.7 |
| One time a two weeks | 33 | 11.0 |
| One time a three weeks | 25 | 8.3 |
| One time a month | 57 | 19.0 |
| | 126 | 42.0 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table4.1. 37 shows that the respondents of the study area, the intensive visit program, they meet one time a month represent 19.0%, this needs more of extension programs in the study area.

**Table (4.1.38) Frequency distribution and percentage of the respondents by extension meetings**

| Meeting extension service | Frequency | Percent |
|---|---|---|
| One time per week | 5 | 1.7 |
| One time per two weeks | 20 | 6.7 |
| One time per three weeks | 4 | 1.3 |
| One time per month | 99 | 33.0 |
| | 128 | 42.7 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.38 shows that the majority of the respondents in the study area are meet one time per month which represents 33.0%, This need meeting weekly to improve good media of extension program.

**Table (4.1.39) Frequency distribution and percentage of radio extension**

| Radio extension services | Frequency | Percent |
|---|---|---|
| Broadcasting lectures per day | 14 | 4.7 |
| Weekly | 79 | 26.3 |
| Monthly | 20 | 6.7 |
| Other | 8 | 2.7 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.39 accentuates that the majority of the respondents in the study area listen radio extension lectures, weekly and monthly which represents 26.3% , 6.7% respectively. This indicates that weekly programs are good media of extension services.

**Table (4.1.40) Frequency distribution and percentage of the respondents by watching television extension services**

| TV extension services | Frequency | Percent |
|---|---|---|
| Broadcasting lectures | 17 | 5.7 |
| Seminars | 28 | 9.3 |
| Drama | 52 | 17.3 |
| Patriotic songs | 2 | .7 |
| Other | 20 | 6.7 |
| | 119 | 39.7 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.40 reveals that the respondents in the study area, the watching TV drama represent 17.3%. This indicated the poor extension in the study area.

**Table (4.1.41) Frequency distribution and percentage of positive sides of extension**

| Positive side of extension | Frequency | Percent |
|---|---|---|
| Technology transfer | 15 | 5.0 |
| Farmers education and training | 107 | 35.7 |
| Other | 4 | 1.3 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.41 shows that the respondents of the study area are benefit from extension positive sides such as farmer's education and training programs which represent 36.0%. This needs more of extension programs in the study area.

**Table (4.1.42) Frequency distribution and percentage by obstacles facing farmers**

| Obstacles and Barriers | Frequency | Percent |
|---|---|---|
| Poor financing and drought | 105 | 35.0 |
| Poor agricultural input | 41 | 13.7 |
| Poor extension and agricultural research | 24 | 8.0 |
| Other obstacles | 3 | 1.0 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.42 shows that the majority of the respondents in the study area faced poor financing drought and poor agricultural input which represents 35.0%, 13.7 %, respectively. This needs more training and extension programs which can benefit farmers to solve them problems.

**Table (4.1.43) Frequency distribution and percentage of income sources of the respondents**

| Income sources of respondents | Frequency | Percent |
|---|---|---|
| Crop farm | 56 | 18.7 |
| Animal farm | 17 | 5.7 |
| Forest | 1 | .3 |
| Occupation | 40 | 13.3 |
| Casual laborer | 160 | 53.3 |
| External remittances &gifts | 6 | 2.0 |
| | 280 | 93.3 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.43 describes that the majority of the respondents of the study area, income sources is casual labouring which represents 53.3% and crop farming represents 18.7 % This means that the sources of income in the study area is very poor so these need to make more for the respondents income sources .

**Table (4.1.44) Frequency distribution and percentage of food sources**

| **Food sources** | **Frequency** | **Percent** |
|---|---|---|
| From farm | 30 | 10.0 |
| From market | 262 | 87.3 |
| Gift | 2 | .7 |
| | 294 | 98.0 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table4.1. 44 shows that the majority of the respondents in the study area, get their food sources from farm and from market which represents10.0 %, and 87.3%,respectively.This means that the respondents do not rely on one source of income

**Table (4.1.45) Frequency distribution and percentage of no of meals per day**

| **Number of meals per day** | **Frequency** | **Percent** |
|---|---|---|
| Three meals per day | 130 | 43.3 |
| Two meals a day | 140 | 46.7 |
| More than three meals a day | 3 | 1.0 |
| | 273 | 91.0 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.45 shows that the majority of the respondents in the study area , take two meals day and three meals a day which represents 46.7%, 43.3% respectively. This indicates good situation of meals per day in the study area.

**Table (4.1.46) Frequency distribution and percentage of annual income**

| Annual income | Frequency | Percent |
|---|---|---|
| One thousand SDG | 136 | 45.3 |
| 2 thousands SDG | 77 | 25.7 |
| 3 thousands SDG | 39 | 13.0 |
| 4 thousands SDG | 9 | 3.0 |
| 5 thousands SDG | 29 | 9.7 |
| | 290 | 96.7 |
| Total | 300 | 100.0 |

* Source: field study, 2011

Table 4.1.46 reveals that the majority of the respondents in the study area are their annual income is one thousand, Two thousands, Three thousands, Four thousands, Five thousands SDG which represents 45.3%, 25.7 %,13.0%, 3.0%, 9.7% respectively . This is means that the majority of the respondents have low income, that needs more development can be for the respondents to increase their incomes in the study area.

## PART TWO:

## Data analysis and Discussion

### Demographic information of the respondents:

The second part discusses the results of chi-square used in the analysis. The purpose of this background information is to present the characteristics of the respondents and show the distribution of the population in the study. Therefore, researcher chooses the following variables:-

**Gender**, **Marital status, Household size, Education level**, **Main occupation** with{ most frequent diseases - Type of house ownership - Area grown, - Main crops -Main type of animals- Obstacles faced farmers,- Role of transfer of technology and extension services - Attending extension meetings - listening to radio extension programs - Source of income - Number of meals per day, and - Income sources.

**Table (4.2.1) The Chi – Square test for relationship between marital status and**

**most frequent diseases in the study area**.

| **Marital status** | **Most frequent diseases of area** | | | | | Total |
|---|---|---|---|---|---|---|
| | malaria | T.B | hepatitis | schistosomaisis | others | |
| Married % | 129 | 2 | 25 | 9 | 81 | 246 |
| | 52.4 | .8 | 10.2 | 3.7 | 32.9 | 100.0 |
| Single % | 13 | 0 | 0 | 2 | 5 | 20 |
| | 65.0 | .0 | .0 | 10.0 | 25.0 | 100.0 |
| Widow % | 1 | 0 | 0 | 0 | 1 | 2 |
| | 50.0 | .0 | .0 | .0 | 50.0 | 100.0 |
| | Chi-square value = 13.834 D f =12 sig =.311 | | | | | |

* Source: field study, 2011

The results of table No. 4.2.1 indicates that there are no significant statistical differences between individuals with difference in the marital status of the study sample and the most frequent diseases. The malaria infected single groups which represent 65%, while the married group is 52.4%. The percentage of the widowed groups is 50.0%. This indicates that the single groups are most subjected to malaria.

There are no significant differences as Chi square value = (13.83), at level of significance (.311) which means that there is no impact of the marital status on diseases in the study area.

**Table (4.2.2) The Chi – Square test relation between marital status and type of house ownership in the study area**.

| **Marital status** | **Type of house ownership** | | | | | Total % |
|---|---|---|---|---|---|---|
| | Owner | For rent | Inheritance | Grant temporary | Other | |
| Married % | 244 | 2 | 8 | 1 | 1 | 256 |
| | 95.3 | .8 | 3.1 | .4 | .4 | 100.0 |
| Single % | 24 | 0 | 0 | 0 | 0 | 24 |
| | 100.0 | .0 | .0 | .0 | .0 | 100.0 |
| Widow % | 2 | 0 | 0 | 0 | 0 | 2 |
| | 100.0 | .0 | .0 | .0 | .0 | 100.0 |
| | Chi-square value = 2.148 D f =12 sig =.999 | | | | | |

* Source: field study, 2011

The results of table No. 4.2.2 indicate that there are no significant statistical differences between individuals with different marital status of sample study and the type of House ownership, which represent 95.3% the married groups.

Whereas, the unmarried category is 100%, and widowed is 100% respectively, This indicate that there is no significant statistical differences, in Chi square value = (2.14), at level of significance (.999), This means no impact of marital status on type of House ownership in the study area.

**Table (4.2.3) The Chi – Square test for relationship between marital status and area grown in the study area.**

| Marital status | Area grown | | | |
|---|---|---|---|---|
| | 0 - less 5 feddans | 5 -10 feddans | 10 feddans and more than | Total % |
| Married % | 77 | 50 | 21 | 148 |
| | 52.0 | 33.8 | 14.2 | 100.0 |
| Single % | 10 | 4 | 2 | 16 |
| | 62.5 | 25.0 | 12.5 | 100.0 |
| Widow % | 0 | 1 | 0 | 1 |
| | .0 | 100.0 | .0 | 100.0 |
| | Chi-square value = 6.568 | | D f =6 sig =.363 | |

*Source: field study, 2011

The results of table No. 4.2.3 show that there is no significant differences between in the marital status of the study sample and of their farm size, for the three married groups which represent 52% of the married groups have (0-5) feddans, 33.8% have (5-10) feddans, while 14.2% have more than (10) feddans. On the other hand the farm size unmarried categories represent 62.5%, of unmarried groups have (0-5) feddans, 25%, have (5-10) feddans, While 12.5%, have more than (10) feddans. As for widowers, 50% of this category has (0-5) feddans, and 12.5% has (5-10) feddans, while 37.5% of the widowers has a farm size of (10) feddans and more.

This shows that there is no significant statistical differences due to Chi square value = (6.56), at level of significance (.363), which means consenting of nonexistence of marital status impact on the size of farms in the study area.

**Table( 4.2.4)The Chi – Square test for relationship between marital status and main crops in the study area.**

| Marital status | Main crops | | | | | Total % |
|---|---|---|---|---|---|---|
| | Cereal crops | Vegetable crops | Fruit crops | Forage crops | Others | |
| Married % | 58 | 16 | 3 | 50 | 2 | 129 |
| | 45.0 | 12.4 | 2.3 | 38.8 | 1.6 | 100.0 |
| Single % | 14 | 2 | 0 | 2 | 0 | 18 |
| | 77.8 | 11.1 | .0 | 11.1 | .0 | 100.0 |
| Widow % | 0 | 0 | 0 | 1 | 0 | 1 |
| | .0 | .0 | .0 | 100.0 | .0 | 100.0 |
| | Chi-square value = 17.77 D f =12 sig =.123 | | | | | |

*Source: field study, 2011

The results of table No. 4.2.4 indicate that there is no significant statistical differences between in the marital status to the study sample and the main crop harvests, the study shows 45% of the married groups harvest cereal crops, and 12.4% harvested vegetables, while 38.8% harvested fodders.

In the unmarried category 77.8% harvested Cereal crops, and 11% harvested vegetables, while 11% harvested fodders.This indication that there are no statistical significant differences due to Chi square value = (17.77) at level of significance (.123), which means consenting the non existence of marital status impact on the main crop harvests in the study area.

**Table(4.2.5 )The Chi – Square test for relationship between marital status and main type of animals in the study area**

| Marital status | Main type of farm animals | | | | | Total |
|---|---|---|---|---|---|---|
| | Camel | Cows | Sheep | Goats | Donkeys | |
| Married % | 2 | 26 | 43 | 37 | 6 | 114 |
| | 1.8 | 22.8 | 37.7 | 32.5 | 5.3 | 100.0 |
| Single % | 0 | 0 | 4 | 6 | 0 | 10 |
| | .0 | .0 | 40.0 | 60.0 | .0 | 100.0 |
| Widow % | 0 | 0 | 0 | 1 | 0 | 1 |
| | .0 | .0 | .0 | 100.0 | .0 | 100.0 |
| | Chi-square value = 21.14 D f =12 sig =.048* | | | | | |

* Source: field study, 2011 Significance at 0.05

Table No. 4.2.5 shows that there is a significant statistical difference between the marital status of the study sample and the main type of farm animal. The table indicates that 22.8% percentage of the married groups have cattle, 37.7% have sheep, while 32.5% have Goats. In contrast 60% of the unmarried have Goats, 40% have sheep while widowers have 100% of Goats,

This indicates that there are significant statistical differences for Chi square value = (21.14), at level of significance (.048), which indicates the existence of marital status impact on the main type of farm animal in the study area.

**Table (4.2.6) The Chi – Square test for relationship between marital status and obstacles face by farmers in the study area.**

| Marital status | Obstacles face by farmers | | | |
|---|---|---|---|---|
| | Poor production | High cost | Other | Total % |
| Married % | 62 | 56 | 9 | 127 |
| | 48.8 | 44.1 | 7.1 | 100.0 |
| Single % | 6 | 10 | 0 | 16 |
| | 37.5 | 62.5 | .0 | 100.0 |
| Widow % | 0 | 5 | 1 | 6 |
| | .0 | 83.3 | 16.7 | 100.0 |
| | Chi-square value = 9.02 | | D f =6 | sig =.172 |

* Source: field study, 2011

Table No. 4.2.6 describes that there is no significant statistical differences between individual with differences in the marital status of the studied samples and the obstacles that face farmers. We discovered that a rate of 48.8% of the married population face declination in production, and 44.1% faced high costs, while 16.7% had other barriers.

This indicates that there are no significant differences due to Chi square value = (9.02), at level of significance (.172), which means the nonexistence of marital status impact on obstacles that face farmers in the study area.

**Table (4.2.7) The Chi – Square test for relationship between marital status and role of technology transfer and extension services in the study area.**

| Marital status | Role of technology transfer & extension services | | Total % |
|---|---|---|---|
| | Poor services | Medium | |
| Married % | 114 | 42 | 156 |
| | 73.1 | 26.9 | 100.0 |
| Single % | 6 | 10 | 16 |
| | 37.5 | 62.5 | 100.0 |
| Widow % | 16 | 0 | 16 |
| | 100.0 | .0 | 100.0 |
| | Chi-square value = 16.73 Df =3 | | sig =.001* |

* Source: field study, 2011 Significance at 0.05

Table No. 4.2.7 indicates that there is major significant statistical relation between individuals with differences in the marital status of the study sample and the role of technology transfer and extension services techniques. The study showed that 73.1% of the married individuals considered that the agricultural extension services are poor services, while 26.9% regarded them as medium.

On the other hand a percentage of 37.5% of the unmarried individuals stated that the agricultural extension services are weak, and 62.5% regarded it as medium. While 100% of widowers population regarded the agricultural extension services as weak. This shows that there are strong significant statistical difference due to Chi square value = (16.73), at level of significance of (.001), which means the existence of impact of marital status on the technology transferring and extension services perceived rates in the study area.

**Table (4.2.8) The Chi – Square test for relationship between marital status and attending extension meetings in the study area.**

| Marital status | Attending extension meetings | | | | Total % |
|---|---|---|---|---|---|
| | One time per week | One time per two weeks | One time per three weeks | One time per month | |
| Married % | 3 | 13 | 4 | 83 | 103 |
| | 2.9 | 12.6 | 3.9 | 80.6 | 100.0 |
| Single % | 2 | 6 | 0 | 6 | 14 |
| | 14.3 | 42.9 | .0 | 42.9 | 100.0 |
| Widow % | 0 | 1 | 0 | 10 | 11 |
| | .0 | .0 | .0 | 100.0 | 100.0 |
| | Chi-square value = 15.61 Df =6 sig =.016* | | | | |

* Source: field study, 2011 Significance at 0.05

Table No. 4.2.8 indicates that there are significant statistical differences between individuals with differences in the marital status of the studied sample and the extension meetings, the table shows that 81.0% of the married population attended the extension meetings once a month, and 12.6% attended once each two weeks. While 43.0% of unmarried attend the extension meetings once a week and same 43.0% attend the extension meetings once a month. As considered the widowers, 100.0% of they attended the extension meetings once a month.

This shows that there is significant statistical differences, for Chi square value = (15.61), at level of significance of (.016), which means the consenting of existence of marital status impact on the attending extension meetings in the study area.

**Table (4.2.9) The Chi – Square test for relationship between marital status and listening to radio extension programs in the study area.**

| Marital status | listening to radio extension programs | | | | Total % |
|---|---|---|---|---|---|
| | Per day | Weekly | Monthly | Other | |
| Married % | 11 | 67 | 14 | 7 | 99 |
| | 11.1 | 67.7 | 14.1 | 7.1 | 100.0 |
| Single % | 3 | 2 | 6 | 0 | 11 |
| | 27.3 | 18.2 | 54.5 | .0 | 100.0 |
| Widow % | 0 | 10 | 0 | 1 | 11 |
| | .0 | 90.9 | .0 | 9.1 | 100.0 |
| | Chi-square value = 21.20 Df =6 sig =.002* | | | | |

* Source: field study, 2011 Significance at 0.05

Table No. (4.2.9) presents a major significant information about statistical relations between individuals with differences in the marital status of the study sample and listening to radio extension programs. The table shows that 68.0% of the married groups listen to radio extension programs weekly, whereas 14.1% listen to the same program monthly.

In the same area 54.5% of the single population listens to radio extension programs monthly, and 27.3% of these unmarried listen to the radio extension programs daily. But 90.0% of widowers listen to the radio extension programs on weekly basis.Therefore it is clear that there is a strong significant statistical relation, as Chi square value = (21.20), at level of significance of (.002), which means the consenting of the existence of marital status impact on the listening to the radio extension programs via radio in the study area.

**Table (4.2.1) The Chi – Square test for relationship between marital status and income sources in the study area.**

| Marital status | Income sources | | | | | Total % |
|---|---|---|---|---|---|---|
| | Crops farm | Animal farm | Occupation | Casual laborer | External remittances | |
| Married % | 50 | 13 | 39 | 134 | 4 | 240 |
| | 20.8 | 5.4 | 16.3 | 55.8 | 1.7 | 100.0 |
| Single % | 6 | 0 | 0 | 18 | 0 | 24 |
| | 25.0 | .0 | .0 | 75.0 | .0 | 100.0 |
| Widow % | 0 | 5 | 1 | 6 | 2 | 14 |
| | .0 | 35.7 | 7.1 | 42.9 | 14.3 | 100.0 |
| | Chi-square value = 42.17 Df =12 sig =.000* | | | | | |

* Source: field study, 2011 Significance at 0.05

The above table. 4.2.10 illustrates there are significant statistical difference between individuals with differences in the marital status of the studied samples and their income sources, table states 21.0% percent of the married people depended on crops harvesting as source of income, whereas 5.4% depended on animals farm as income source, and 16.3% depended on employment as their income source, and while 55.8% depended of casual laborer as income source. On the other hand 25% of the unmarried individual depended on crops harvesting as a source of income, and 75% got their source of income from casual laborer. Whereas 100% of widowed had their sources of income from casual laborer. and 29.0% of widowers pastured animals to earn their income source, however (43.0%) depended on casual laborer as source of income. So the table shows a strong relationship, as Chi square value = (53.86), at level of significance of (.000), which means consenting the existence of marital status impact on income sources in the study area.

**Table (4.2.11) The Chi – Square test for relationship between marital status and number of meals per day in the study area.**

| Marital status | Number of meals / day | | | |
|---|---|---|---|---|
| | Three meals / day | Two meals / day | More than three meals / day | Total % |
| Married % | 113 | 117 | 3 | 233 |
| | 48.5 | 50.2 | 1.3 | 100.0 |
| Single % | 14 | 10 | 0 | 24 |
| | 58.3 | 41.7 | .0 | 100.0 |
| Widow % | 2 | 12 | 0 | 14 |
| | 14.3 | 85.7 | .0 | 100.0 |
| | Chi-square value = 8.12 D f =6 sig =.229 | | | |

* Source: field study, 2011

The data in the table No. 4.2.11 presents that there is a no significant statistical differences between individuals with differences in the marital status for the study sample and the number of meals per day. The study shows that 48.5% of the married people take three meals every day, while 50.2% percent of the same categories have two meals per day.

In the unmarried category, 58.3% have three meals a day and 41.7% of these unmarried eat two meals per day. In addition 41.3% of widowers in this area take three meals daily and 85.7% of this category has two meals per day. This illustrate that there is no significant statistical differences, as Chi square value = (8.12), at level of significance of (.229), which means the consenting of nonexistence of marital status impact on the number of meals per day in the study area.

**Table (4.2.12) The Chi – Square test for relationship between marital status and annual income in the study area.**

| Marital status | Annual income SDG | | | | | Total % |
|---|---|---|---|---|---|---|
| | One thousand | 2thousands | 3thousands | 4thousands | 5thousands | |
| Married | 121 | 68 | 26 | 9 | 23 | 247 |
| % | 49.0 | 27.5 | 10.5 | 3.6 | 9.3 | 100.0 |
| Single | 5 | 3 | 10 | 0 | 6 | 24 |
| % | 20.8 | 12.5 | 41.7 | .0 | 25.0 | 100.0 |
| Widow | 10 | 4 | 3 | 0 | 0 | 17 |
| % | 58.8 | 23.5 | 17.6 | .0 | .0 | 100.0 |
| | Chi-square value = 36.41 D f =12 sig =.000* | | | | | |

* Source: field study, 2011 Significance at 0.05

Table No. 4.2.12 in this table the result of the respondent in the study area shows a strong significant statistical relationship between the study sample and the annual income, the result shows 49% of the married individuals have an annual income of one thousand SDG, and 27.5% two thousands SDG of annual income, whereas 10.5% have an annual income of three thousands SDG, while 3.6% have of four thousands SDG of annual income, and 9.3% of this category have an annual income of five thousands SDG. But unmarried respondents 42.0% have an annual income of three thousands SDG, and 25% of them earned of five thousands SDG, as income annually while 20.8% have one thousand SDG of annual income. As for widowers, 58.8% have an annual rate of one thousand SDG, and 23.5% have an annual income of two thousands SDG.

This indication that there is a strong significant statistical relation, as Chi square value = (36.41), at level of significance of (.000), which means consenting the existence of marital status impact on the annual income for the citizens in the study area.

**Table (4.2.13) The Chi – Square test for relationship between gender and most frequent diseases in the study area.**

| Gender | Most frequent diseases of area | | | | | Total % |
|---|---|---|---|---|---|---|
| | Malaria | T.B | Hepatitis | Schistosomaisis | Others | |
| Male | 120 | 0 | 26 | 11 | 74 | 231 |
| % | 51.9 | .0 | 11.3 | 4.8 | 32.0 | 100.0 |
| Female | 35 | 2 | 0 | 0 | 13 | 50 |
| % | 70.0 | 4.0 | .0 | .0 | 26.0 | 100.0 |
| | Chi-square value = 20.16 Df =4 sig =.000* | | | | | |

* Source: field study, 2011 Significance at 0.05

The results of table No. 4.2.13 indicates that there is a significant statistical difference between individuals with differences in the gender of the study sample and the most frequent diseases. Whereas, the malaria infected male groups recorded 52.0%, while the female groups recorded 70%, This indicates that the female groups are the subjected most group to malaria.

Therefore, there are significant statistical differences as Chi- Square value = (20.16), at level of significance of (.000) which means that there is strong impact of the Gender on most frequent diseases in the study area.

**Table (4.2.14) The Chi – Square test for relationship between gender and type of house ownership in the study area**

| Gender | Type of house ownership | | | | | Total % |
|---|---|---|---|---|---|---|
| | Ownership | For rent | Inheritance | Grant temporary | Other | |
| Male% | 231 | 2 | 8 | 1 | 1 | 243 |
| | 95.1 | .8 | 3.3 | .4 | .4 | 100.0 |
| Female% | 57 | 0 | 0 | 0 | 0 | 57 |
| | 100.0 | .0 | .0 | .0 | .0 | 100.0 |
| | Chi-square value = 2.93 Df =4 sig =.569 | | | | | |

* Source: field study, 2011

The results of table No. 4.2.14 demonstrate that the test is no significant differences between individuals with differences. The gender of the study sample and the type ownership of a house shows that the male population which represent (95.1%) of ownership house, whereas (100%), of the female have ownership house, which indicate that there are no significance statistical differences, as Chi- Square value = (2.93), at level of significance (.569), This means consenting of none impact of Gender groups on ownership of house in the study area.

**Table (4.2.15) The Chi – Square test for relationship between gender and area grown in the study area**

| Gender | Area grown | | | |
|---|---|---|---|---|
| | 0 - less 5 feddans | 5 -9 feddans | 10 feddans and more than | Total % |
| Male% | 71 | 43 | 21 | 135 |
| | 52.6 | 31.9 | 15.6 | 100.0 |
| Female% | 20 | 13 | 5 | 38 |
| | 52.6 | 34.2 | 13.2 | 100.0 |
| | Chi-square value = .164 | | Df =2 | sig =.921 |

* Source: field study, 2011

The results of table No. 4.2.15 show that there are no significant differences between individuals with differences in the gender of the study sample and farm size, the percentage of (52.6%) males have (0-5) feddans, and (32%) of the same gender have (5-9) feddans, while (15.6%) have more than (10) feddans.

On the other hand the females of (52.6%), have farms size of (0-5) feddans, while (34.2%), of them have farms size of (5-9) feddans, and (13.2%), have farms size which is more than (10) feddans.

This is an indication that there are no significant statistical differences due to Chi square value = (6.56), at level of significance (.363), which means consenting of nonexistence of gender impact on the size of farms in the study area.

**Table (4.2.16) The Chi – Square test for relationship between gender and main crops in the study area**

| Gender | Main crops | | | | | Total % |
|---|---|---|---|---|---|---|
| | Cereal crops | Vegetable crops | Fruit crops | Forage crops | Others | |
| Male % | 59 | 8 | 0 | 48 | 2 | 117 |
| | 50.4 | 6.8 | .0 | 41.0 | 1.7 | 100.0 |
| Female % | 13 | 10 | 3 | 10 | 0 | 36 |
| | 36.1 | 27.8 | 8.3 | 27.8 | .0 | 100.0 |
| | Chi-square value = 23.10 Df =4 sig =.000* | | | | | |

* Source: field study, 2011 Significance at 0.05

The data in table No. 4.2.16 represent the strong significant differences between individuals with differences in the gender in the study sample and the main crop harvests represent (50.4%) of the males mainly harvest cereal crops, and (6.8%) harvest vegetables, and (41%) harvest fodders.

While a (36.1%) of the females in the study area harvest cereal crops, and (27.8%) of them harvest vegetables, and others (27.8%) harvest fodders.

This is an indication that there are significant differences due to Chi-Square value = (23.10) at level of significance of (.000), which means the existence of gender impact on the main crop harvests in the study area.

**Table (4.2.17) The Chi – Square test for relationship between gender and main type of animals in the study area**

| Gender | Main type of animals | | | | | Total % |
|---|---|---|---|---|---|---|
| | Camel | cattle | Sheep | Goat | Donkeys | |
| Male % | 1 | 16 | 34 | 42 | 4 | 97 |
| | 1.0 | 16.5 | 35.1 | 43.3 | 4.1 | 100.0 |
| Female % | 2 | 10 | 13 | 9 | 2 | 36 |
| | 5.6 | 27.8 | 36.1 | 25.0 | 5.6 | 100.0 |
| | Chi-square value = 5.61 D f =4 sig =.164 | | | | | |

* Source: field study, 2011

Table No. 4.2.17 explains that there are no significant statistical differences between individuals with differences in the gender in the population of the study sample and the main type of animal farm. A mile percentage of (16.5%) have cattle, and (35.1%) have sheep', while (43.3%) have goats.

However, (27.8%) of females have cattle, and (36.1%) have sheep, (25%) have goats.

So the table shows that there are no significant statistical differences for Chi square value = (5.61), at level of significance (.164), which indicates nonexistence of Gender impact on the main type of farm animal in the study area.

**Table (4.2.18) The Chi – Square test for relationship between gender and obstacles face by farmers in the study area**

| Gender | Obstacle face by farmers | | | |
|---|---|---|---|---|
| | Poor production | High cost | Other | Total % |
| Male % | 59 | 51 | 6 | 116 |
| | 50.9 | 44.0 | 5.2 | 100.0 |
| Female % | 9 | 21 | 4 | 34 |
| | 26.5 | 61.8 | 11.8 | 100.0 |
| | Chi-square value = 6.90 | | Df =2 | sig =.032* |

* Source: field study, 2011 Significance at 0.05

Table No. 4.2.18 indicates that there are significant statistical differences between individuals with differences in the gender of the studied sample and the obstacles that face by farmers. The study shows that (50.9%) of the male groups face a Poor production, (44%) of the same group face high costs, and others (5.2%) face other barriers. Also the table shows (26.5%) of the females face poor production, while (61.8%) same group face high cost.

This illustrates that there are significant differences due to Chi square value = (6.90), at level of significance of (.032), which means consenting the existence of Gender impact on obstacles that are face by farmers in the study area.

**Table (4.2.19) The Chi – Square test for relationship between gender and role of technology transfer and extension services in the study area**

| Gender | Role of technology transfer & extension services | | Total % |
|---|---|---|---|
| | Poor services | Medium services | |
| Male % | 107 | 34 | 141 |
| | 75.9 | 24.1 | 100.0 |
| Female % | 31 | 18 | 49 |
| | 63.3 | 36.7 | 100.0 |
| | Chi-square value = 2.91 Df =1 sig =.088 | | |

* Source: field study, 2011

Table No. 4.2.19 explains that there is no significant difference between individuals with differences in the gender of the sample study and the role of technology transfer and extension services, which represent (75.9%) of the male groups considered that the agricultural extension services are poor services, and (24.1%) of the same group regard these services medium.

On the other hand, female category of (63.3%) responded that the agricultural extension services as week, while (36.7%) consider the agricultural extension services as medium. The analysis in the table show that there is no significant statistical relationship due to Chi -Square value = (2.91), at level of significance of (.088), which means the consenting the nonexistence of the impact of gender on the technology transfer and extension services techniques in the study area.

**Table ( 4.2.20) The Chi – Square test relation between gender and attending extension meetings in the study area**

| Gender | Attending extension meetings | | | | Total % |
|---|---|---|---|---|---|
| | One time per week | One time per two weeks | One time per three weeks | One time per month | |
| Male % | 4 | 17 | 4 | 69 | 94 |
| | 4.3% | 18.1% | 4.3 | 73.4 | 100.0 |
| Female % | 1 | 3 | 0 | 30 | 34 |
| | 2.9% | 8.8% | .0 | 88.2 | 100.0 |
| | Chi-square value = 3.63 Df =3 sig =.303 | | | | |

* Source: field study, 2011

Table No. 4.2.20 shows that there are no significant statistical differences between individuals with differences in the gender of the studied sample and the extension meetings, in findings show that (73.4%) of the male population attended the extension meetings once a month, while (18.1%) attended the extension meetings once each two weeks. The study shows, (88.2%) of the female attended the extension meetings once a month, and (8.8%) of same group attended the extension meetings every two weeks.

There are no significant statistical differences, for Chi- Square value = (3.63), at level of significance of (.303), which means the nonexistence of gender impact on the attending agricultural extension meetings in the study area.

**Table (4.2.21) The Chi – Square test for relationship between gender and listening to radio programs in the study area.**

| Gender | Listening to radio programs | | | | Total % |
|---|---|---|---|---|---|
| | Per day | Weekly | Monthly | Other | |
| Male % | 14 | 55 | 16 | 2 | 87 |
| | 16.1 | 63.2 | 18.4 | 2.3 | 100.0 |
| Female % | 0 | 24 | 4 | 6 | 34 |
| | .0 | 70.6 | 11.8 | 17.6 | 100.0 |
| | Chi-square value = 15.03 | | Df =3 | sig =.002* | |

* Source: field study, 2011 Significance at 0.05

Table No. 4.2.21 illustrates that there is a strong significant statistical between individuals gender in the study sample and listening to radio for extension programs, the result shows (16.1%) of the men listen to the extension radio programs every day, and (63.2%) of the same group listen the programs weekly.

In contrast (70.6%) of the female population listen to the extension programs by radio weekly, while (11.8%) of same female group listen to the programs monthly.

This shows a major significant statistical relationship, as Chi- Square value = (15.03), at level of significance of (.002), which means the existence of gender impact on the listening to the agricultural extension programs via radio in the study area.

**Table (4.2.22) The Chi – Square test for relationship between gender and income sources in study area**

| Gender | Income sources | | | | | Total % |
|---|---|---|---|---|---|---|
| | Crops farm | Animal farm | occupation | Casual laborer | External remittances | |
| Male | 42 | 14 | 25 | 146 | 4 | 231 |
| % | 18.2 | 6.1 | 10.8 | 63.2 | 1.7 | 100.0 |
| Female | 14 | 4 | 15 | 14 | 2 | 49 |
| % | 28.6 | 8.2 | 30.6 | 28.6 | 4.1 | 100.0 |
| | Chi-square value = 23.06 Df =4 sig =.000* | | | | | |

* Source: field study, 2011 Significance at 0.05

Table No. 4.2.22 describes the result of the chi- square test about the gender respondents and their income sources in the study area. It shows the strong significant statistical relationship between gender of the studied samples and their income sources, (18.2%) of the males depended on crops harvesting as sources of income, and (6.1%) depend on animal farm as income sources, while (10.8%) got their income from an occupation, and (63.2%) of males depend on casual laboring as income sources.

The female category (28.6%) of the female depend on crops harvesting as a sources of income, while (8.2%) on animal farm as a sources of income. And other (30.6%) depend on occupation as a sources of income. Also (28.6%) depend on casual laboring income sources, while (4.1%) got their income sources from external remittances.

This makes clear the strong significant relationship, as Chi- Square value = (23.06), at level of significance of (.000), which means the existence of gender impact on income sources in the study area.

**Table (4.2.23 ) The Chi – Square test for relationship between gender and number of meals per day in the study area.**

| Gender | number of meals per day | | | |
|---|---|---|---|---|
| | **Three meals per day** | **Two meals a day** | **more than three meals a day** | **Total %** |
| Male | 112 | 105 | 3 | 220 |
| % | 50.9 | 47.7 | 1.4 | 100.0 |
| Female | 18 | 35 | 0 | 53 |
| % | 34.0 | 66.0 | .0 | 100.0 |
| | Chi-square value = 6.09 Df =2 sig =.048* | | | |

* Source: field study, 2011 Significance at 0.05

The data in table 4.2.23 presents that is significant statistical differences between individuals with difference of the gender for the study sample and the number of meals per day. It indicates that (50.9%) of the male groups take three meals daily, and (47.7%) take two meals per day. While the female groups is (34%) take three meals a day, and (66%) of them take two meals per day.

Here there are significant statistical differences, as Chi- Square value = (6.09), at level of significance of (.048), which means the existence of gender impact on the number of meals per day in the study area.

**Table (4.2.24) The chi – Square test for relationship between gender and annual income in the study area**

| Gender | Annual income SDG | | | | | Total % |
|---|---|---|---|---|---|---|
| | One thousand | 2 thousands | 3 thousands | 4 thousands | 5 thousands | |
| Male | 111 | 56 | 32 | 7 | 29 | 235 |
| % | 47.2 | 23.8 | 13.6 | 3.0 | 12.3 | 100.0 |
| Female | 25 | 21 | 7 | 2 | 0 | 55 |
| % | 45.5 | 38.2 | 12.7 | 3.6 | .0 | 100.0 |
| | Chi-Square value = 10.36 D f =4 sig =.035* | | | | | |

* Source: field study, 2011 Significance at 0.05

The table No. 4.2.24 of the study indicates that there is significant statistical between individual gender of the study sample and the annual income, which is clears that (47.2%) of the males group had an annual income of one thousand SDG, whereas (23.8%) of the same group had annual income of two thousands SDG, and also (13.6%) have an annual income of three thousands SDG, and (12.3%) of percentage had an annual income of five thousands SDG,. On another hand, (45.5%) of the female groups category have an annual income of one thousand SDG, (38.2%) of them have an annual income of two thousands SDG, and (12.7%) have an annual income of three thousands SDG.

This indication that there is significant statistical relationship, as Chi-Square value = (10.36), at level of significance of (.035), which means the existence of gender impact on the annual income for the citizens in the study area.

**Table (4.2.25) The Chi – Square test for relationship between household size and most frequent diseases in the study area.**

| Household size | Most frequent diseases of area | | | | | Total % |
|---|---|---|---|---|---|---|
| | Malaria | T.B | hepatitis | schistosomaisis | others | |
| 2-5person % | 61 | 0 | 14 | 3 | 15 | 93 |
| | 65.6 | .0 | 15.1 | 3.2 | 16.1 | 100.0 |
| 6-10person % | 83 | 2 | 11 | 8 | 63 | 167 |
| | 49.7 | 1.2 | 6.6 | 4.8 | 37.7 | 100.0 |
| 11-15person % | 11 | 0 | 1 | 0 | 6 | 18 |
| | 61.1 | .0 | 5.6 | .0 | 33.3 | 100.0 |
| | Chi-square value = 19.42 Df =8 sig =.013* | | | | | |

* Source: field study, 2011 Significance at 0.05

The results of table No. 4.2.25 provide that there are significant statistical differences between individuals with differences in the household size of the study sample and the most frequent diseases. The data shows that families of (2-5) people, were affected with malaria affected (65.6%) , while the families of (6-10) persons affected with malaria (49.7%) .of these families of (11-15) persons (61.1%) percentage are affected with malaria,

Therefore, there are significance of statistical differences as Chi- Square value = (19.42), at level significance of (.013) which means the existence of impact of the household size on most frequent diseases in the study area.

**Table (4.2.26 ) The Chi – Square test for relationship between household size and type of house ownership in the study area**

| Household size | Type of house ownership | | | | | Total % |
|---|---|---|---|---|---|---|
| | Own | For rent | Inheritance | Grant temporary | Other | |
| 2-5 person % | 103 | 2 | 0 | 0 | 1 | 106 |
| | 97.2 | 1.9 | .0 | .0 | .9 | 100.0 |
| 6-10 person % | 166 | 0 | 6 | 1 | 0 | 173 |
| | 96.0 | .0 | 3.5 | .6 | .0 | 100.0 |
| 11-15 person % | 16 | 0 | 2 | 0 | 0 | 18 |
| | 88.9 | .0 | 11.1 | .0 | .0 | 100.0 |
| | Chi-square value = 14.20 Df =8 sig =.077 | | | | | |

* Source: field study, 2011

The results of table No. 4.2.26 shows that there are no significant differences between individuals with difference of the household size of the study sample and the ownership of a house, of families' 2-5of persons had 97.2% percent of households.

Whereas, of the families 6 -10 of persons had 96%, also families of 11-15 people had 88.9%, percent of the households.

This clearly indicates that there are no significant statistical differences, as Chi square value = 14.20, at level of significance of.077, which means none impact of household size on type of house ownership in the study area.

**Table (4.2.27) The Chi – Square test for relationship between household size and area grown in the study area**

| Household size | Area grown | | | |
|---|---|---|---|---|
| | 0 - less 5 feddans | 5 less than 10 feddans | 10 feddans & more than | Total % |
| 2-5 person% | 44 | 16 | 7 | 67 |
| | 65.7 | 23.9 | 10.4 | 100.0 |
| 6-10 person% | 39 | 33 | 19 | 91 |
| | 42.9 | 36.3 | 20.9 | 100.0 |
| 11-15 person% | 8 | 4 | 0.0 | 12 |
| | 66.7 | 33.3 | 0.0 | 100.0 |
| | Chi-square value = 10.80 | | D f =4 | sig =.029* |

* Source: field study, 2011 Significance at 0.05

The results of table No. 4.2.27 show that there are significant statistical differences between individuals with differences in the household of the study sample and the size of their farms, 65.7% of the families of (2 -5) people have farms size is (0-5), and 23.9% of families of same category have (5 less than10) feddans. and 10.4% of same category families have a more than (10) feddans also the families of (6 -10) persons ,that is 42.9 % have (0 -5) feddans, and percentage of 36.3% have (5 less than 10) feddans, also percentage 20.9% have more than(10) feddans ,and the families of (11-15) persons which constitute 66.7% had (0-5) feddan , and percentage 33.3% have (5 -10) feddans, respectively.This is an indication that there are significant statistical differences due to Chi square value = (10.80), at level of significance of (.029), which means the existence of household size impact on the size of farms in the study area.

**Table (4.2.28) The Chi – Square test for relationship between household size and main crops in the study area.**

| Household size | Main crops | | | | | Total% |
|---|---|---|---|---|---|---|
| | Cereal crops | Vegetable crops | Fruit crops | Forage crops | Others | |
| 2-5 person% | 21 | 10 | 0 | 22 | 2 | 55 |
| | 38.2 | 18.2 | .0 | 40.0 | 3.6 | 100.0 |
| 6-10 person% | 40 | 8 | 3 | 32 | 0 | 83 |
| | 48.2 | 9.6 | 3.6 | 38.6 | .0 | 100.0 |
| 11-15 person% | 11 | 0 | 0 | 1 | 0 | 12 |
| | 91.7 | .0 | .0 | 8.3 | .0 | 100.0 |
| | Chi-square value = 18.20 Df =8 sig =.024* | | | | | |

* Source: field study, 2011 Significance at 0.05

The results of table No. (4.2.28) indicates that there are significant statistical differences between individuals with difference of the household size pertaining to the study sample and their main crop harvest. According to the (38.2%) of the household size of (2-5) persons mainly harvest cereal crops. While (18.2%) of same category harvest vegetables. Also percentages (40.0%) them harvest forage crops. Whereas (48.2%) of the household size of (6-10) persons harvest cereal crops. And (9.6%) of respondents were harvest vegetable crops while (38.6%) of this category harvest forage crops. On the other hand (91.7%) of the households (11-15) people harvest cereal crops, and (8.3%) of same groups harvest fodders.

This is an indication that there are significant differences due to Chi-Square value = (18.20) at level of significance of (.024), which means the existence of household size impact on the main crop harvests in the study area.

**Table (4.2.29) The Chi – Square test for relationship between household size and main type of farm animals in the study area**

| Household size | Type of farm animals | | | | | Total % |
|---|---|---|---|---|---|---|
| | Camel | Cattle | Sheep | Goats | Donkeys | |
| 2-5 person% | 0 | 6 | 16 | 24 | 3 | 49 |
| | .0 | 12.2 | 32.7 | 49.0 | 6.1 | 100.0 |
| 6-10 person% | 3 | 14 | 28 | 26 | 3 | 74 |
| | 4.1 | 18.9 | 37.8 | 35.1 | 4.1 | 100.0 |
| 11-15 person% | 0 | 3 | 3 | 1 | 0 | 7 |
| | .0 | 42.9 | 42.9 | 14.3 | .0 | 100.0 |
| | Chi-square value = 9.20 Df =8 sig =.326 | | | | | |

* Source: field study, 2011

Table No. 4.2.29 indicates that there are no significant statistical differences between individuals with differences in the household size of the study sample and the type of farm animal. (12.2%) of the household size containing (2-5) people have cattle, while (32.7%) have sheep, and (49%) have goats. Also, (18.9%) of (6 – 10) the household size have cattle, (37.8%) have sheep. However household size of (11-15) people of (42.9%) have cattle and (42.9%) have sheep, whereas (14.3%) had goats.

So, this indicates that there are no significant statistical differences for Chi square value = (9.20), at level of significance of (.326, which indicates nonexistence of household size impact on the type of farm animal in the study area.

**Table (4.2.30) The Chi – Square test for relationship between household size and obstacles face by farmers in the study area**

| Household size | Obstacle face by farmers | | | |
|---|---|---|---|---|
| | Poor production | High cost | Other barriers | Total % |
| 2-5 person% | 26 | 26 | 6 | 58 |
| | 44.8 | 44.8 | 10.3 | 100.0 |
| 6-10 person% | 38 | 40 | 4 | 82 |
| | 46.3 | 48.8 | 4.9 | 100.0 |
| 11-15 person% | 4 | 3 | 0 | 7 |
| | 57.1 | 42.9 | .0 | 100.0 |
| | Chi-square value = 2.33 | | D f =4 | sig =.674 |

* Source: field study, 2011

Table No. 4.2.30 it is seen that data in the table there are no significant statistical differences between individuals with differences in the household size of the study samples and the obstacles that are face by farmers which is. (44.8%) of (2-5) people in the area face decreasing production, while the same percentage (44.8%) face high costs and (10.3%) face other barriers. On the other hand (46.3%) of the household size of (6 – 10) people face decreasing production, as (48.8%) face high cost. While (57.1%) household size of (11-15) people face poor production, and (42.9%) face high cost.

This gives an indication that there are no significant differences due to Chi -Square value = (2.33), at level of significance of (.674), which means the nonexistence of household size impact on obstacles faced by farmers in the study area.

**Table (4.2.3) The Chi -Square test for relationship between household Size and role of technology transfer and extension services in the study area**

| Household size | Role of Technology transfer and Extension Services | | Total % |
|---|---|---|---|
| | Poor extension services | Medium services | |
| 2-5 person% | 65 | 8 | 73 |
| | 89.0 | 11.0 | 100.0 |
| 6-10 person% | 68 | 38 | 106 |
| | 64.2 | 35.8 | 100.0 |
| 11-15 person% | 5 | 3 | 8 |
| | 62.5 | 37.5 | 100.0 |
| | Chi-square value = 14.40 D f =2 sig =.001* | | |

* Source: field study, 2011 Significance at 0.05

As exposed by table no. 4.2.31 that there is a strong significant difference between individuals with differences in the household size of the study sample and the role of technology transfer and extension services, since the study show (89%) of the household size groups (2-5) people individuals consider that the agricultural extension services are poor, and (11%) regarded them as medium. On the other hand a percentage of (64.2%) of the household size group (6-10) individual persons them stated that the agricultural extension services as poor, and (35.8%) regarded as medium. While gross families of (11-15) persons percentage of (62.5%) regarded the agricultural extension services as poor, and (37.5%) of the same group regard as medium. This is an indication that there are strong significant statistical differences due to Chi square value = (14.40), at level of significance of (.001), which means the impact of household size on the technology transfer and extension services in the study area.

**Table (4.2.32) The Chi – Square test for relationship between household size and attending of extension meetings in the study area**

| Household size | Attending of Extension Meetings | | | | Total % |
|---|---|---|---|---|---|
| | One time per week | One time per two weeks | One time per three weeks | One time per month | |
| 2-5 person % | 2 | 8 | 0 | 35 | 45 |
| | 4.4 | 17.8 | .0 | 77.8 | 100.0 |
| 6-10 person% | 3 | 12 | 4 | 56 | 75 |
| | 4.0 | 16.0 | 5.3 | 74.7 | 100.0 |
| 11-15 person% | 0 | 0 | 0 | 5 | 5 |
| | .0 | .0 | .0 | 100.0 | 100.0 |
| | Chi-square value = 4.17 | | D f =6 | sig =.653 | |

* Source: field study, 2011

Table No.(4.2.32) indicates that there are no significant differences between individual household size of the study samples and the extension meetings, the table shows, that (77.8%) of the household size group (2 -5) people attend the extension meetings once a month, and (17.8%) of the same category attend the extension meetings once each two weeks.

As concerned the household size group (6-10) person's individual persons the percentage of (74.7%) attend the extension meetings once a month and (16 %) attend the extension meetings once each two weeks.Whereas of (100%) percentage of household size group (11- 15), attend the once a per month. This is clear that there are no significant statistical differences, for Chi- Square value = (4.17), at level of significance of (.653), which means the consenting of nonexistence of household size impact on the extension meetings in the study area.

**Table (4.2.33) The Chi – Square test for relationship between household sizes who listen to radio programs in the study area**

| Household size | Listen to Radio programs | | | | Total % |
|---|---|---|---|---|---|
| | Per day | Weekly | Monthly | Other | |
| 2-5 person% | 7 | 20 | 10 | 5 | 42 |
| | 16.7 | 47.6 | 23.8 | 11.9 | 100.0 |
| 6-10 person% | 7 | 51 | 10 | 3 | 71 |
| | 9.9 | 71.8 | 14.1 | 4.2 | 100.0 |
| 11-15 person% | 0 | 5 | 0 | 0 | 5 |
| | .0 | 100.0 | .0 | .0 | 100.0 |
| | Chi-square value = 10.08 D f =6 sig =.121 | | | | |

* Source: field study, 2011

Table No. 4.2.33 we can say that there is a no significant statistical differences relationship between individuals with difference in the household size and their respondents of the study sample and the listen to radio of extension programs, 16.7% percentage of the household size group (2-5) listen to the radio extension programs every day, and 47.6% of same category listen the same programs weekly, as (23.8%) listen a monthly.

Whereas a percentage of (71.8%) of the household size (6-10) individuals listen to the radio extension programs per weekly and (14.1%) percent listen monthly. And (100%) of household size group (11-15) people, listen weekly. We can therefore recognize that there is no significant statistical differences as Chi square value = (10.08), at level of significance of (.121), which means the consenting of the nonexistence of household size impact on the listen to the radio extension programs in the study area

**Table (.2.34) The Chi – Square test for relationship between household size and income sources in the study area**

| Household size | Income sources | | | | | Total % |
|---|---|---|---|---|---|---|
| | Crops farm | Animal farm | Occupation | Free work activity | External remittances | |
| 2-5 person% | 18 | 12 | 16 | 46 | 2 | 94 |
| | 19.1 | 12.8 | 17.0 | 48.9 | 2.1 | 100.0 |
| 6-10 person% | 35 | 4 | 19 | 106 | 4 | 168 |
| | 20.8 | 2.4 | 11.3 | 63.1 | 2.4 | 100.0 |
| 11-15 person% | 3 | 2 | 5 | 5 | 0 | 15 |
| | 20.0 | 13.3 | 33.3 | 33.3 | .0 | 100.0 |
| | Chi-square value = 29.25 D f =8 sig =.009* | | | | | |

* Source: field study, 2011 Significance at 0.05

Table No. 4.2.34 gives us the result show that there is a strong significant statistical differences in relationship between individual with differences in the household size of the study samples and the income sources, for we found a percentage (19.1%) of the household size groups of (2-5) people individual depend on cereal crops harvesting as sources of income, and percentage (12.8%) on animal farm earn their income sources, (17%) depend on occupations as income sources, and (48.9%) depend of casual laboring as income sources. This study explains that (20.8%) of the household size (6-10) people group depend on cereal crops as a sources of income, and the same category is (63.1%) depend on casual laboring as a sources of income. A percentage (20%) of the household size (11-15) persons group depended on cereal crops as a sources of income. while, the same group (13.3%) depend on Farm animals to income sources and (33.3%) depend on casual laboring as of income sources, and (33.3%) occupation as an income sources. So the table, shows that there is a strong significant relationship, as Chi square value = (29.25), at corporeal significance (.009), which means the existence of household size impact on income sources in the study area.

**Table (4.2.35) The Chi – Square test for relationship between household size and number of meals per day in the study area**

Table No. 4.2.35 the data in table show that there are no

| Household size | number of meals / day | | | |
|---|---|---|---|---|
| | Three meals / day | Two meals / day | More than three meals / day | Total % |
| 2-5 person% | 42 | 53 | 1 | 96 |
| | 43.8 | 55.2 | 1.0 | 100.0 |
| 6-10 person% | 78 | 79 | 2 | 159 |
| | 49.1 | 49.7 | 1.3 | 100.0 |
| 11-15 person% | 7 | 8 | 0 | 15 |
| | 46.7 | 53.3 | .0 | 100.0 |
| | Chi-square value = .919 | | D f =4 | sig =.922 |

* Source: field study, 2011

significant statistical differences relationship between individuals with differences in the household size for the study sample and the number of meals per day. (43.8%) percent of the household size (2-5) persons take three meals daily, and same group of (55.2%) have two meals per day. While, a percentage (49.1%) of the household size (6-10) persons group category take three meals day, and (49.7%) of this group have two meals per day.

Also, (46.7%) of the household size (11-15) persons group category have three meals daily, and (53.3 %) have two meals per day.

This is an indication that there are no significant statistical differences, as Chi square value = (.919), at level of significance of (.922), which means the nonexistence of household size impact on the number of meals per day in the study area.

**Table (4.2.36) The Chi – Square test for relationship between household size and annual income in the study area.**

| Household size | Annual income SDG | | | | | Total % |
|---|---|---|---|---|---|---|
| | One thousands | 2thousands | 3thousands | 4thousands | 5 thousands | |
| 2-5 person% | 53 | 26 | 13 | 3 | 8 | 103 |
| | 51.5 | 25.2 | 12.6 | 2.9 | 7.8 | 100.0 |
| 6-10 person% | 73 | 51 | 18 | 6 | 21 | 169 |
| | 43.2 | 30.2 | 10.7 | 3.6 | 12.4 | 100.0 |
| 11-15 person% | 7 | 0 | 8 | 0 | 0 | 15 |
| | 46.7 | .0 | 53.3 | .0 | .0 | 100.0 |
| | Chi-square value = 27.90 D f =8 sig =.000* | | | | | |

* Source: field study, 2011 Significance at 0.05

Table No. 4.2.36 in this table, the result of the study shows that there is a strong significant statistical differences relationship between the household size of study area, and the annual income percentage of (51.5%) of the household size (2-5) persons individual have an annual income of one thousand SDG, and (25.2%) percent have annual income of two thousands SDG, and (12.6%) have an annual income of three thousands SDG, and (3.0%) have four thousands SDG, and percentage (8.0%) have an annual income of five thousands SDG. On the other hand percentages (43.2%) of the household size (6-10) category group have an annual income of one thousand SDG and (30.2 %) of them have an annual income of two thousands SDG and (10.7%) have an annual income of three thousands SDG. Percentage of (12.4%) have an annual income five thousands SDG and, (46.7%) of the household size (11-15) category have an annual income of one thousand SDG. while the group of (53.3%) have an annual income rate of three thousands SDG.

This indicates that there is a strong significant statistical relationship, as Chi- Square value = (27.90), at level of significance of (.000), which means the existence of household size impact on the annual income for the citizens in the study area.

**Table (4.2.37) The Chi – Square test of relationship between education level and most frequent diseases in the study area.**

| Education level | Most frequent diseases of area | | | | | Total% |
|---|---|---|---|---|---|---|
| | Malaria | T.B | hepatitis | schistosomaisis | others | |
| Illiterate% | 54 | 0 | 15 | 5 | 29 | 103 |
| | 52.4 | .0 | 14.6 | 4.9 | 28.2 | 100.0 |
| Khalwa% | 18 | 0 | 5 | 4 | 21 | 48 |
| | 37.5 | .0 | 10.4 | 8.3 | 43.8 | 100.0 |
| Secondary% | 43 | 2 | 4 | 0 | 26 | 75 |
| | 57.3 | 2.7 | 5.3 | .0 | 34.7 | 100.0 |
| University% | 40 | 0 | 2 | 2 | 11 | 55 |
| | 72.7 | .0 | 3.6 | 3.6 | 20.0 | 100.0 |
| | Chi-square value = 28.65 D f =12 sig =.004* | | | | | |

Source: field study2011 Significance at 0.05

The table No. (4.2.37) as far as we come to the result that there are is a significant statistical difference relationship between individuals with differences in the qualification of the study sample and the most frequent diseases. percentage (52.2%) of Illiterate groups have malaria infected records, while the khalwa groups recorded (37.5%). The secondary groups have (52.3%) , and the university group (72%), which indicate that the education level different percentage university category are the most group subjected to malaria, because most of them health care awareness than population of the area.

This table shows, that there is a significant differences of statistical as Chi square value = (28.65), at level of significance of (.004) which means that there are impact of the education level on most frequent diseases in the study area.

**Table (4.2.38) The Chi – Square test for relationship between education level and type for house ownership in the study area**

| Education level | Type of house ownership | | | | | Total% |
|---|---|---|---|---|---|---|
| | Ownership | For rent | Inheritance | Grant temporary | Other | |
| Illiterate% | 103 | 2 | 7 | 0 | 0 | 112 |
| | 92.0 | 1.8 | 6.3 | .0 | .0 | 100.0 |
| Khalwa% | 50 | 0 | 1 | 0 | 0 | 51 |
| | 98.0 | .0 | 2.0 | .0 | .0 | 100.0 |
| Secondary % | 82 | 0 | 0 | 0 | 0 | 82 |
| | 100.0 | .0 | .0 | .0 | .0 | 100.0 |
| University % | 53 | 0 | 0 | 1 | 1 | 55 |
| | 96.4 | .0 | .0 | 1.8 | 1.8 | 100.0 |
| | Chi-square value = 21.75 Df =12 sig =.040* | | | | | |

* Source: field study2011 Significance at 0.05

The results of table No. (4.2.38) indicates that there are significant statistical differences between the educational level of the study sample and the ownership of a house, which shows that the Illiterate population have (92%) of the house ownership, while is khalwa group have (98%) of the house, and secondary groups category have (100%) of the house ownership, also university groups have (96.4%) of the house ownership, which indicate that there is significant statistical differences, as Chi -Square value = (21.75), which is the level of significance of (.040), which means the existence of impact of education level on type of ownership house in the study area.

**Table (4.2.39) The Chi – Square test for relationship between education level and area grown in the study area.**

| Education level | Area grown | | | |
|---|---|---|---|---|
| | 0 less 5 feddans | 5 less than10 feddans | 10 feddans and more than | Total% |
| Illiterate% | 28 | 21 | 12 | 61 |
| | 45.9 | 34.4 | 19.7 | 100.0 |
| Khalwa% | 23 | 5 | 0 | 28 |
| | 82.1 | 17.9 | .0 | 100.0 |
| Secondary% | 19 | 16 | 6 | 41 |
| | 46.3 | 39.0 | 14.6 | 100.0 |
| University% | 21 | 14 | 8 | 43 |
| | 48.8 | 32.6 | 18.6 | 100.0 |
| | Chi-square value = 13.50 | | Df =8 | sig =.036* |

* Source: field study2011 Significance at 0.05

The results of table No. (4.2.39) show that there are significant statistical differences between the educational level of the study sample of individual and the farm size, a percentage of (45.9%) of the illiterate farms size is (0-5) feddans, and (34.4%) of the same group have (5 less than 10) feddans, while a percentage (19.7%) have more than (10) feddans. While the khalwa category (82.1%), have their farms size (0-5) feddans, and (17.9%), have farms size (5-10) feddans . As for secondary groups, (46.3%) have farms sizing of (0-5) feddans, and (39%) have farms sizing of (less than 10) feddans, and a rate of (14.6%) have farms sizing of 10 feddans and more.

Also for university groups, (48.8%) have farm size (0-5) feddans, and (32.6%) their farm size (5less than 10) feddans, and (18.6%) have farm size of (10) feddans and more. This i indicates that there are significant statistical differences due to Chi square value = (13.50), at level of significance of (.036), which means existence of education level impact on the farm size in the study area.

**Table (4.2.40) The Chi – Square test for relationship between education level and main crops in the study area**

| Education level | Main crops | | | | | Total% |
|---|---|---|---|---|---|---|
| | Cereal crops | Vegetable crops | Fruit crops | Forage crops | Others | |
| Illiterate% | 19 | 0 | 0 | 28 | 2 | 49 |
| | 38.8 | .0 | .0 | 57.1 | 4.1 | 100.0 |
| Khalwa% | 11 | 8 | 0 | 6 | 0 | 25 |
| | 44.0 | 32.0 | .0 | 24.0 | .0 | 100.0 |
| Secondary% | 21 | 6 | 0 | 14 | 0 | 41 |
| | 51.2 | 14.6 | .0 | 34.1 | .0 | 100.0 |
| University% | 21 | 4 | 3 | 10 | 0 | 38 |
| | 55.3 | 10.5 | 7.9 | 26.3 | .0 | 100.0 |
| | Chi-square value = 37.14 | | | Df =12 | sig =.000* | |

* Source: field study2011 Significance at 0.05

The date in table No. (4.2.40) presents strong significant differences of relationship between the educational level pertaining to the study sample and the main crop harvests, in which (38.8%) of the illiterates group mainly harvest cereal crops, whereas (57.1%) harvest forage crops.

While (44%) of the khalwa groups harvest cereal crops, (32%) of them harvest vegetable crops, and (24%) harvest forage crops. The secondary groups, of (51.2%) harvest cereal crops and other (14.6%) of them harvest vegetable crops and (34.1%) harvests forage crops.

This indicates that there are strong significant difference due to Chi - Square value = (37.14) at level of significance of (.000), which means the existence of education level impact on the main crop harvests in the study area.

**Table (4.2.41) The Chi – Square test for relationship between education level and main type of animals in the study area.**

| Education level | Main type of animals | | | | | Total% |
|---|---|---|---|---|---|---|
| | Camel | Cattle | Sheep | Goats | Donkeys | |
| Illiterate% | 1 | 13 | 11 | 19 | 1 | 45 |
| | 2.2 | 28.9 | 24.4 | 42.2 | 2.2 | 100.0 |
| Khalwa% | 0 | 4 | 1 | 18 | 2 | 25 |
| | .0 | 16.0 | 4.0 | 72.0 | 8.0 | 100.0 |
| Secondary% | 2 | 0 | 18 | 7 | 3 | 30 |
| | 6.7 | .0 | 60.0 | 23.3 | 10.0 | 100.0 |
| University% | 0 | 9 | 17 | 7 | 0 | 33 |
| | .0 | 27.3 | 51.5 | 21.2 | .0 | 100.0 |
| | Chi-square value = 45.54 Df =12 sig =.000* | | | | | |

* Source: field study Significance at 0.05

Table No. (4.2.41) explains that there are strong significant statistical differences between the educational level of the study sample and the type of farm animal. A percentage (28.9% of the illiterate group have cattle, and (24.4%) have sheep, and (42.2%) have goats. However (16%) of the khalwa group have cattle, (72%) have goats. The secondary group of (6.7%) has cattle, (60%) have sheep, the percentage of (23.3%) has goats. The University groups of (27.3%) have cattle, (51.5%) have a sheep, and (21.2%) have goats. This indicates that there are significant statistical differences for Chi square value = (45.54), at level of significance of (.000), which indicates existence of education level impact on the type of farm animal in the study area.

**Table (4.2.42) The Chi – Square test for relationship between education level and obstacles face by farmers in the study area**

| Education level | Obstacle face by farmers | | | |
|---|---|---|---|---|
| | Poor production | High cost | Other | Total% |
| Illiterate% | 23 | 26 | 4 | 53 |
| | 43.4 | 49.1 | 7.5 | 100.0 |
| Khalwa% | 21 | 6 | 0 | 27 |
| | 77.8 | 22.2 | .0 | 100.0 |
| Secondary% | 14 | 23 | 0 | 37 |
| | 37.8 | 62.2 | .0 | 100.0 |
| University% | 10 | 17 | 6 | 33 |
| | 30.3 | 51.5 | 18.2 | 100.0 |
| | Chi-square value = 24.68 Df =6 sig =.000* | | | |

* Source: field study 2011 Significance at 0.05

Table No. (4.2.42) indicates that there is strong significant statistical differences between the educational level of the study samples and the obstacles that face by farmers. The study shows that (43.4%) of the illiterate groups face decreasing of production and (49.1%) face high costs, and (7.5%) face other barriers. The khalwa groups of percentage (77.8%) face poor production and (22.2%) face high cost. Also (37.8%) of the secondary groups face decreasing of production, and (62.2%) of same group face high cost. As for University category (30.3%) face poor production and (51.5%) face high cost.This is an indicates that there are significant differences due to Chi square value = (24.68), at level of significance of (.000), which means consenting the existence of education level impact on obstacles that face by farmers in the study area.

**Table (4.2.43) The Chi – Square test for relationship between education level and role of technology transfer and extension services in the study area.**

| Education level | Role of technology transfer & extension services | | Total% |
|---|---|---|---|
| | Poor extension services | Medium services | |
| Illiterate% | 60 | 19 | 79 |
| | 75.9 | 24.1 | 100.0 |
| Khalwa% | 22 | 8 | 30 |
| | 73.3 | 26.7 | 100.0 |
| Secondary% | 36 | 11 | 47 |
| | 76.6 | 23.4 | 100.0 |
| University% | 20 | 14 | 34 |
| | 58.8 | 41.2 | 100.0 |
| | Chi-square value = 4.07 D f =4 sig =.253 | | |

* Source: field study2011

Table No. (4.2.43) indicates that there is no significant statistical relationship between the educational level of the study sample of the individual and the role of technology transfer and extension services, since (75.9%) of the Illiterate group consider that in the agricultural extension services as poor, and (24.1%) of them as medium. On the other hand, the khalwa group of (73.3%) regard the agricultural extension services are poor, and percentage (26.7%) regard as medium. As for secondary, category of (76.6%) regarded the agricultural extension services as poor, and (23.4%) it as medium. While (58.8%) of the university group regard the agricultural extension services as poor and (41.2%) regard it as medium.

This indicates that there is no significant statistical difference due to Chi-Square value = (4.07), at level of significance of (.253), which means the impact of education level on the technology transfer and extension services in the study area.

**Table (4.2.44) The Chi – Square test for relationship between education level and attending extension meetings in the study area.**

| Education level | Attending extension meetings | | | | Total% |
|---|---|---|---|---|---|
| | One meals per week | One time per two weeks | One time per three weeks | One time per month | |
| Illiterate% | 0 | 7 | 0 | 42 | 49 |
| | .0 | 14.3 | .0 | 85.7 | 100.0 |
| Khalwa% | 0 | 4 | 4 | 12 | 20 |
| | .0 | 20.0 | 20.0 | 60.0 | 100.0 |
| Secondary% | 3 | 5 | 0 | 25 | 33 |
| | 9.1 | 15.2 | .0 | 75.8 | 100.0 |
| University% | 2 | 4 | 0 | 20 | 26 |
| | 7.7 | 15.4 | .0 | 76.9 | 100.0 |
| | Chi-square value = 29.06 D f =9 sig =.001* | | | | |

* Source: field study2011 Significance at 0.05

Table No. (4.2.44) indicates that there are strong significant statistical differences relationship between individuals with differences in the educational level of the study sample and the extension meetings. The findings are that (14.3%) of the illiterate groups attend the extension meetings once a per two weeks, and (85.7%) of same category attend the extension meetings once per month. while, the (20%) of khalwa groups individuals attend the extension meetings once each two weeks, and (20%) attend the extension meetings once each three weeks, and a percentage of (60%) attend the extension meeting once per month. The study shows, (15.2%) of secondary groups categories attend the extension meetings once in two weeks, (75.8%) attended the once a month. While (15.4%) of university group attend extension meeting once each two week and (76.9%) of same category attended once per month. This give us that there is significant and strong relationship, for Chi square value = (29.06),at level of significance of (.001), which means the existence of education level impact on the attending extension meetings in the study area.

**Table (4.2.45) The Chi – Square test for relationship between education level and listening to radio program in the study area.**

| Education level | Listens to radio program | | | | Total% |
|---|---|---|---|---|---|
| | per day | Weekly | Monthly | Other | |
| Illiterate% | 6 | 35 | 4 | 1 | 46 |
| | 13.0 | 76.1 | 8.7 | 2.2 | 100.0 |
| Khalwa% | 2 | 12 | 4 | 2 | 20 |
| | 10.0 | 60.0 | 20.0 | 10.0 | 100.0 |
| Secondary% | 6 | 13 | 6 | 2 | 27 |
| | 22.2 | 48.1 | 22.2 | 7.4 | 100.0 |
| University% | 0 | 19 | 6 | 3 | 28 |
| | .0 | 67.9 | 21.4 | 10.7 | 100.0 |
| | Chi-square value = 13.41 D f =9 sig =.145 | | | | |

* Source: field study2011

Table No. ( 4.2.45) illustrates that there is no significant statistical relationship between individuals with differences in the educational level of the study sample and the listening to radio extension programs. The illiterate groups of (13%) individuals listen to the radio extension programs per day, and (76.1%) of same group listen to the same programs a weekly. The result shows (10%) of the khalwa categories individuals listen to the radio extension programs per day. (60.0%) of the same category listen to the radio per weekly. The contrasts (22.2%) of the secondary groups listen to the extension radio programs per day, and a percentage of (48.1%) listento the radio programs weekly. While (67.9%) of university population, listening to the radio extension programs weekly, and (21.4%) of same group listen per monthly. This shows that there is no significant statistical relationship, as Chi- Square value = (13.41), at level of significance of (.145), which means the non existence of education level impact on the listening to the radio extension programs in the study area.

**Table (4.2.46) The Chi – Square test for relationship between education level and income sources in the study area.**

| Education level | Income sources | | | | | Total% |
|---|---|---|---|---|---|---|
| | Crops farm | Animal farm | Occupation | Casual laborer | External remittances | |
| Illiterate% | 14 | 11 | 3 | 65 | 6 | 99 |
| | 14.1 | 11.1 | 3.0 | 65.7 | 6.1 | 100.0 |
| Khalwa% | 6 | 6 | 3 | 35 | 0 | 50 |
| | 12.0 | 12.0 | 6.0 | 70.0 | .0 | 100.0 |
| Secondary% | 25 | 1 | 0 | 50 | 0 | 76 |
| | 32.9 | 1.3 | .0 | 65.8 | .0 | 100.0 |
| University% | 11 | 0 | 34 | 10 | 0 | 55 |
| | 20.0 | .0 | 61.8 | 18.2 | .0 | 100.0 |
| | Chi-square value = 160.33 D f =12 sig =.000* | | | | | |

* Source: field study2011 Significance at 0.05

Table No. (4.2.46) describes that there is a strong significant difference of statistical between in the educational level of the study samples and the income sources. We found that (14.1%) of the illiterate population depend on cereal crops harvesting as sources of income, and (11.1%) of same group depend on animals production as income sources, and (65.7%) ) of them depend of casual laboring as income sources. While (12%) of khalwa group depend on farm crops as income sources, and (12%) of them depend on animal farm as income sources, so (70%) of same group depend on casual laboring as sources of income. On the other hand, (32.9%) of the secondary category depend on crops harvesting as a sources of income, and (65.8%) of them depend on casual laboring as a sources of income. Also, (20%) of the university groups depend on farm crops as sources of income. In which (61.8%) of them depend on occupation as sources of income, and (18.2%) depend on casual laboring as sources of income. This table shows that there are strong significant differences as Chi-Square value = (160.33), at level of significance of (.000), which means consenting the existence of educational level impact on income sources in the study area.

**Table (4.2.47) The Chi – Square test for relationship between education level and number of meals per day in the study area.**

| Education level | Number of meals per day | | | |
|---|---|---|---|---|
| | Three meals per day | Two meals a day | More than three meals day | Total% |
| Illiterate% | 34 | 60 | 2 | 96 |
| | 35.4 | 62.5 | 2.1 | 100.0 |
| Khalwa% | 27 | 22 | 0 | 49 |
| | 55.1 | 44.9 | .0 | 100.0 |
| Secondary% | 48 | 25 | 1 | 74 |
| | 64.9 | 33.8 | 1.4 | 100.0 |
| University% | 21 | 33 | 0 | 54 |
| | 38.9 | 61.1 | .0 | 100.0 |
| | Chi-square value = 19.26 Df =6 sig =.004* | | | |

* Source: field study2011 Significance at 0.05

Table No. (4.2.47) the data shows that there are strong significant difference in relationship between individuals with differences in the educational level for the study sample and the number of meals per day. Percentages (35.4%) of the illiterate groups have three meals daily, and (62.5%) have two meals per day. Whereas, (55.1%) of the khalwa category have three meals daily, and a (44.9%) of same category have two meals per day. Also, (64.9%) of the secondary categories have three meals daily and (33.8%) have two meals per day. The percentages of (38.9%) of the university group have three meals daily, and (61.1%) have two meals per day. This indicates that there is significant statistical differences, as Chi - Square value = 19.26), at level of significant of (.004), which means the consenting of existence of educational level impact on the number of meals per day in the study area.

**Table (4.2.48) The Chi – Square test for relationship between education level and annual income in the study area.**

| Education level | Annual income SDG | | | | | Total% |
|---|---|---|---|---|---|---|
| | thousand | 2thousands | 3thousands | 4thousands | 5 thousands | |
| Illiterate% | 51 | 30 | 14 | 5 | 8 | 108 |
| | 47.2 | 27.8 | 13.0 | 4.6 | 7.4 | 100.0 |
| Khalwa% | 30 | 10 | 6 | 0 | 3 | 49 |
| | 61.2 | 20.4 | 12.2 | .0 | 6.1 | 100.0 |
| Secondary% | 46 | 10 | 4 | 2 | 16 | 78 |
| | 59.0 | 12.8 | 5.1 | 2.6 | 20.5 | 100.0 |
| University% | 9 | 27 | 15 | 2 | 2 | 55 |
| | 16.4 | 49.1 | 27.3 | 3.6 | 3.6 | 100.0 |
| | Chi-square value = 58.99 D f =12 sig =.000* | | | | | |

* Source: field study2011 Significance at 0.05

The obtainable result of the table no. (4.2.48) shows that there is a strong significant statistical relationship between the educational level of the study sample and the annual income. It is clear that (47.2%) of the illiterate groups have an annual income of one thousand SDG, and (27.8%) of same group have annual income of two thousands SDG, whereas (13%) have an annual income of three thousands SDG, while (4.6%) have an annual income of four thousands SDG, and (7.4s %) have an annual income of five thousands SDG. On the other hand, (61.2%) of the khalwa category have an annual income of one thousand SDG, while (20.4%) of them have two thousands SDG, and (12.2%) of same category have three thousands SDG. And (6.1%) of them have five thousands SDG, Also, percentage of (59.0%) of the secondary groups' have an annual income of one thousand SDG. While (12.8%) have two thousands SDG. Such as (5.1%) of them have three thousands SDG. and (20.5%) have five thousands SDG. As for, (16.4%) of University groups have an annual income one thousand SDG, this category was (49.1%) have two thousands SDG. And a also (27.3%) who have three thousands SDG. This table indicates that there is a strong significant statistical relationship, as Chi- Square value = (58.99), at level of significance of (.000), which means consenting the existence of educational level has an impact on the annual income for the citizens in the study area.

**Table (4.2.49) The Chi – Square test for relationship between main occupation and most frequent diseases in the study area.**

| Main occupation | Most frequent diseases of area | | | | | Total % |
|---|---|---|---|---|---|---|
| | Malaria | T.B | Hepatitis | Schistosomaisis | Others | |
| Farmer% | 46 | 2 | 2 | 1 | 21 | 72 |
| | 63.9 | 2.8 | 2.8 | 1.4 | 29.2 | 100.0 |
| Business% | 5 | 0 | 6 | 2 | 18 | 31 |
| | 16.1 | .0 | 19.4 | 6.5 | 58.1 | 100.0 |
| Animal herder% | 8 | 0 | 5 | 0 | 4 | 17 |
| | 47.1 | .0 | 29.4 | .0 | 23.5 | 100.0 |
| Fisher% | 4 | 0 | 0 | 0 | 3 | 7 |
| | 57.1 | .0 | .0 | .0 | 42.9 | 100.0 |
| Casual laborer% | 92 | 0 | 13 | 8 | 41 | 154 |
| | 59.7 | .0 | 8.4 | 5.2 | 26.6 | 100.0 |
| | Chi-square value = 43.31 Df =16 sig =.000* | | | | | |

* Source: field study2011 Significance at 0.05

The results of table No. (4.2.49) indicates that there are significant statistical differences between individuals and the main occupation of the study sample and the most frequent diseases. Percentages of (63.9%) of the farmers group infected with malaria, while the business group of (16.1%). Percentages are infected (47.1 %) of animal herders category are infected with malaria, which indicate that (57.1%) of the fishing groups are infected with malaria, to the farmers group who are the most group subjected to malaria. Therefore, there is significant difference as Chi -Square value = (43.31), at level of significance of (.000) which means that there is strong relationship and impact of the main occupation on most frequent diseases in the study area.

**Table (4.2.50) The Chi – Square test for relationship between main occupation and type of house ownership in the study area**

| Main occupation | Type of house ownership | | | | | Total% |
|---|---|---|---|---|---|---|
| | Ownership | For rent | Inheritance | Grant temporary | Other | |
| Farmer % | 78 | 1 | 2 | 0 | 0 | 81 |
| | 96.3 | 1.2 | 2.5 | .0 | .0 | 100.0 |
| Business% | 33 | 1 | 0 | 0 | 0 | 34 |
| | 97.1 | 2.9 | .0 | .0 | .0 | 100.0 |
| Animal herder% | 18 | 0 | 0 | 0 | 0 | 18 |
| | 100.0 | .0 | .0 | .0 | .0 | 100.0 |
| Fisher% | 6 | 0 | 1 | 0 | 0 | 7 |
| | 85.7 | .0 | 14.3 | .0 | .0 | 100.0 |
| Casual laborer% | 153 | 0 | 5 | 1 | 1 | 160 |
| | 95.6 | .0 | 3.1 | .6 | .6 | 100.0 |
| | Chi-square value = 11.19 Df =16 sig =.797 | | | | | |

* Source: field study2011

The results of table No. (4.2.50) indicates that there is a not significant difference in relationship between individuals with differences of main occupation of the study sample and the type of house ownership. The study gives us that the farmers groups have. (96.3%) house owners and (1.2%) have rent house ownership, while (2.5%) have for inherited houses. While (97.1%) of the business groups category are house owners and (2.9%) percent have rented houses. While (100%), of animal herder groups house owners and (85.7%), of fishing groups are house owners and a percentage (14.3%) of same category inherited houses.

This indicate that there is no significant statistical differences, as Chi-Square value = (11.19), which is level of significance of (.797), which means consenting of none impact of main occupation on house ownership in the study area.

**Table (4.2.51) The Chi – Square test for relationship between main occupation and area grown in the study area.**

| Main occupation | Area grown | | | |
|---|---|---|---|---|
| | 0 - less 5 feddans | 5 less than 10 feddans | 10 feddans more than | Total% |
| Farmer% | 27 | 23 | 17 | 67 |
| | 40.3 | 34.3 | 25.4 | 100.0 |
| Business% | 12 | 10 | 2 | 24 |
| | 50.0 | 41.7 | 8.3 | 100.0 |
| Animal herder% | 4 | 1 | 2 | 7 |
| | 57.1 | 14.3 | 28.6 | 100.0 |
| Fisher% | 48 | 22 | 5 | 75 |
| | 64.0 | 29.3 | 6.7 | 100.0 |
| Casual laborer% | 27 | 23 | 17 | 67 |
| | 40.3 | 34.3 | 25.4 | 100.0 |
| | Chi-square value = 15.31 | | D f =6 | sig =.018* |

* Source: field study2011 Significance at 0.05

The results of table No (4.2.51) show that there are significant differences of statistical relationship between individuals with differences in the household of the study sample and the size of their farm, such as 40.3% of the farmers category have farms size of (0-5) feddans, and34.3%of same category have (5 -10) feddans and also (25.4%) have more than (10 ) feddans. While (50.0 %) of business groups have ( 0 -5 ) feddans and percentage (41.7%) of same group had (5 – 10) feddans , also percentage of (8.0 %) have more than(10) feddans ,and 57.7%of animal herders have (0 - 5) feddans and 14.3% of the same group have (5 -10 ) feddans, while percentage of (28.6%) have more than (10) feddans. On the other hand, percentage of 64.0% of fisher category and farm size have (0-5) feddans while 29.3% of same category have (5-10) feddans. This results shows that there are significant statistical differences due to Chi square value = (15.31), at level of significance of (.018), which means consenting of existence of household impact on the size of farm in the study area.

**Table (4.2.52) The Chi – Square test for relationship between main occupation and main crops in the study area.**

| Main occupation | Main crops | | | | | Total% |
|---|---|---|---|---|---|---|
| | Cereal crops | Vegetable crops | Fruit crops | Forage crops | Others | |
| Farmer% | 40 | 4 | 3 | 18 | 0 | 65 |
| | 61.5 | 6.2 | 4.6 | 27.7 | .0 | 100.0 |
| Business% | 3 | 2 | 0 | 13 | 0 | 18 |
| | 16.7 | 11.1 | .0 | 72.2 | .0 | 100.0 |
| Animal herder% | 0 | 0 | 0 | 4 | 0 | 4 |
| | .0 | .0 | .0 | 100.0 | .0 | 100.0 |
| Fisher% | 29 | 12 | 0 | 23 | 2 | 66 |
| | 43.9 | 18.2 | .0 | 34.8 | 3.0 | 100.0 |
| Casual laborer% | 40 | 4 | 3 | 18 | 0 | 65 |
| | 61.5 | 6.2 | 4.6 | 27.7 | .0 | 100.0 |
| | Chi-square value = 31.28 | | | D f =12 | sig =.002* | |

* Source: field study2011 Significance at 0.05

The results of table No. (4.2.52) indicates that there is strong significant differences relationship between individuals with differences in the main occupation pertaining to the study sample and the main crop harvests, where we find (61.5%) of the farmers groups mainly harvest cereal crops, and (27.7%) harvest forage crops. While (16.7%) of the business groups harvest cereal crops, and (11.1%) harvest vegetable crops, and (72.2%) harvest forage crops. On the other hand, (100%) of the animal herders group harvest forage crops. Whereas (43.9%) of fishers group harvest cereal crops and (18.2%) harvest vegetable crops and (34.8%) harvest forage crops. We can say that, there are strong significant differences due to Chi- Square value = (31.28) at level of significance of (.002), which means consenting the existence of main occupation impact on the main crop harvests in the study area.

**Table (4.2.53) The Chi – square test for relationship between main occupation and main type of farm animals in the study area.**

| Main occupation | Main type of farm animals | | | | | Total % |
|---|---|---|---|---|---|---|
| | Camel | Cattle | Sheep | Goats | Donkeys | |
| Farmer % | 2 | 10 | 22 | 14 | 5 | 53 |
| | 3.8 | 18.9 | 41.5 | 26.4 | 9.4 | 100.0 |
| Business % | 1 | 5 | 2 | 5 | 0 | 13 |
| | 7.7 | 38.5 | 15.4 | 38.5 | .0 | 100.0 |
| Animal herder% | 0 | 4 | 2 | 5 | 1 | 12 |
| | .0 | 33.3 | 16.7 | 41.7 | 8.3 | 100.0 |
| Fisher % | 0 | 7 | 21 | 27 | 0 | 55 |
| | .0 | 12.7 | 38.2 | 49.1 | .0 | 100.0 |
| Casual laborer% | 2 | 10 | 22 | 14 | 5 | 53 |
| | 3.8 | 18.9 | 41.5 | 26.4 | 9.4 | 100.0 |
| | Chi-square value = 21.90 Df =12 sig =.038* | | | | | |

* Source: field study Significance at 0.05

Table No. (4.2.53) indicates that there is significant statistical differences between individuals and the main occupation of the study sample and the type of farm animal. A percentage (18.9%) of the farmers group have cattle, and (41.5%) of them have sheep, while (26.4%) have goats.

While (38.5%) of the business group have cattle, whereas (15.4%) have sheep, and (38.5%) have goats, On the other hand, (33.3%) of animal herder groups have cattle and (16.7%) of same group have sheep and (41.7%) have goats. Whereas (12.7%) of fishers groups have cattle, while (38.2%) of same group have sheep, (49.1%) have goats. This indicate that, there are significant statistical differences for Chi- Square value = (21.90), at level of significance of (.038), which indicates the existence of main occupations impact on the type of farm animal in the study area.

**Table (4.2.54) The Chi – Square test for relationship between main occupation and obstacles face by farmers in the study area.**

| Main occupation | Obstacles face by farmers | | | |
|---|---|---|---|---|
| | Poor production | High cost | Other | Total % |
| Farmer % | 27 | 31 | 3 | 61 |
| | 44.3 | 50.8 | 4.9 | 100.0 |
| Business % | 6 | 5 | 3 | 14 |
| | 42.9 | 35.7 | 21.4 | 100.0 |
| Animal herder% | 12 | 2 | 0 | 14 |
| | 85.7 | 14.3 | .0 | 100.0 |
| Fisher % | 23 | 34 | 4 | 61 |
| | 37.7 | 55.7 | 6.6 | 100.0 |
| Casual laborer% | 27 | 31 | 3 | 61 |
| | 44.3 | 50.8 | 4.9 | 100.0 |
| | Chi-square value 16.21 | | Df =6 | sig =.012* |

* Source: field study2011 Significance at 0.05

Table No. (4.2.54) the obtainable results of table is that there is a strong significant statistical differences relationship between the main occupation of population samples and the obstacles that are face by farmers. A percentage (44.3%) of the farmer groups face low production, and (50.8%) of the farmers face high costs. while (42.9%) of business groups face poor production and (35.7%) same category face high cost. (21.4%) of business face other barriers. Also (85.7%) of the animal herders group face low production, and (14.3%) of same group face high cost.

A percentages (37.7%) of fishers group face poor production, while (55.7%) of fishers face high cost. This indicate that there are significance differences of statistical due to Chi -Square value = (16.21), at level of significance of (.012), which means the existence of main occupation impact on obstacles that face farmers in the study area.

**Table (4.2.55) The Chi – Square test for relationship between main occupation and role of technology transfer and extension services in the study area.**

| Main occupation | Role of technology transfer & extension services | | Total% |
|---|---|---|---|
| | Poor extension services | Extension services medium | |
| Farmer% | 52 | 18 | 70 |
| | 74.3 | 25.7 | 100.0 |
| Business% | 14 | 4 | 18 |
| | 77.8 | 22.2 | 100.0 |
| Animal herder% | 6 | 4 | 10 |
| | 60.0 | 40.0 | 100.0 |
| Fishers% | 3 | 0 | 3 |
| | 100.0 | .0 | 100.0 |
| Casual laborer% | 63 | 26 | 89 |
| | 70.8 | 29.2 | 100.0 |
| | Chi-square value = 2.42 Df =4 | | sig =.659 |

*Source: fieldstudy2011

Table No 4.2.55 shows that there is no significant statistical relationship between the main occupation of the study sample population and the role of technology transfer and extension services. The result shows that 74.3% of the farmers group considers that the agricultural extension services are poor, and 25.7% of farmers group regard it as medium. While77.8%of business category believes the agricultural extension services as poor, and percentage of 22.2% believe it as medium. On the other hand, 60.0% of animal herder groups see the agricultural extension services as poor, while 40.0%of them see it as medium .however100%of fishers group believes the agricultural extension services as poor. This study shows that there is no significant statistical relationship due to Chi square value = (2.42), at level of significance of (.659), which means non impact on the main occupation on the technology transfer and extension services in study area.

**Table 4.2.56 The Chi – Square test for relationship between main occupation and attending extension meetings in the study area.**

| Main occupation | Attending extension meetings | | | | Total% |
|---|---|---|---|---|---|
| | One time per week | One time per two weeks | One time per three weeks | One time per month | |
| Farmer% | 5 | 5 | 0 | 38 | 48 |
| | 10.4 | 10.4 | .0 | 79.2 | 100.0 |
| Business% | 0 | 1 | 0 | 9 | 10 |
| | .0 | 10.0 | .0 | 90.0 | 100.0 |
| Animal herde%r | 0 | 4 | 0 | 0 | 4 |
| | .0 | 100.0 | .0 | .0 | 100.0 |
| Fisher% | 0 | 10 | 4 | 52 | 66 |
| | .0 | 15.2 | 6.1 | 78.8 | 100.0 |
| Casual laborer% | 5 | 5 | 0 | 38 | 48 |
| | 10.4 | 10.4 | .0 | 79.2 | 100.0 |
| | Chi-square value = 34.70 Df =9 sig =.000* | | | | |

*Source: field study2011 Significance at 0.05

Table No. (4.2.56) indicates that there is strong significant statistical differences relationship between individuals with differences in the main occupation of the study sample and the extension meetings. The findings are that (10.4%) of the farmers groups attend the extension meetings once per week, and (10.4%) of same category attend the extension meetings once every two weeks. While, the (79.2%) of same group they attend the extension meetings once each month. On the other hand (10.0%) of business population attend the extension meetings once each two weeks, and percentage (90%) of same population once every month. The study shows, (100%) of animal herder's categories attended the extension meetings once each two weeks, whereas (15.2%) of fishers people attend the meetings in once two weeks. While (6.1%) of same group attend extension meetings once each three week and (78.8%) of same category attend once per each month. This give us that there is significant and strong statistical differences, for Chi- Square value = (34.70), at level of significance (.000), which means the existence of main occupation impact on the extension meetings in the study area.

**Table (4.2.57) The Chi – Square test for relationship between main occupation and listening to radio programs in the study area.**

| Main occupation | Listening to radio programs | | | | Total |
|---|---|---|---|---|---|
| | Per day | Weekly | Monthly | Other | |
| Farmer% | 12 | 24 | 4 | 4 | 44 |
| | 27.3 | 54.5 | 9.1 | 9.1 | 100.0 |
| Business | 0 | 9 | 0 | 3 | 12 |
| | .0 | 75.0 | .0 | 25.0 | 100.0 |
| Animal herder% | 0 | 0 | 4 | 0 | 4 |
| | .0 | .0 | 100.0 | .0 | 100.0 |
| Fisher% | 2 | 46 | 12 | 1 | 61 |
| | 3.3 | 75.4 | 19.7 | 1.6 | 100.0 |
| Casual laborer% | 12 | 24 | 4 | 4 | 44 |
| | 27.3 | 54.5 | 9.1 | 9.1 | 100.0 |
| | Chi-square value = 49.14 Df =9 sig =.000* | | | | |

* Source: field study2011 Significance at 0.05

Table No. (4.2.57) illustrates that there is significant difference between individuals with differences in the main occupation of the study sample and the listening to radio for extension programs, the study shows that 27.3% of the farmers listen to radio extension programs per day, while 54.5% of the same group listen to same programs weekly and percentage 9.1% of farmers listen to radio extension program monthly. The result shows that 75.0% of the business categories listen to radio extension programs weekly.

In contrast 100.0% of the animal herder's population listens to radio extension programs monthly. Whereas 3.3% of fisher's respondents, listen to radio extension programs daily. While 75.4% of same group listen to radio extension program weekly and 19.7% listen to radio extension program monthly. This shows that there is significant statistical relationship, as Chi -Square value = (.000), at level of chi-square of (49.14), which means the existence of main occupation impact on the listening to the radio extension programs in the study area.

**Table (4.2.58) The Chi – Square test for relationship between main occupation and income sources in the study area**

| Main occupation | Income sources | | | | | Total% |
|---|---|---|---|---|---|---|
| | Crops farm | Animal farm | Occupation | Casual laborer | External remittances | |
| Farmer% | 42 | 7 | 3 | 24 | 0 | 76 |
| | 55.3 | 9.2 | 3.9 | 31.6 | .0 | 100.0 |
| Business% | 2 | 1 | 1 | 28 | 0 | 32 |
| | 6.3 | 3.1 | 3.1 | 87.5 | .0 | 100.0 |
| Animal % herder | 0 | 10 | 0 | 4 | 0 | 14 |
| | .0 | 71.4 | .0 | 28.6 | .0 | 100.0 |
| Fisher% | 0 | 0 | 0 | 6 | 0 | 6 |
| | .0 | .0 | .0 | 100.0 | .0 | 100.0 |
| Others% | 12 | 0 | 36 | 98 | 6 | 152 |
| | 7.9 | .0 | 23.7 | 64.5 | 3.9 | 100.0 |
| | Chi-square value = 214.03 Df =16 sig =.000* | | | | | |

*Source: field study2011 Significance at 0.05

Table No. (4.2.58) describes that there is a strong significant difference statistical relationship between individual with differences in the main occupation and the income sources of the study samples. We found that 55.3% of the farmers population depend on cereal crops harvesting as sources of income, and 9.2% of same group depend on animal's production as income sources, and 31.6% of them depend of casual laboring as income sources. On the other hand, 6.3% of business group depend on farm crops as income sources, and 3.1% of them depend on animal farm as income sources, also 87.5% of same group depend on casual laboring as a sources of income. Whereas 71.4% of the animal herders category depend on animal production as a sources of income, and 28.6% of them depend on casual laboring as a sources of income. Also, 100% of the fisher's population depend on casual laboring as a sources of income.

This is study shows that there are strong significant difference, as Chi square value = (214.03), at level of significance of (.000), which means consenting the existence of main occupation impact on income sources in the study area.

**Table (4.2.59) The Chi – Square test for relationship between main occupation and number of meals per day in the study area.**

| Main occupation | number of meals per day | | | |
|---|---|---|---|---|
| | Three meals per day | Two meals per day | More than three meals per day | Total% |
| Farmer % | 46 | 23 | 1 | 70 |
| | 65.7 | 32.9 | 1.4 | 100.0 |
| Business % | 15 | 16 | 2 | 33 |
| | 45.5 | 48.5 | 6.1 | 100.0 |
| Animal herder% | 10 | 8 | 0 | 18 |
| | 55.6 | 44.4 | .0 | 100.0 |
| Fisher % | 3 | 1 | 0 | 4 |
| | 75.0 | 25.0 | .0 | 100.0 |
| Others % | 56 | 92 | 0 | 148 |
| | 37.8 | 62.2 | .0 | 100.0 |
| | Chi-square value = 26.82 | | Df =8 | sig =.001* |

* Source: field study, 2011 Significance at 0.05

Table No. (4.2.59) the data shows that there are strong significant differences between individuals with different main occupation for the study sample and the numbers of their meals have per day. A percentage of 66.0% of the farmers groups take three meals daily, and 33.0% take two meals per day, while 1.4% take more three meals a day. Whereas, 45.5% of the business category take three meals daily, and a 48. 5% of same category take two meals per day and a percentage 6.1% of business population take more three meals day. On the other hand, 55.6% of the animal herder's category take three meals daily and 44.4% take two meals per day. Also percentages, 39.0% of the fishers group take three meals daily, and 25% take two meals per day. This indicate that there is significant statistical differences, as Chi -Square value = (26.82), at level of significance of (.001), which means the consenting of existence of main occupation impact on the number of meals per day in the study area.

**Table (4.2.60) The Chi –Square test for relationship between main occupation and annual income in the study area**

| Main occupation | Annual income SDG | | | | | Total% |
|---|---|---|---|---|---|---|
| | One thousand | 2thousands | 3thousands | 4thousands | 5thousands | |
| Farmer% | 36 | 17 | 11 | 1 | 10 | 75 |
| | 48.0 | 22.7 | 14.7 | 1.3 | 13.3 | 100.0 |
| Business% | 15 | 6 | 4 | 4 | 3 | 32 |
| | 46.9 | 18.8 | 12.5 | 12.5 | 9.4 | 100.0 |
| Animal herder% | 16 | 0 | 0 | 0 | 2 | 18 |
| | 88.9 | .0 | .0 | .0 | 11.1 | 100.0 |
| Fisher% | 3 | 0 | 0 | 0 | 3 | 6 |
| | 50.0 | .0 | .0 | .0 | 50.0 | 100.0 |
| Casual laborer% | 66 | 54 | 24 | 4 | 11 | 159 |
| | 41.5 | 34.0 | 15.1 | 2.5 | 6.9 | 100.0 |
| | Chi-square value = 45.01 D f =16 sig =.000* | | | | | |

* Source: field study, 2011 Significance at 0.05

The obtainable result of the table no. (4.2.60) shows that there is a strong significant differences between the main occupation of the study sample and the annual income. It is clear that 48.0% of the farmers group have an annual income of one thousand SDG, and 22.7% of same group have annual income of two thousands SDG, whereas 14.7% have an annual income of three thousands SDG, while 13.3% have an annual income of five thousands SDG. On the other hand, 46.9% of the business categories had an annual income of one thousand SDG, while 18.8% of them had two thousands SDG, and 12.5% of same category have three thousands SDG. And 12.5% of them have four thousands SDG, and also with in this category of 9.4% have five thousands SDG. The percentage of 88.9% of the animal herder's have an annual income of one thousand SDG. While 11.1% of them have five thousands SDG. Whereas 50.0% of fishers groups have an annual income one thousand SDG, also in this category 50.0% who had five thousands SDG. The study indicate that there is a strong significant statistical, as Chi -Square value = (45.01), at level of significance of (.000), which means the existence of main occupation impact on the annual income for the citizens in the study area.

# 5. CHAPTER FIVE

## 5.1 SUMMARY, CONCLUSION AND RECOMMENDATIONS

**Summary of findings:**

This is the final chapter which presents the summary, for main findings of the research on means of achieving sustainable livelihood and food security of Jommueya area

The study deals in part one with analyzing frequency distributions and percentages. The main results were the following:

The percentage of males headed households were more than females headed households, where the gender percentages were 81%, 19%, respectively. The majority of the respondents of the study area were of productive ages 18-60. The respondents of the study area were married. This means that the marital status in the area was stable and makes family labour available. The majority of the household's size is (6-10) persons, 57.7%. The most of the respondents in the study area were illiterate which represent 37.3%. The respondents work in different jobs, so as most of the respondents in the study area work as casual laborers. The bulk of the works in the study area were carried by males 60.7%.Most of the respondent's source of water from artesian wells 99%. The respondents benefit from public electricity corporation account for 79.4%. Most of the respondents who use paved roads are 58.0%. Majority of the respondents have health centers 63.3%. Most of the respondent's educational services attend at 99.3% .The majority of the respondents in the study area were facing problem of water shortage which represents 51.3%. The most of the respondents in the study area use mini- buses which represents 58.9%. This means a faster means of transportation in order to shorten times spent and which give more comfort. The transportation problems faced by the respondents in the study area were that long distance

represents 58.7%. The health clinic centers which work, for 12 Hours daily represents 46.6%. The majority of the respondents in study area attend Maternal and child vaccination which represent 89%. The majority of the respondents reported malaria as the main diseases in the study area which represent 51.3%. The respondents in study area reported that the main obstacles face were lack of enough classes and teachers which represents 60.7%, 20.7% respectively. The majority of respondents in the study area were faced with lack of enough teachers who are permanent which represent 73.0% and 4.0 % respectively. This illustrates the scarcity of teachers due to low salaries, transportations, and accommodation problems for the married women teachers. The majority of the respondents in study area have farm size of 0 –less 5 feddan was 30.3%. The majority of the respondents in study area, were cropping of 0 less 5 feddans was 30.0% This means the farmers in the study area grow small farms. The majorities of the respondents of the study area grow cereal and forage crops which represents 24.0%. The majority of the respondents in the study area have 10 head of sheep which represents 24.0%.This means the respondents of the area needs more farm animals. The respondents in the study area, have goats and sheep which represents 16.3%, 15.3 %, respectively. The majority of the respondents in the study area raise animal for milk purposes which represents 32.3% .This help as means the source of income generation in the study area. The respondents of the study area of animal farm was milking animals which represents 35.0%. This needs more of multipurpose farm animals. The respondents of the study area were face obstacles and barriers for high cost and low production which represents 24.0%, 22.7% respectively. This means that one of the reasons of respondents in the study area to change their works from the farmer to casual laboring. The majority of the respondents in the study area reported the role of technology transfer and agricultural extension services were poor and medium which represents 46.0%, and 17.3% respectively.. The majority of

respondents in the study area are face with poor financing and drought and poor agricultural inputs which represents 35.0%, 13.7 %, respectively. This needs more training and extension programs to help farmers solve problems. The majority of the respondents of the study area, income sources was casual laboring which represents 53.3% and crop farm represents 19.0 %. This means that the sources of income in the study area was very poor and there as need to make more of sources for the respondents incomes . Most of the respondents in the study area, reported that their food sources from market and from farm which represents 87.3%, and 10.0 %, respectively. The majority of the respondents in the study area take two meals/ day and three meals / day which represent 47.0%, 43.3% respectively. This indicated the good situation of meals / day in the study area. The majority of the respondents in the study area put their annual income as one thousand, Two thousands, Three thousands, Four thousands and Five thousands SDG which represents 45.3%, 26.0 %,13.0%, 3.0%, 10.0% respectively This means that the majority of the respondents have low annual income which needs more development efforts to help the respondents to increase their incomes in the study area

***In part two the analysis of Chi- square shows the following results:-***

*Gender:* with{ Most frequent diseases - Area grown, - Main crops -Main type of animals- Obstacles faced by farmers,-Role of technology transfer and extension services - Sources of food-number of meals per day- sources of income –annual income

The Gender sample for most frequent diseases shows that the male group recorded 52.0%, while the female is 70% for malaria. The Gender and farm size, percentage recorded similarity which is 53% that have 0-5 feddans for males and females respectively. The Gender and the main crops harvests, males recorded 50.4%, while female 36.1% of cereal crops. The Gender

and the main type of animal farm shows that male have no cattle, but have 35.1% sheep and 43.3% have goats. The females 28.0% have cattle and 36.1% have sheep, while 25% of them have goats. The Gender and the obstacles which are face by the farmers. The study shows that 51.0% of the male groups face Poor production, and 44% of the same group face high costs. The female group shows that 26.5% of the females face poor production, while 62.0% of the same group face high costs. The Gender and the role of technology transfer and extension services, shows that 76.0% of the male groups considered the agricultural extension services to be poor, on the other hand female category of 63.3% responded that agricultural extension services are weak. We found Gender and their income sources as 63.2% of males depend on casual laboring as the income source.. On the other hand, the Gender and the number of meals per day, indicates that 51.0% of the male groups take three meals daily, and 48.0% have two meals per day. The female group's category of 34% take three meals a day, and 66% of them take two meals per day. The gender and the annual income, makes it clear that 47.2%of the males group had an annual income of one thousand SDG. While the female recorded 45.5%of the same income.

The marital status of the study sample and the most frequent diseases. The malaria infected single groups 65%, because they were ignorant or have no awareness. The marital status and the type of house ownership recorded 95.3% of the married groups. But the marital status and farm size, for the married group score 52% of the married group which have (0-5) feddans, as well as in the marital status pertaining to the study sample and the main crop harvests. The study shows that 45% of the married group harvest cereal crops. Which are the marital status and the main type of farm animal the study indicates that percentage of 22.8% of the married groups have

cattle and 37.7% have sheep, while 32.5% have goats. In contrast, 60% of the unmarried have Goats, while 40% have Sheep and widowers have 100% of Goats. We find that 48.8% of married people face declination in production, and 44.1% have high costs. Beside these reasons 73.1% of married population consider agricultural extension services are weak. Widowers and divorced regard that the agricultural extension services are weak. We find that 80% of married people attend the extension meetings once a month. Most married population listen to radio that is 67.7%) weekly. But 90% of the widower listen to the radio weekly, while the singles listen to radio at the 54.5%. More over us noted that the married people depend on cereal crops at 20.8% and others depend on animals and employment, while 55.8% depend on free business as source of income. So we find that the married people have three meals a day but others only two meals a day which is 50.2%. Also the study shows that 49% of married individuals have annual income of one thousand SDG while others two up to five thousands. But the unmarried have between 2 to 3 thousands SDG annually. But the widowers 58.8% have one thousand SDG annually. This shows a big difference in the gender incomes.

This shows that there are no significant differences between the household size and the ownership of a house. The families of (2-5) of persons have 97.2% percent of households. Whereas, of the families of 6 -10 of persons have 96%, also families of (11-15) people have 88.9%, percent of the households. But the household size and the size of their farms, 65.7% of the families of (2 -5) people have farms size of (0-5) feddans.

The study shows that there is a strong significant statistical between the household size of jommueya area, and the annual income, percentage 51.5% of the household size (2-5) persons have an annual income of one thousand SDG, and (25.2%) have annual income of two thousands SDG,

and 12.6% have an annual income of three thousands SDG, and 3.0% have four thousands SDG, and percentage 8.0% have an annual income of five thousands SDG.

On the other hand, the percentages 43.2% of the household size (6-10) group category have an annual income of one thousand SDG, and 30.2 % of them have an annual income of two thousands SDG, while 10.7% have an annual income of three thousands SDG. and 12.4% have an annual income five thousands SDG. Also, 46.7% of the household size (11-15) person's of the group category have an annual income of one thousand SDG, while same group of 53.3% have an annual income rate of three thousands SDG.

## 5.2 CONCLUSION:

Livelihood and food security characteristics revealed that they were making an effort for the population of this area to get-off food shortage and poverty reduction, majority of households in this area main food sources depend on the market because most of them work as casual laboring which is the main income sources and as merchants or small businesses, fishing, rearing livestock, handicraft....etc.

Despite the weakness and lack of natural resources there was some development projects for the area, which Omdurman locality have intensive efforts and future development plans, such as:

Ministry of agriculture by directing graduates to benefit from the distribution of greenhouses in order to reduce unemployment and poverty alleviation in jommueya agricultural Scheme. In recent years economic activity were started with establishment of dairy and poultry farms and the expansion of forage cultivation as well as growing vegetables were started the

development projects such as roads network, health centers, and electricity stations etc. The main obstacles which face the area is water shortage, because most of population get water from Artesian wells, the overall, policy to means of achieving sustainable improve livelihood and food security, must be activities and serious attempts to improve the living conditions for increasing activities of agricultural extension to educate farmers by increasing visits or meetings or extension programs by radio or TV.

People need to be encoused to self –employment in small workshops for making doors windows and shelters besides black smith work and welding. They some activities must be to courage to take skills which relate to the River such as pottery, bricks, and fishing in the White Nile, some of the people work as merchants and traders who there should be increase in the social services such as schools, hospitals, and mosques.

The jommueya area witnessed a remarkable development in various aspects that influenced positive means of achieving sustainable livelihoods and food security, such as public services, education, health centers, water supply, electricity, roads network and transportation linking villages with each other. Similar activities for income-generating and raising the standard of living, access to food by the population of the study area, as well as to outreach awareness-raising activities for small farmers to raise production and sustainability of agriculture and shall lead to a positive impact on sustainability of livelihoods and food security in the jommueya area.

## 5.3 Recommendations:

After investigations and study the following recommendations are suggested:-

- To rehabilitation of the Jommueya agricultural scheme in all aspects. This is to include the prevention of desert encroachment projects and increments of income generation activities.
- To increase primary schools for girls and provision of accommodations for teachers.
- To expansion of health care services in order to reach every village.
- To digging of more artesian wells to reduce water shortages.
- To putting more efforts in agricultural extension services and training of farmers.
- To support the poor people in Jommueya area and subsidize the essential food security and livelihood items (stable food security and livelihood) through distribution of food to the most vulnerable group, (i.e.) destitute, elderly, handicapped poor and disabled persons malnourished children pregnant and lactating mothers..
- To improve the livelihood condition in Jommueya area by supplying the essential services mainly the piped water, electricity supply, sanitation and garbage collection points and encourage the local communities to improve their area by constructing public service facilities for the inhabitants such as latrines.
- To establish new mother and child health centers in order, to insure coverage and offer the essential services.
- To improve the food and nutrition security, health and primary education system in the Jommueya area as well as all over the Sudan.

- To improve the income of the poor households through encouraging the income generating projects.
- To establish school feeding projects and supplying teaching facilities to the schools in order to encourage the education and increase the enrolment especially among girls, for the household headed by women especially.
- To encourage the people to minimize deterioration of the environment by replacing the charcoal and wood with cylinder gas or kerosene to be used as a fuel.

The local community can help those who live in shelters to construct simple houses from mud or red breaks

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# 5.5APPENDICES

## Appendix (1)

**بسم الله الرحمن الرحيم**

**جامعة السودان للعلوم والتكنولوجيا**

**كلية الدراسات العليا**

**استبانة في بحث دكتوراه في الارشاد الزراعي والتنمية الريفية عن سبل المعيشة والامن الغذاء في المناطق الريفية**

**دراسة حالة منطقة جموعية ريف جنوب غرب امدرمان :**

**استمارة المبحوثين :**

المحلية : .....

القرية : .....

رقم المبحوث : .....

**أولاً: خصائص الشخصية للأسرة:**

| | |
|---|---|
| **النوع :** | ذكر ( ) أنثى ( ) |
| **العمر :** | اقل من 15 سنة ( ) 16- 25 سنة ( ) 26- 35 سنة ( ) 36-45 سنة ( ) 46-55 سنة ( ) 56 فأكثر ( ) |
| **الحالةالاجتماعية :** | متزوج ( ) غير متزوج ( ) مطلق ( ) أرمل ( ) هجر ( ) |
| **حجم الاسر :** | 2 - 5 شخص ( ) 6 – 10 شخص( ) 11 – 15شخص ( ) 16 شخص فأكثر ( ) |
| **مستوىالتعليم:** | امي ( ) خلوة ( ) دراسة نظامية قبل جامعة ( ) جامعي ( ) |
| **المهنة الاساسية:** | مزارع ( ) تاجر ( ) مربى الحيوانات ( ) صياد الاسماك ( ) أخر أذكر( ) |
| **عدد افراد الاسرة المشاركة بالعمل:** | ذكورفقط ( ) إناث فقط ( ) ذكور + إناث ( ) معاً |
| **عدد سن العمل لافراد الاسرة:** | 2 شخص ( ) 3 أشخاص ( ) 4 أشخاص ( ) 5 أشخاص ( ) 6 أشخاص ( ) |
| **عدد الإناث في سن العمل:** | ( ) |
| **عدد الذكورفي سن العمل:** | ( ) |

ثانياً: طرق المعيشة للاسرة :

| | |
|---|---|
| مصدر مياه للأسرة: | النيل ( ) أبار ارتوازية ( ) ترعة ( ) بحيرة طبيعية ( ) ينابيع ( ) شلالات ( ) اخرى أذكر ( ) |
| الساعات التي تستثمرها الاسرة في الاسبوع لتوفير المياه: | طول اليوم ( ) 12 ساعة ( ) 6 ساعات ( ) 3 ساعات ( ) |
| كيفية الحصول الاسرة بالمياه: | عربية تنكر ( ) حمار كارو ( ) حمار خرج ( ) مواسير- حنفية ( ) اخرى اذكر ( ) |
| المشاكل التي تواجه سكان القرية: | نقص المياه ( ) مياه غير نظيفة ( ) تكلفة عالية للمياه ( ) بعد مسافة مصدر المياه ( ) |
| مصدر الكهرباء للأسرة: | كهربة عامة ( ) مولد خاص للاسرة ( ) مولد تجارى ( ) طاقة الشمسية ( ) أخرى اذكر ( ) |
| فترة الزمنية التي تتوفرفيه الكهربة: | طوال اليوم 24 ساعة ( ) 12 ساعة ( ) 6 ساعات ( ) 3 ساعات ( ) ساعة فقط ( ) |
| معوقات لتي تواجه سكان القرية: | قطع التيار الكهربي متكرر ( ) عالية التكلفة ( ) غير منتظمة ( ) أخرى ( ) |
| شبكة طرق والمواصلات التي تربط بها إلي المدن الكبير: | طرق الترابية وعرة ( ) طرق ردمية ( ) طرق مسفلة ( ) أخرى أذكر( ) |
| فترة الزمنية التي تتوفر المواصلات : | طول اليوم ( ) مرة واحد فى اليوم ( ) مرتين في الاسبوع ( ) مرة واحد في الاسبوع ( ) |
| نوع المواصلات المتوفر: | لواري ( ) بصات ( ) حافلات ( ) بكاسي ( ) ركشات ( ) حمار كارو ( ) أحرى أذكر ( ) |
| معوقات التي تواجه سكان المنطقة عن المواصلات: | زحمة المواصلات في الكباري ( ) طول المسافة ( ) وعورة الطرق ( ) اخري أذكر ( ) |
| وجود مركز صحي: | نعم ( ) لا ( ) |
| عدد ساعات العمل في المركز: | 24 ساعة ( ) 12 ساعة ( ) 6 ساعات ( ) 3 ساعات ( ) |
| عدد الاقسام في المركز: | قسم الاطفال ( ) قسم النساء وتوليد ( ) قسم العام ( ) قسم الطوارئ والاسعاف ( ) |

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| **نوع الطبيب المرتبطة بالمركز:** | عمومي ( ) اخصائي ( ) مساعدةاخصائي ( )<br>طبيب تقليدى ( ) ممرض ( ) دايات فقط ( ) |
| **مقابلة الطبيب:** | يومى ( ) في الاسبوع يومين ( ) في الاسبوع يوم واحد ( ) |
| **حملات التطعيم للنساء والأطفال:** | نعم ( ) لا ( ) |
| **فترة زمنية لهذه الحملة:** | بعد كل شهر ( ) بعد كل ثلاثة شهور ( ) بعد كل ستة شهور ( )<br>بعد كل تسعة شهور ( ) بعد كل سنة ( ) |
| **اكثر أمراض ظهوراً بالمنطقة:** | الملارية ( ) الدرن ( ) مرض إلتهاب الكبد الوبائي ( ) البلهارسيا<br>( ) اخرى أذكر ( ) |
| **وجودمدرسة:** | نعم ( ) لا ( ) |
| **نوع المدرسة:** | إبتدائي ( ) بنات( ) بنين( ) مختلطة ( ) متوسطة ( )<br>بنات ( ) بنين ( ) مختلطة ( ) ثانوية ( ) بنات ( )<br>بنين ( ) مختلطة ( ) لا يوجد ( ) |
| **عدد القرى المشتركة للمدرسة :** | نعم ( ) لا ( ) كيف يصلون الطلاب إلى المدرسة ؟<br>مواصلات ( ) بالأرجل ( ) |
| **وجود سكن الطلابي (داخلية):** | نعم ( ) لا ( ) بنات ( ) بنين ( ) مختلطة ( ) لايوجد ( ) |
| **معوقات التي تواجه سكان المنطقة:** | عدد الفصول غير كافية ( ) المدرسة غير مسورة ( ) تسيب<br>الطلاب ( ) الاساتذة غير كافية( ) كتب المدرسية غالية ( ) اخرى |
| **الاساتذة:** | غير متوفرة ( ) عدم الالتزام ( ) اخرى ( ) |
| **نوع حيازة البيت للاسرة:** | ملك ( ) إيجار ( ) منحة مؤقتة ( ) وراثة ( )<br>مسكون ( ) أخري أذكر ( ) |
| **عدد الغرف في لبيت** | غرفة مع راكوبة و محوش ( ) غرفتين مع راكوبة ومحوش ( )<br>ثلاثة غرف مع راكوبة ومحوش ( ) |
| **مكونات ادوات البناء للبيت** | أخشاب وقش( ) طوب أحمر ( ) جالوس ( ) احجار طبيعية<br>( ) طين مخلوط بالروث ( ) اخري ( ) |
| **التقانة المستخدمة :** | آلة يدوية طورية وكريك ( )آلة كهربية خلاطة الاسمنت ( ) |

ثالثاً: الانتاج الزراعي: ( أ ) نباتي:

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| المساحة المزروعة بواسطة الاسرة: | صفر - اقل من 5 فدان ( ) 6 - 10 فدان ( ) 11 فدان فأكثر ( ) |
| نوع حيازة الزراعية للاسرة: | ملك ( ) إيجار ( ) وراثة ( ) منحة مؤقتة ( ) أخرى أذكر ( ) |
| المزروعة بواسطة الاسرة: | صفر - اقل من 5 فدا ( ) 6 - 10 فدان ( ) 11 فدان فأكثر ( ) |
| طريقة الزراعة: | تقليدية ( ) حديثة ( ) |
| تحضير الارض: | زراعة بدون حرث ( ) آلات يجرها الحيوان( ) تركترات ( ) آلآت ثقيلة ( ) |
| طريقة الرى: | راحي( ) بالرش ( ) بالتنقيط ( ) اخرى اذكر |
| المحصول الأساسي الذى تزرعه الاسرة: | محاصيل الحبوب ( ) محاصيل الخضر ( ) محاصيل الفاكهة ( ) محاصيل العلف ( ) اخرى اذكر ( ) |
| التقانة المستخدمة: | آلات زراعية ( ) بذور محسنة ( ) اسمدة كيميائية ( ) مبيدات ( ) بحوث جديدة ( ) |
| عدد حيوانات المزرعة: (ب) حيوانى | 10 رأس( ) 20 رأس( ) 30 رأس( ) 40 رأس( ) 50 رأس فأكثر ( ) |
| أنواع حيوانات المزرعة: | الإبل ( ) أبقار ( ) ألضأن ( ) ماعز ( ) حمير ( ) أرانب ( ) دجاج ( ) أخرى أذكر( ) |
| طريقة التربية: | تقليدية ( ) حديثة ( ) اخري ( ) |
| غرض التربية: | لحم ( ) لبن ( ) بيض ( ) صوف ( ) أخري أذكر ( ) |
| حيوان الاساسي للمزرعة: | حيوان لاحم ( ) حيوان لبن ( ) حيوان بيض( ) حيوان صوف ( ) |
| معوقات التي تواجه المزارع: | ضعف الانتاج ( ) عالية التكلفة ( ) ضعف خدمات البطري( ) اخري اذكر ( ) |
| التقانة المستخدمة: | ديباجات ( ) أدوية ( ) آلة الحلب ( ) آلة قطع الصوف ( ) اخرى اذكر |

**رابعاً: خدمات الارشاد الزراعي:**

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| **دوره لنقل التقانة:** | ضعيف (  ) متوسط (  ) كاف (  ) عالي (  ) |
| **تأثيره على المزارعين في المنطقة:** | واضح (  ) غير واضح (  ) بعض المناطق (  ) |
| **طرق الذى يستخدمه كعملية إرشادية:** | |
| **زيارات مكثفة :** | في الاسبوع مرة (  ) اسبوعين مرة (  ) ثلاثة اسبوع مرة (  ) شهر مرة (  ) |
| **إجتماعات:** | في الاسبوع مرة (  ) اسبوعين مرة (  ) ثلاثة اسبوع مرة (  ) شهر مرة (  ) |
| **الاذاعة :** | تبث محاضرات يومي(  ) اسبوعي (  ) شهري (  ) اخري(  ) |
| **والتلفزيون:** | يبث محاضرات (  ) ندوات (  ) مسرحيات (  ) أغان وطنية (  ) اخرى (  ) |
| **عدد جوانب الايجابية لعملية الإرشادية :** | نقل التقانة (  ) تدريب وتثقيف المزارعين (  ) توصيل نتائج البحوث الزراعية (  ) أخرى |
| **معوقات التي تواجه سكان المنطقة** | جفاف ونقص التمويل (  ) نقص المدخلات الزراعية (  ) ضعف الارشاد والبحوث الزراعية (  ) آفات اخرى (  ) |

**خامساً: مصادر الدخل للاسرة:**

| **مصدر الدخل:** | رئيسي | جانبي | لايوجد |
|---|---|---|---|
| مزارع نباتي | | | |
| مزارع الحيواني | | | |
| الغابات | | | |
| وظيفة | | | |
| أعمال حرة أخرى | | | |
| دعم من الخارج | | | |

**سادساً: مصادر الطعام**

| مصدر الطعام | رئيسي | جانبي | لايوجد |
|---|---|---|---|
| من المزرعة | | | |
| من السوق | | | |
| مساعدات الجمعيات | | | |
| هبة | | | |

**عدد الوجبات في اليوم :** 3 وجبات (  ) 2 وجبات(  ) 1 وجبة (  ) أقل من وجبة (  )
أكثر 3وجبات (  )

**الدخل السنوى للاسرة :** مليون جنيه (  ) 2 مليون جنيه(  ) 3مليون جنيه (  )
4 مليون جنيه (  ) 5 مليون فأكثر (  )

**2011/7/10م**