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**Food Security in South Kordofan State:
A Food Poverty and
Livelihood Perspective**

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DEDICATION

To my mother

To my father

To my husband

To my children

To my family

To my friends

With love and respect.

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Abstract

The objective of the study is to evaluate food security and livelihood in Muglad rural area in south Kordfan state by measuring food security indicators (income-expenditure and their utilization - Food expenditure -Share of expenditure- Food production calorie consumption -nutritional status) food and livelihood poverty line. The study was carried out in July 2010. Due to security, weather and time constraints purposive sampling was used. A framework of 100 households, composed of 25 Dinka, 45 Sedentary and 30 Agro-pastoral household were randomly selected from four villages in Muglad rural area, and an elaborated questionnaire formats was used to detail household food intake, expenditure and income. The primary data were collected from the questionnaire whereas secondary data was collected from relevant sources such as official report references and previous studies. Data was analyzed using descriptive statistics with the help of EXCEL and SPSS computer programmes. The main results were as follows. The poor household in Neamtain village expends about 25% of his/her earned income in purchasing food and 75% for accessing non-food consumption. For Shateen village, a poor household expends about 60% of his/her earned income in accessing food 40% to purchase of non food basic needs. IDPs A typical poor household was found to earn about SDG10,300 (\$1.61 per capita per day) in Agad village sedentary farming compared to SDG8,800 (\$1.37 per capita per day) in UM Kherine village agro-pastoral farming. On average all of the households interviewed have met their international standard of Kcal 2100 per capita from their current food consumption; and the three social groups, Dinka, Sedentary and Agro-pastoral households, interviewed in Muglad have substantially exceeded the regional food intake threshold estimated by WFP at Kcal, 1800 per capita per day. Global Acute Malnutrition rate is found high and beyond the UNICEF-SHERE emergency rate (GAM 15%), for Muglad rural area the GAM is 17%. The study recommended improving the livelihood and enhancing capacities of people through income generating activities. Moreover assisting physical access to food from the host community own farms. The issue of land tenure and access to land by the IDP household need to be addressed and unpaid land access relaxed. The current per individual participant person to be revised upward to not less than EUR 65.0 per capita for Dinka and Agro-pastoral households and not less than EUR32 for the Sedentary farm household. Also running several nutrition programmes across community are required.

مستخلص الدراسة:

العنوان: الأمن الغذائي بولاية جنوب كردفان من منظور الفقر الغذائي وسبل كسب العيش.

تهدف هذه الدراسة إلى تقييم الأمن الغذائي بمنطقة ريفي المجلد بولاية جنوب كردفان وذلك بقياس مؤشرات الامن الغذائي (الدخل - الانفاق - الانفاق على الغذاء - انتاج الغذاء - استهلاك السعرات الحرارية - الوضع التغذوي وخط الفقر). تمت الدراسة بولاية جنوب كردفان منطقة ريفي المجلد في يوليو 2010. ونسبة للظروف الامنيه والطقس استخدمت العينة الاستهدافيه في إطار مائة اسرة 25 من الدينكا 45 من السكان المستقرين و 30 أسرة تمارس الزراعة والرعي تم إختيارهم عشوائيا من اربعة قرى من ريفي المجلد تم استخدام مخطط استبياني لتفصيل مقدار الغذاء المتناول والدخل والانفاق تم جمع المعلومات الاولية من الاستبيان والمعلومات الثانويه من المصادر ذات الصلة والتقارير الرسميه والدراسات السابقة. تم تحليل البيانات باستخدام الاحصاء الوصفي وذلك باستخدام برنامجي إكسل و spss وكانت النتائج كما يلي : تنفق الاسر الفقيرة في قرية نيمتين 25% من دخلها في شراء الغذاء و 75% من الدخل في المستهلكات غير الغذائية اما الاسر الفقيرة في قرية شاتين 60% من دخلها في شراء الغذاء و 40% من الدخل في المستهلكات غير الغذائية. كما وجدت الدراسة ان الاسرة النموذجية الفقيرة تكسب 10,300 جنيه سوداني (1,61 دولار للفرد في اليوم) في قرية عقاد التي تمارس الزراعة مقارنة ب 8,800 جنيه سوداني (1,37 دولار للفرد في اليوم) في قرية ام خيرين التي تمارس الزراعة والرعي . في المتوسط إستوفت كل الأسر التي تمت معاينتها المعيار الدولي للسعرات الحرارية (2100 كيلوسعرة للفرد) كما يعكس ذلك استهلاكها. وفاقته الفئات الاجتماعيه الثلاثة التي تمت مقابلتها مدخل السعرات الحراريه المتناولة الاقليمي وفق تقدير برنامج الغذاء العالمي (1800 كيلو سعرة للفرد في اليوم) بفارق كبير. ووجدت الدراسة ان معدل سوء التغذية العالمي مرتفع فوق معدل الحاجة الملحة الذي وضعتة اليونيسيف (15%) بينما بلغ في المجلد (17%) وقد اوصت الدراسة بالآتي: تحسين سبل كسب العيش وتعزيز قدرات سكان المنطقه عن طريق انشطة إدرار الدخل بجانب المساعده في الوصول لمصادر الغذاء من مزارع المجتمع المضيف. قضية ملكية الارض وحصول المزارعين عليها تحتاج الى معالجة مع المرونة في الحصول على الارض غير مدفوعة الرسوم. لا بد من زيادة المساعدات لما لا يقل عن 65 يورو لاسر الدينكا والاسر الرعوية الصغيرة والى ما لا يقل عن 32 يورو للاسر المستقرة. كذلك هنالك حاجة لتنفيذ عدد من البرامج التغذوية عبر المجتمع

Abbreviation

ANGATO : A National NGO partner with CONCERN

CBO : Community Based Organization

CPA : Comprehensive Peace Agreement – between GoS and SPLA
on 2005

CSI : Coping Strategies World Food Programme Index

Dinka : The foreign name of the Monyjang people. The main IDP
group in Muglad area

DoF : Department of Forestry in the Muglad MoA

DoN : Department of Nutrition in Muglad Public Hospital

EUR : Euro money

EC : European Commission

IDP : Internally displaced person(s)

LRRD : Linking Relief, Rehabilitation and Development

MDGs : Millennium Development Goals (UN)

MIS : management information system

NGO : Non-Governmental Organization

NICEF : United Nations Children’s Emergency Fund

WFP : World Food Programme

WTO : World Trade Organization

ZAMZAM : A National NGO partner with CONCERN

Chapter one

Introduction

1.1.General Background:

Food security is one challenge facing a number of growing and developed economies in the world and has been one of the concerns that continuously influence the politics and welfare of people significantly.

The food security in Sudan is highly precarious in spite of the potentialities and resource endowment of the country. The main reason for the precarious food security situation is drought and drought-related factors, degradation of natural resources and civil strife in many parts of the country. The situation has been accentuated by stifling macroeconomic fiscal and pricing policies including heavy taxation at federal, state and local levels, as well as marketing bottlenecks, sub-optimal farming practices and high input costs.

Under such precarious production conditions, the country has been caught in an alternating mode of food surpluses and deficits on one side and insecurity on the other. In recent history the country has experienced three serious food shortage situations; the first one was in the seventies the second in mid eighties and the last in the early nineties.

Most of the cereals produced in Sudan are either from mechanized or traditional rain fed farming systems they both depend on the rain fall pattern, quantity and quality have deteriorated over time, often leading to serious drought with all its negative consequences on production .It is commonly perceived that when the production fails in the mechanized and traditional rain fed farming system the entire country experiences a food insecurity situation because of problems of food availability (Eldukheri and other2o11)

In Greater Kordofan, however, the conflict continues to displace new people in groups of related families and the majority of these people have moved to Muglad and Abyei localities, which by now host more than 150,000 displaced persons. IDPs

have arrived in Muglad and Abyei since mid 2007 as a result of banditry armed conflict that emerged in that year.

The soil types in Muglad rural area is mainly sandy clay and dominated by the production of groundnuts, a main export crop for Sudan. Livestock, though are large in numbers, but, kept as a depository of wealth and a manifestation of social prestige in Kordofan, the cultivable plots even by sedentary farmers are relatively small ranging from 5 to 10 compared to State average of 17 mukhamas (0.42 hectare).

Communities and households in South Kordofan State have limited capacity to withstand the impacts of shocks such as floods, poor rainfall, and high food prices.

The food security in South Kordofan State is characterized by:

- Lingering impacts of decades of the North South conflict ;
- Poor economic development (under developed infrastructure , weak/ non existent institutions , markets not well developed ; limited economic opportunities outside agriculture , etc);
- Subsistence oriented mixed agriculture dominates the economy and generates most of the employment ;
- Presence of a substantial returnee population and burden this places of the host Population and the limited socio economic and government services infrastructure;
- High levels of chronic under nutrition and hunger ;
- Recurrent shocks: poor rainfall, flooding high prices. Etc ;
- Limited household and communal capacity to cope with shocks.

The rationale of the food security and livelihood in south kordofan is developed approach described by the term Linking Relief Rehabilitation and development bring positive food security and developmental gains Particularly, in post conflict environment formation for relief focused projects into meaningful approaches for sustainable live.

1-2 Research problem:

The dry land farming in Sudan is characterized by three problems that combined with civil war and frequent droughts have led to chronic impoverishment in many parts of Sudan and in particular western Sudan. These problems are:

- 1- Low agriculture productivity
- 2- High seasonal and year to year fluctuation due to insufficient water for crop and live stock production
- 3- Scarcity of off farm employment opportunities

1.3 Research Objectives:

1. Assess the food security status of Muglad rural area – South Kordofan state.
2. Recommend short and medium term interventions to support food security and livelihood of the assessed population
3. Identify issues that require further follow up or monitoring.

1-4 Research hypothesis

In this study the author assumes that:

- a) In expectation of food assistance, individuals of Dinka, Sedentary and Agro-pastoral group's households in Muglad do not reveal their exact food resources. And;
- b) Do not have met their international standard of Kcal 2100 per capita from their current food consumption.

1-5 Research Methodology

In this study an elaborated questionnaire format was used. A sample of 100 households composed of, 25 Dinka, 45 Sedentary and 30 Agro-pastoral household are randomly selected from four villages in Muglad rural area, to detail household food intake, expenditure and income

1.6 Organization of the study.

Chapter one Included (Introduction- research problem- Research Objective- Research hypothesis - Research Organization). Chapter two Literature review Chapter three Material and Methods Chapter four Results and Discussions Chapter five Conclusion and Recommendations plus appendix and reference

Chapter two

Literature review

2.1 Food and Nutrition:

2.1.1 Human beings needs for food:

The primary function of food is to supply energy for the body. Foods provide six major classes or nutrients: carbohydrates, lipids (fats), proteins, minerals, vitamins and water; some supply energy: and all build and maintain cells and tissues, and regulate body processes.

Human beings needs for food could include:

- To nourish the body.
- To satisfy hunger.
- To satisfy certain social needs.
- To change needs with the humans life cycle.

To satisfy food habits (Idris and Ali,2007).

2.1.2. Nutritional Status:

Nutritional status has been defined as a person state of health as it is instructed by intake and utilization of nutrients .Nutritional studies concentrated on specific nutrient deficiencies and such diagnosable diseases specific deficiencies result from low intake or inefficient utilization of on or more essential nutrients. Unsatisfactory nutritional status can also result from over consumption of particular nutrients (Joseph 1995)

2.1.3.:Nutrition:

A well-balanced diet is made up of foods that provide us with all these vital needs. A shortage (deficiency) can lead to malnutrition and health problem. Malnutrition can also occur even if sufficient quantity of food is available, but does not provide all the nutrients we need. Therefore, it is important to know what nutrients we need: carbohydrates, fats, proteins, vitamins, minerals, Idris, and Ali, 2007)

2.1.4 Malnutrition:

Malnutrition has been defined as a pathological condition brought about by inadequacy of one or more the nutrients essential for survival, growth, reproduction and capacity to learn and function in society people whose diets fall short of standard levels of in take for essential nutrients suffer from malnutrition that can mild.

Although, nutritional status is improving for many people in the world it was state that more than 800 million people do not have sufficient food meek their nutritional needs (FAO 2004).

2.1.5- Food consumption pattern:

Many factors influence the diets people choose. Food being both a pleasure and necessity. Sensory satisfaction is as much a motivation as physiological need. Foods and preparation methods deemed acceptable from ethnic tradition, social culture and acquired habit. Dietary composition depends on disposable income, eating habit and food choices changing with rising prosperity (Joseph, 1995)

2.2. Food Balance sheet (FBS):

Food Balance sheet (FBS, which are collated in most countries, show the quantities of food commodities available for human consumption at the national level by building up a picture of production import and export. The FBS shows the average level of food supply in the country over a given period of time.

2.2.1. FAO food balance sheet:

FAO prepares the food balance sheet, with the purpose of using it in the early warning system. It could also be prepared by the concerned ministry, e.g. Ministry of Agriculture and irrigation. The information collected from the agricultural surveys is sued for preparing this sheet. The information that is given usually lasts for one year and includes:

Food available in the country (stored food since last year + exported food + food produced) – (exported food + food consumed in one year + amount of seed needed for sealing purposes + food lost in storage + fodder crops for livestock) = extra food which could be transferred for next year.

If the result was negative, the final figure will represent unsecured food; arrangements should be made to cover this difference (Idris, and Ali, 2007)

2.2.2. Net work of global food systems:

That includes a range of activities and processes involved in the production (which entails a variety of methods including farming – fishing – hunting –raising livestock and gathering) harvesting, processing, transportation and consumption. (Bryan 2010).

2.3. Food self sufficiency and food security:

2.3.1. Food self-sufficiency: It is defying the needs of the people in the area of food.

Is generally taken to mean the extent to which a country can satisfy its food needs from its own domestic production. It is sometimes through that the best way to increase a country food security level is to increase its level of self sufficiency and this idea has a certain intuitive appeal self sufficiency usually measured by the self sufficiency ratio (SSR).

2.3.2. Food insecurity: It is uncertain ability to meet immediate food needs.

Food security: is defined by the World Bank as "Access by all people at all times to enough food needed for an active and healthy life"; and by FAO as " All people at all times have physical access (including physical, social and economic access) to sufficient, safe and nutritious food necessary to lead active and healthy lives (FAO 2009). (Bryan, 2010).

2.3.3. Food security important dimensions:

According to the FAO (1996), there are three important elements of food security which include:

1. Availability which achieved when sufficient supplies of food of appropriate quality at consistently available to all individuals.
2. Access ensured when household and all individuals have adequate recourse to obtain food for nutritious diet.

3. Utilization refers to the proper biological use of food through adequate diet, water, sanitation and health care.

2.4. Food insecurity

2.4.1. Causes of food insecurity:

Most experts agree that global food insecurity is due to lack of available food on the international level. Rather, it is caused by diminished to cal food supply resulting from a variety of circumstances including political instability, lack of available land for growing crops population growth and gender inequalities.

(Michelle, Kathy 2009).

The most evident food insecurity arises from drought, other climatic disruptions and political strife (Joseph, 1995).

2.4.2. Major causes of food insecurity in Sudan:

has many causes, chief among which are the continuing civil conflict, period usually adverse climatic conditions and a poor physical and administrative infrastructure that often stifles development, trade and the movement of material these main causes overlap and exacerbate each other (Study on food security and self reliance in Sudan (Mohammed, August 2001)

2.4.3. Continuing world food insecurity:

Drought, floods, diseases, plagues, and others (natural disasters) have forever affected the amount of food available for human consumption. Such events will continue to impact agriculture, with regional most inevitably experiencing food shortage. The problem inherently wrong with the food system is that farmers are (producing what they do not eat, and eating what they do not produce). For that fact many developing countries at this time paying high prices for importing food (Geoffrey and Kriten , 2010).

2.4.4. Types of household food insecurity:

Chronic food insecurity: is a persistently inadequate diet caused by the continual inability of households to acquire needed food either through market purchases or production.

Transitory food in security: is temporary decline in a household's access to needed food due to food price, products, on income (international Conference on Nutrition, 1992)

2.4.5- Vulnerable groups of food insecurity:

Vulnerable social groups who are often hit hard by natural disasters and wrong agricultural policies include:

1. Families who are poor in assets and productive resources.
2. The resource poor-drought prone or others staying in marginal areas.
3. Poor pastoralists.
4. The urban poor.
5. Refugees, internally displaced persons (IDPs) and other people affected by war.
6. Unemployed persons.

(Idris and Ali ,2007)

2.4.6. Assessing food insecurity:

Most studies on food security defined food solely as cereals. The proportion of cereals in total food consumption (measured in calorie equivalent) ranged from 85% in Afghanistan to 16% in Zaire. Cereals are a dominant staple in Asia. In Africa and Latin America the role of non-cereals in consumption is very important. In 26 out of 94 countries studied, cereals constituted less than 40% of the calories consumed. Grains compose an average of more than 70% of total calorie intake in least developed countries (LDC).

2.5. Household coping strategies:

Households adopt a variety of coping mechanisms which are not always efficient due to lack of resources, and other factors, to off set the impact of production shortfalls three stages can be identified. The first involves elements of risk minimization such as savings, investments, accumulation of assets, and diversification of income sources. The second involves divestment of assets, and in of loan, and searching for new credit, the last one is to sell all their remaining assets, collect famine foods and migrate to other area.

2.6. Food security indicators:

Multiple indicators are used to assess the degree of food security situation in a developing country. These are:

1. Food production: this refers to the average level of staple crop production over a number of years.
2. Income: refers to the income level of a typical household, which can be approximated by the per capita GDP level indicator.
3. Total expenditure: refers to the total amount of spending of a typical household on goods and services.
4. Food expenditure: refers to the amount of spending of a typical household on staple food.
5. Share of expenditure on food: refers to the percentage of spending of a typical household on food relative to the total spending of the household.
6. Calorie consumption: refers to the daily per capita calorie consumption of an individual in a typical household.
7. Nutritional status: refers to the under nutrition level of an individual of a typical household as detected by the Required Food Intake Chart (Idris and Ali ,2007).

2.7. Improving food security:

Is widely debated and much complex issue but one of supreme importance that affects millions of people. Hunger and under nutrition continue to be serious problem for many peoples in many countries. Household food security can be improved in the short and long runs.(Joachim,1992) .

2.8- Achieving food security:

Food security will only be achieved when :-

- The core goal is to feed every one sustainably and healthily.
- Culturally appropriate goals of suitability, availability and accessibility are pursued.
- The food system is ecologically sound and resilient in the face of environmental volatility.
- Agriculture enhances the productive capacity of the land.
- The food system builds capacities and skills to ensure future generation can continue to produce (Geoffrey and, Kristen and Abatha and (2010).

2.9. Empirical Importance of Food Security and Food Aid in Sudan.

The Sudan is a country which is rich in agricultural resources that were envisaged at some point in time, not only, to generate adequate food to achieve self-sufficiency as is the case before early 1980', but, also to satisfy the food demand in the region. Yet Sudan continued to encounter deteriorating food production capacities and associated livelihood drawbacks, resulting in continual and often chronic food deficits especially in western, Red Sea and southern regions. The underlying factors include recurrent droughts, degradation of natural resources and civil strife in many parts of the country. The situation has been accentuated by stifling macroeconomic fiscal and pricing policies including heavy taxation imposed by authorities at federal, state and local levels, as well as marketing bottlenecks, sub-optimal farming practices and high input costs.

Under such precarious production conditions, the country has been caught in an alternating mode of food surpluses and deficits whereby provision of food aid to vulnerable segments of the population has been necessary. Consequently, food aid and food security are currently common deeds among humanitarian aid agencies operating in Sudan. For instance, World Food Program (WFP) is the main contributor to food aid in the country, the majority of which being of emergency nature, although non-emergency interventions are still considerable often carried out through NGOs. WFP is found to be doing a great job for meeting the food gap in the country,

however, at exceptionally high logistical costs and poor distributional gap with very high inclusive and exclusive errors which necessitate urgent improvements in targeting methods and market analysis. The EC, the second donor funding humanitarian activities in Sudan is following the track of WFP by providing food security and livelihood micro finance for interested NGO, both national and international, with a fund size of more than 800,000 euro per project (Elamin, 2007). Therefore, the future of Sudan's food security and food aid hinges on a number of underlying factors. While development strategies that promote domestic food production and access are of crucial importance, food aid flows are expected to continue to form an important component. On the other hand, the Sudan is currently in the process of accession to the WTO and is undertaking major domestic policy and legislation adjustments in harmony with WTO discipline and utilizing concessions to least-developed countries.

2.10. Overview of South Kordofan

Located in the transition zone between Northern and Southern Sudan South Kordofan , (which includes the Nuba Mountains) is a State that is slowly recovering from the impacts of the 21 year long conflict between the Sudan Peoples Liberation Movement / Army (SPLM/A) and the Government of Sudan (GOS) : massive population displacement, destruction of community and household assets and constrained livelihood opportunities .

The conflict within Greater Kordofan, however, continues to displace new people in groups of related families and the majority of these people have moved to Muglad and Abyei localities. Which by now host more than 150,000 displaced person, IDPs have arrived in Muglad and Abyei since mid 2007 as a result of recent banditry armed conflict emerged in that year. In addition, According to discussion with Government officials and tribal leaders, Dinkas, Birgit, Salamat, Burgo groups of people and other tribes have continuously been displaced from neighboring localities in Darfur. The soils type in Muglad rural area is mainly sandy clay and dominated by the production of groundnuts, a main export crop for Sudan. Livestock, though are large in numbers, but, kept as a depository of wealth in Kordofan. Surprisingly, the

cultivable plots even by sedentary farmers are relatively small ranging from 5 to 10 compared to State average of 17 mukhamas, (0.42 hectare)

Both rural and urban poor show hunger, being sick , not able to see the doctor, lacking shelter, having no access to services (schools, clean water, communication, transport etc.), even they cannot afford the cost of their basic needs (food, cloth and shelter). Under such conditions they compelled to depend on natural resources for their subsistence which has a negative impact on natural resources

The development of socio economic infrastructure and the delivery of social services in the State among is the lowest in Sudan.

Following the signing of the cease fire agreement for the Nuba Mountains in 2002 and North South Comprehensive Peace Agreement (CPA) in January 2005, the security situation in the state has continued to improve and large number of displaced population and refugees has been returned.

However, localized conflicts between nomadic population and farmers, often along tribal lines such as those between Messeria Arabs nomads and the Dinka farmers continue to hamper prospects for peace and the pursuit of better livelihood opportunities.

While the state is endowed with substantial land and water resources, agricultural development remains very low and mainly subsistence oriented.

2.10.1. Household crop production:

During the 2008/2009 agricultural season there have been reports of shortage of rainfall particularly in the western parts of the state along the boarder region with Darfur. The following data from the ministry of agriculture in South Kordofan shows that the 2008/2009 serial production has been lower compared to previous year, (17%) as well as the long term average (3%).

Table2.2 Household crop production:

| Season | 2002/2003 – 2006/2007 | 2007/2008 | 2008/2009 |
|---|----------------------------------|------------------|------------------|
| Production in (m Metric Tons | 372 | 437 | 362 |

2.10.2 Food security and livelihood project in Muglad rural area.

The FSL programme started in 2007, with the objective of improved food production and tree coverage; it progressed in 2009 with improved vegetables production at household level and fruit tree coverage, measured by land cultivation and household participation indicators. In 2010 the objective progression of the FSL has been increased household food production and reduced rate of malnutrition through more engagement of women in food provision, quality and safety.

The food security project activities include the following: distribution of improved seeds and agriculture equipment, construction of grain banks, provision of fruit seedlings, conduct training with local farmers on good agricultural practices and awareness on sustainable land use, and build community organizations to facilitate provision of these services. Help establish links between the government line ministries and CBOs in natural resources rehabilitation fruit and shade tree growing. These are mainly implemented by ANGATO. Activities also include Support to women groups by Zam Zam through distribution of vegetable seeds, chicken and goats.

2.11. previous study.

2.11.1. Poverty Food security and Malnutrition in an urban and rural setting:

The food and nutrition security situation was investigated in the former West Kordofan State, in Al Nuhud and six surrounding villages as examples of urban and rural areas. program. Incomes of <300 SDG reported by 68.2% of households of which 71.3% were rurals, and 31.8% earned >300 SDG of which 81.4% were urban. 76.8% of the households earned <\$1/day (68.0% rural). This was reflected in the food expenditure as 90.8% of the rural spent <10 SDG/day compared to 45.0% by urban) and in the normal number of meals/day as 2 meals/day in rural (80.0%) and 3

meals/day in urban (85.0%) households. Urban with relatively better income spent more on food (5-15 SDG by 90.0%) while one-quarter of rural spent <5 SDG and two-thirds spent 5-<10 SDG. Income positively correlated with food expenditure. Household size significantly influenced the intake of energy and protein in both urban and rural households. Energy intake was adequate in urban but not rural households). More urban households were food secure (60.0%) than rural ones (38.3%). Under nutrition as wasting (present status) or stunting (past status) was high among the under ten children. Recommendations for possible implementations are suggested to the authorities for improving the food and nutrition security in North Kordofan State (Hashim, 2008).

2.11.2. Coping strategies As Food Insecurity Indicator in Rural White Nile

This study (Tarig, 2007) aimed at identifying and using coping strategies adopted by food insecure households in rural areas as a food insecurity indicator. Coping strategies as used here refer to short-term means of dealing with food insufficiency within the current entitlements of the household or relevant consumption unit. The emphasis has been on changes in diet, and changes in distribution and consumption within the household. Generally smaller than the necessary to adequately feed them. The average income per individual per day was found below the poverty line (\$1/Day). These results indicated that all members of the households are vulnerable to food shocks or deficits. Regarding household coping mechanisms According to the method of calculating the CSI it equals 11 for the fully food secure households and 44 for the famine affected households any score between these two figures means that the food security position is getting worse. The CSI was found to be 24.3 for all groups in the rainy season and 17.38 in the dry season. The study recommends that the government and the donor community should strengthen the coping strategies of the rural households and communities i.e. assistance in term of food, seeds, hand tools, medicines, etc. is required to cope with disaster.

2.11.3 Food security and poverty analysis for some states in Sudan:

The main objective of this study (Hnaa, 2007) is to define the problem of food security in Sudan, and in viewing practical examples for measuring the different poverty indicators, comparing them through a stratified sample in the rural and urban areas of four selected states namely, Khartoum, Northern, North Kordofan and the Red Sea States. The other objective was to compare the intake calories level by the different income levels.. It found that the distribution of incomes and intake calories were not equitable in general. However, the inequity in intake calories distribution was found to be less visible than in income distribution. Also the results of the study showed that there was a strong relationship between income and consumption. It also found that the Red See State was the best among the four states in terms of equitable distribution in incomes and intake calories. However, it concluded that the distribution were less than the expected optimum.

Khartoum State was the worst in terms of urban and rural income distribution among the four states, that for conquered decampment, which consequent the wars and natural disasters. The study proved that, the best income distribution was found in North Kordofan State, while it was the worst in terms of intake calories distribution. Also it showed that the urban of Northern State was the worst in income distribution among the urban four states because the majority of the population in that State migrated outside and inside the Sudan.

The study clarified the importance of income factor in addition to intake calories in determining the level of poverty since the basic human needs are composed of food, education, health, shelter, clothing, means of transport...etc. The study recommended the creation of employment opportunities to reduce unemployment, provision of basic services in rural areas to reduce emigration, increasing agricultural production to achieve self sufficiency, increasing awareness on food and nutrition among people, enhancing the role of Zakat and other social amenities and safety nets, enhancing the role of strategic grain reserve, and reducing civil conflicts and effects of natural disasters

2.11.4 The Effect of Darfur Conflict on Food Security and livelihood:

The objective of this study (Osman, 2009) was to evaluate the effect of conflict on food security and standard of living in Melliet and Elsyah districts and to study the reasons of nutritional resources changes and to draw recommendations for sustainable solutions for the study area. The study was carried out in North Darfur State in (Melliet and Elsyah districts) during the period October to December 2008. The main results of the study were as follows: the main income source is Dukhn, goats, sheep, fuel wood and dry grasses sales. The study concluded to: 70% of the sample size of Elsyah leaved their original areas to the camps and they became more dependent on relief and 68% of them changed their activities compared with Melliet (24% who left their villages).

Also the conflict affected food security and standard of living of population of the area. The study recommended the following: 1- The security must be implemented and encourage optional return of population to their original villages. 2- To diffuse peace culture and strengthening social solidarity among the tribes. 3- Development of the affected areas with conflict and social participation in sustainable development programmer. 4- The government should exercise its power and protect all pastoralists and pay attention to roads improvements and implement the resolutions settlements among the tribes.

Chapter Three

Methodology

3.1 Area of Study and Sampling

3.1.1 Muglad rural area profile:

Abyei locality host over 100,000 war displaced persons (IDPs), mostly from other parts of Greater Kordofan region and the rest are Dinka displaced by just ended South Sudan civil war. Many of these IDPs live in scattered open camps in or around the rural towns in the region, mostly in Muglad HQ. Small influx of new IDPs has characterized the current situation in Muglad rural area, since the last two years which is attributed to the ongoing civil conflicts in western Sudan. The Dinka IDPs have resided this areas for more than twenty years and almost locally integrated with the native host families, albeit their number have decreased substantially following the Comprehensive Peace Agreement (CPA) in 2005.

3.1.2. Data Sampling:

A data enumeration framework of 100 households, composed of 25 Dinka, 45 Sedentary and 30 Agro-pastoral household are randomly selected from four villages namely; Neamtainn, Shateen, Agad, Um-kherine in Muglad rural area, South Kordofan state and an elaborated questionnaire formats was used to detail household food intake, expenditure and income.

3.2- Methods:

3.2.1 Data Analysis:

Data was analyzed at three social economic group levels, namely Dinka IDPs, Sedentary farm households and Agro-pastoral households using EXCEL/SPSS at the Muglad rural area to identify unmet need of food assistance per person or capita. The calculation of the amount of food assistance recommended would be based on the difference between the international caloric requirement of 2100 Kcal and the expected access to seasonally adjusted food resources in 2010. It is expected that food assistance (through various modalities) will be recommended in cases where the annual food deficit is estimated to be more than 20 percent. The underlying

assumption is that in expectation of food assistance, individuals do not reveal their exact food resources.

The extent of a community's ability to meet its deficits through its own resources was estimated by an analysis of factors such as security, agricultural season, pasture and livestock conditions, and other income opportunities that may be available in and around the community.

3.2.2 Measurement of food and nutrition security:

In this study, expenditures and incomes of the households interviewed were used in order to approximate them quantitatively. To build up a food security and livelihood poverty line covering basic needs of food, shelter, education, health and expenses of farming and livestock rearing, we proceed as follows:

- a) Stipulate a consumption bundle that deemed to be adequate, with both food and non-food components.
- b) Estimate the cost of the bundle for each social economic group, in this case IDP and host communities.

3.2.3 Unmet food:

To find unmet food and livelihood needs we use the answers of the interviewed community to the question of how would they behave if they had faced a scale famine where we use key informants as follows:

- a) Reduction in number of meals
- b) Reduction in quantity of meals
- c) Migration
- d) Borrowing
- e) Wild food consumption
- f) Slaughter of livestock
- g) Sale of livestock
- h) Cutting of trees
- i) Purchasing (trading in wild animals)

3.2.4- Food and livelihood poverty line:

In this study we use methodology that, the very poor are defined as those whose expenditure falls below a Kcal 2100 natural requirement food poverty line. By contrast, the poor are those whose expenditure (or income) falls below a poverty line, in this study we rename it food security and livelihood poverty line. The food security and livelihood conditions of the Dinka IDPs, Sedentary farm and Agr-pastoral host families interviewed, in Muglad rural area, based on food dietary energy intake and the costs of basic needs including, in addition to food, expenditures on shelter, education, health and farming and livestock enterprises.

The poverty line is constructed using two approaches:

- 1) the food poverty line, which is based on the minimum amount of money a rural household needs to purchase some basic-needs of food bundle and nothing more and
- 2) the food and livelihood poverty line, where an estimated cost of basic non-food needs is added to the first poverty line.

This procedure of estimating these two lines of poverty outlined in the following four steps:

1. A nutritional requirement of 2,100 K. Calories per person per day was used to denote the food poverty line in terms of good health, as proposed by the FAO on the United Nations.
2. The cost of meeting this K. Calories 2,100 food energy requirement is estimated for each of the three social group household types surveyed, namely, Dinka IDP, Sedentary farm household, and Agro-pastoral household, using a diet that reflects the habits of these rural households. This is what we call the food poverty line and be denoted as Z^F .
3. We then added a non-food cost component (Z^{NF}), based on the ratio of expenditure of food and other non food consumption actually faced by the rural households interviewed.
4. Then the basic needs or what is called in this evaluation study the food and livelihood poverty line is estimated by

$$Z^{BN} = Z^F + Z^{NF}$$

To perform a rigorous analysis, the food poverty line z^F is further sub divided into status quo (SQ) and natural requirement (NR) food poverty lines, differentiating between the actual food threshold and the minimum nutrition requirement of Kcal 2,100 per capita/ day.

Chapter Four

Results and Discussions

4.1 Cost of basic needs measurement of food and nutrition security:

4.1.1 Main expenditure categories in a typical year and their utilization in South Kordofan:

Table 4.1, shows the mix of the household consumption, by seasons and annual expenditures, of the poor Dinka IDP, and Sedentary host subgroups in Neamtain village. For Neamtain village, both the IDP and host households expend about 25% of total expenditure on buying food from the market, the next expenditure source is education (35%). This means, of the approximated a SDG 7,240 expended income by the poor household in Neamtain village, 25% went for purchasing food and 75% for accessing non-food consumption.

Figs 4. 1, 4.2 and 4.3 show the mix of the household consumption, by seasons and annual expenditures, and their utilization by season by sedentary farm and Dinka households in Neamtainn village, Muglad rural area in South Kordofan respectively.

Table 4.1. Main expenditure categories in a typical year and their utilization by season by sedentary farm and Dinka households in Neamtainn village, Muglad rural area in South Kordofan:

| Expenditure category | Total in percentage% | | Average annual SDG per household | Harvest | Winter | Summer | Rainy |
|---|----------------------|-------|----------------------------------|-----------|-----------|-----------|------------------|
| | Sed. | Dinka | | Oct-Dec % | Jan-Mar % | Apr-Jun % | season Jul-Sep % |
| Food | 25 | 25 | 3,200 | 30 | 30 | 10 | 30 |
| Shelter | 05 | 10 | 310 | 100 | 0 | 0 | 0 |
| Education | 35 | 35 | 2,180 | 30 | 30 | 10 | 30 |
| Health | 25 | 20 | 750 | 40 | 20 | 30 | 20 |
| Agricultural Inputs & Vet services | 10 | 10 | 800 | 30 | 15 | 10 | 45 |
| Total expenditure | 100 | 100 | 7,240 | | | | |

Fig. 4.1

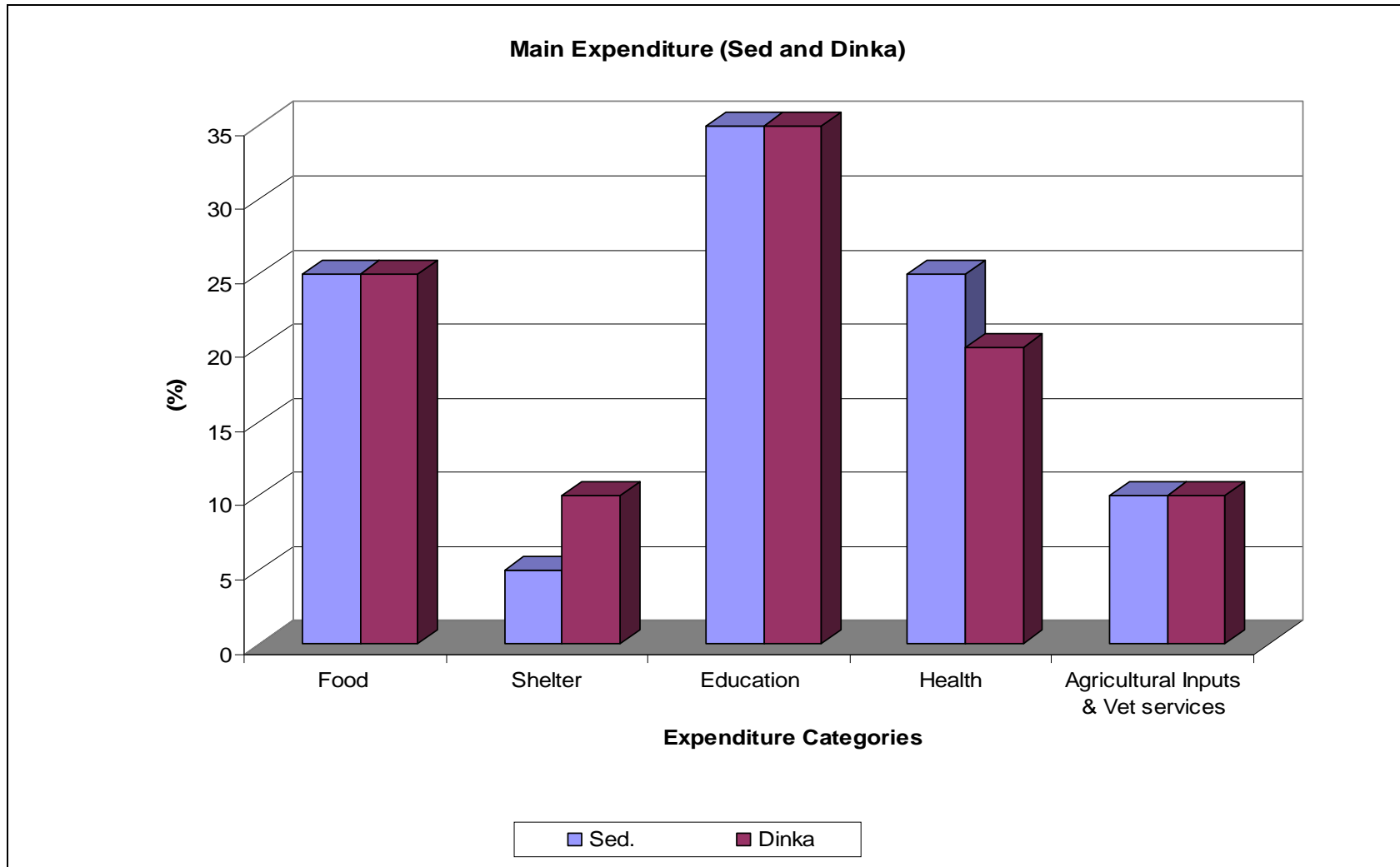


Fig 4.2

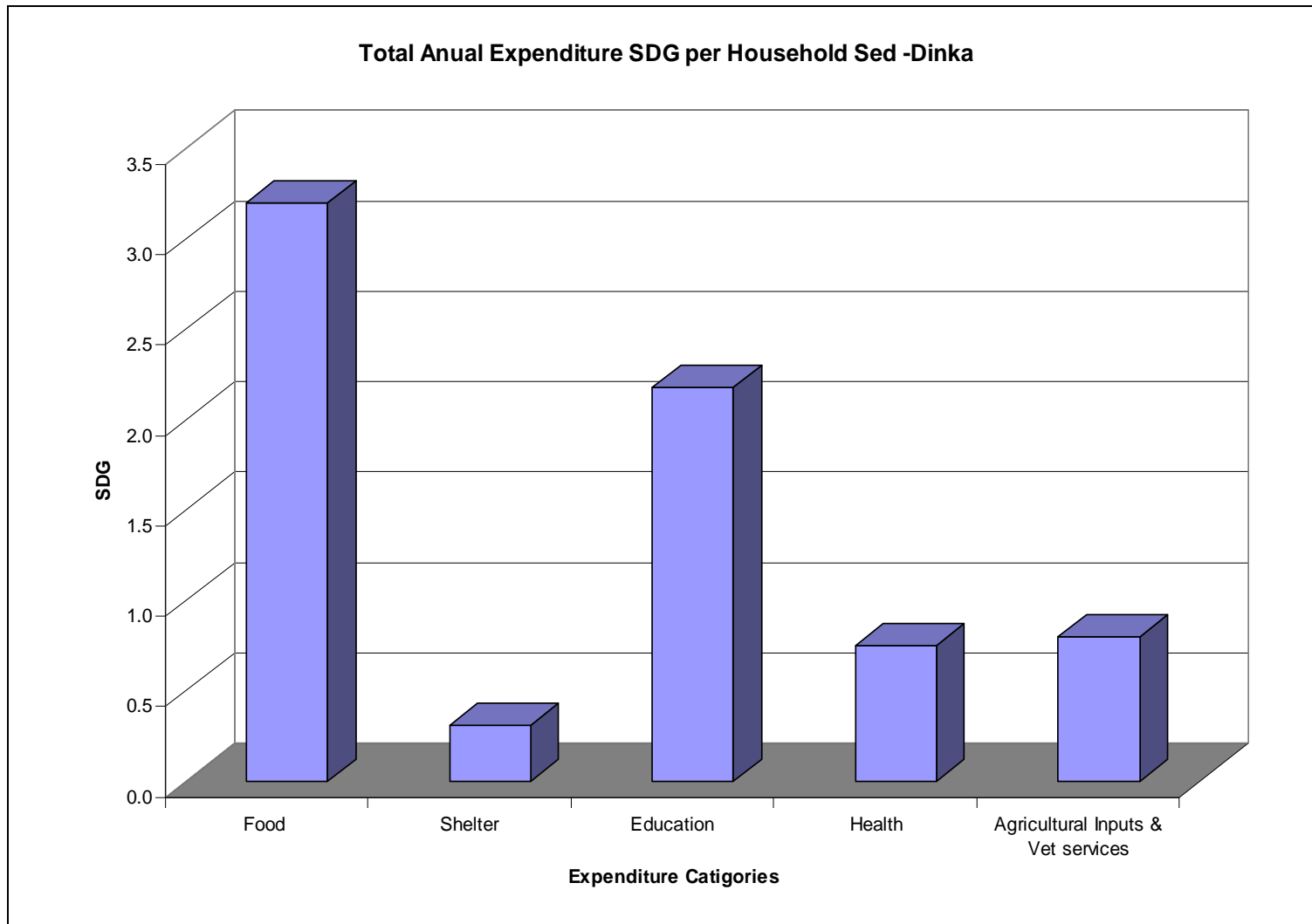
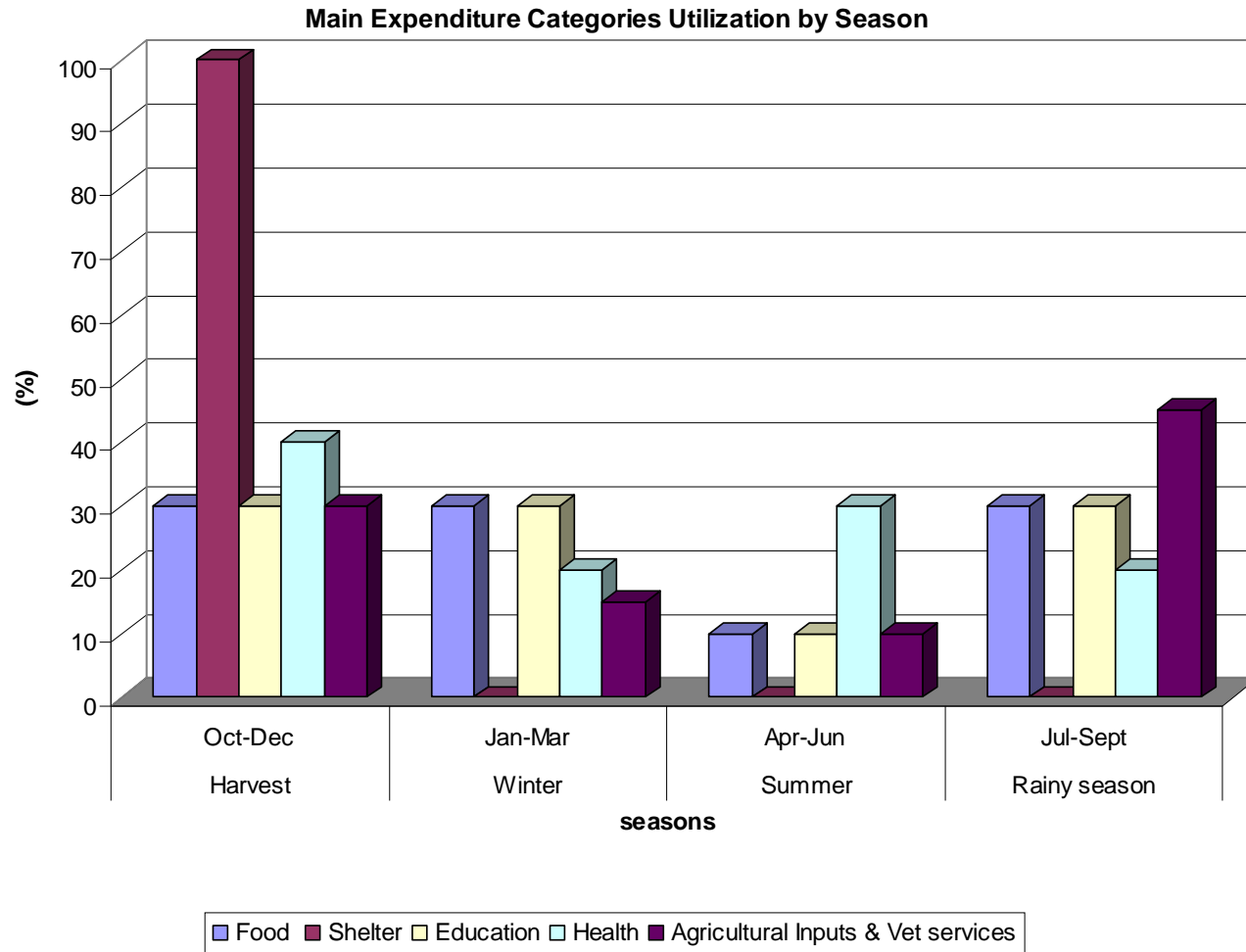


Fig 4.3



4.1.2 Main expenditure categories in a typical year and their utilization by season By Agro- pastoral and Dinka households in , Shateen village, Muglad locality in South Kordofan

Table 4.2 shows the Main expenditure categories in a typical year and their utilization by season By Agro- pastoral and Dinka households in , Shateen village, Muglad locality in South Kordofan, a poor household expends about 60% of his/her earned income in accessing food 40% for purchase of non food basic needs. The Dinka IDPs in Muglad rural area expend no money at all in agriculture and or rearing of livestock, because they could hardly access and manage agricultural lands

Figs 4.4,4 .5 and 4.6 show the main expenditure categories in a typical year and their utilization by season By Agro- pastoral and Dinka households in , Shateen village, Muglad locality in South Kordofan

Table 4.2. Main expenditure categories in a typical year and their utilization by season By Agro- pastoral and Dinka households in , Shateen village, Muglad locality in South Kordofan

| Expenditure category | Total percentage | | in Total annual SDG household | Harvest per Oct-Dec % | Winter Jan-Mar % | Summer Apr-Jun % | Rainy season Jul-Sept % |
|------------------------------------|------------------|-------|-------------------------------|-----------------------|------------------|------------------|-------------------------|
| | Pastrals | Dinka | | | | | |
| Food | 55 | 60 | 2400 | 20 | 45 | 25 | 25 |
| Shelter | 05 | 0 | 300 | 100 | 0 | 0 | 0 |
| Education | 20 | 30 | 600 | 30 | 40 | 0 | 30 |
| Health | 10 | 10 | 400 | 35 | 15 | 30 | 20 |
| Agricultural Inputs & Vet services | 10 | 0 | 1280 | 10 | 30 | 10 | 50 |
| Total expenditure | 100 | 100 | 4,980 | | | | |

Fig 4.4

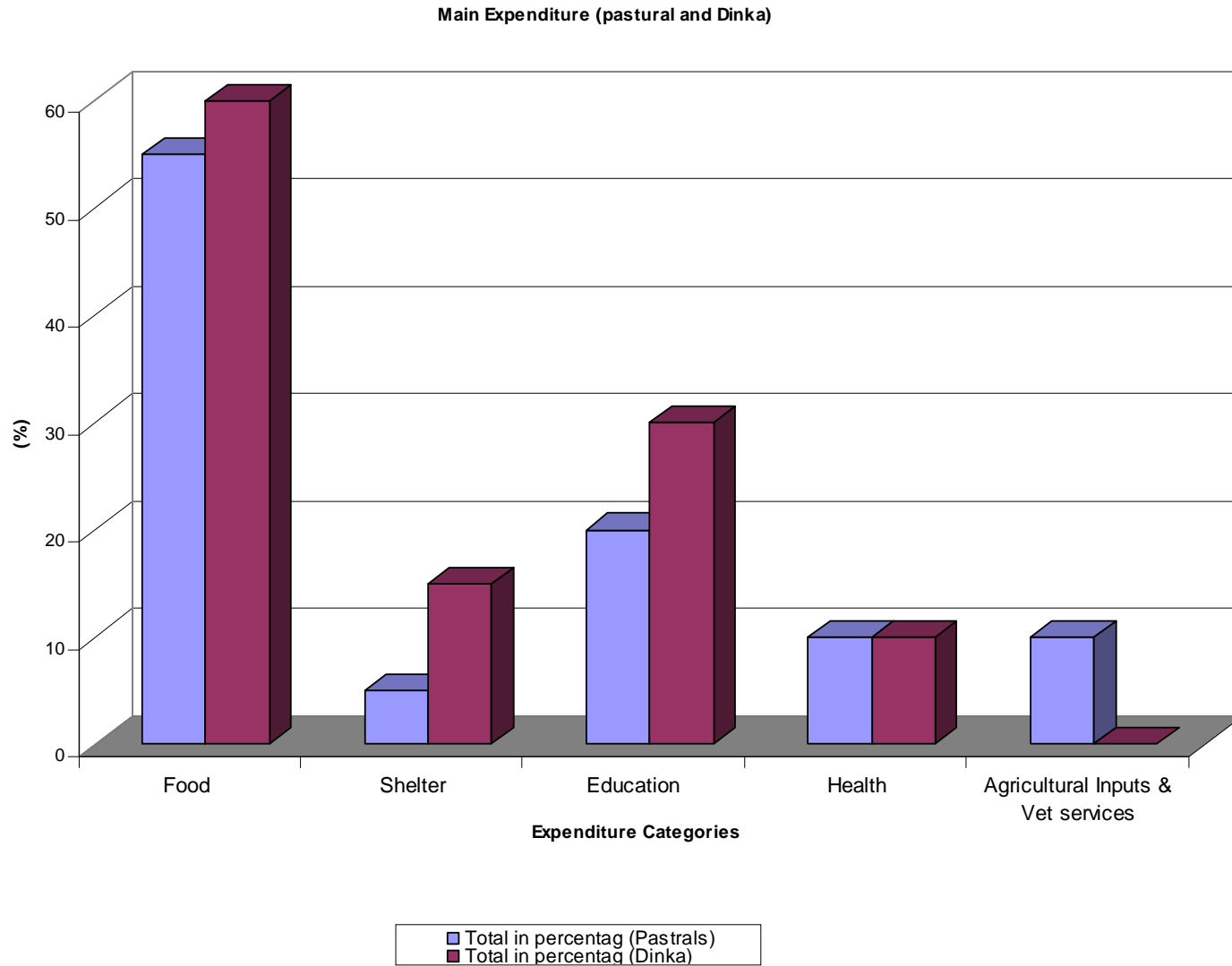


Fig 4.5

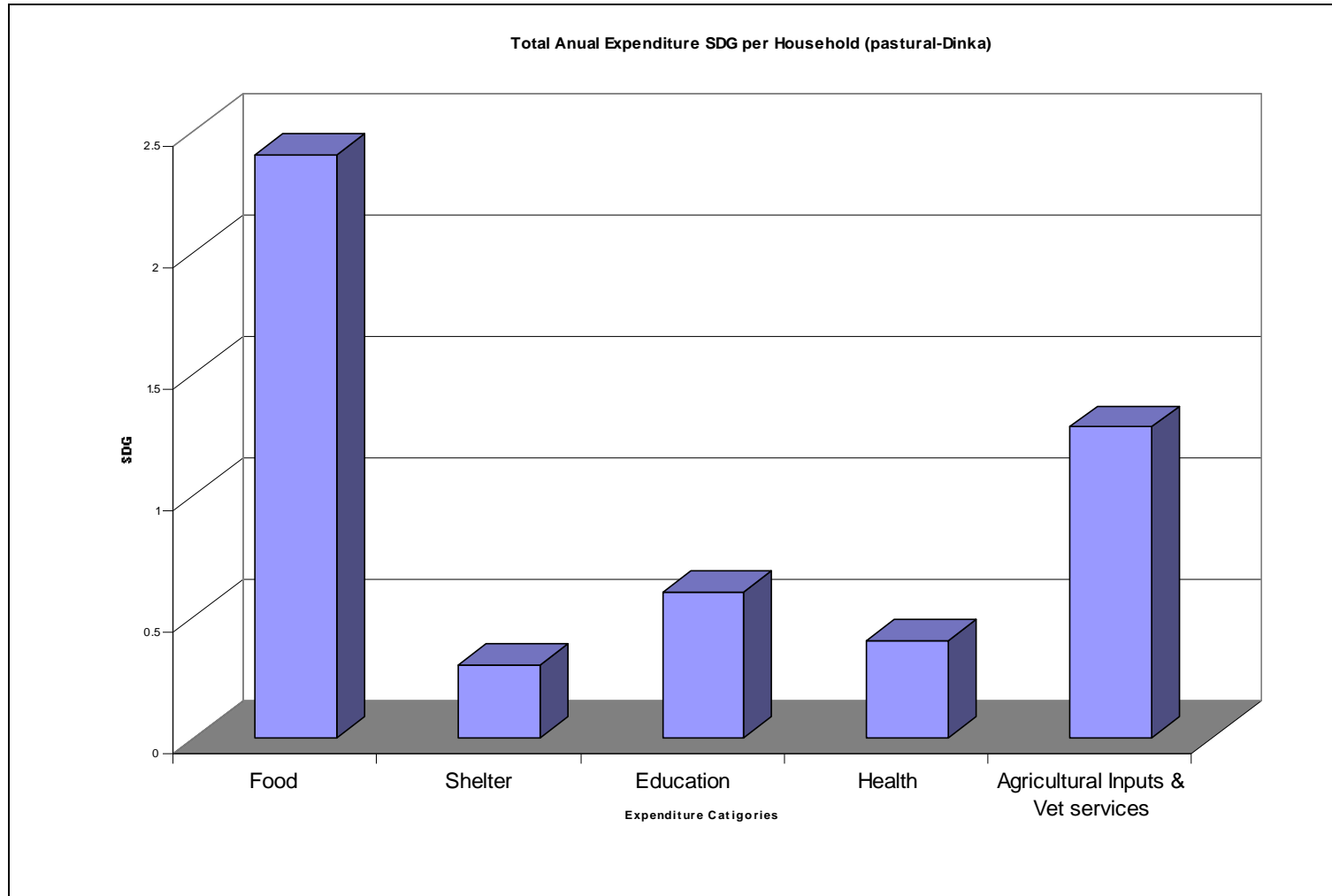
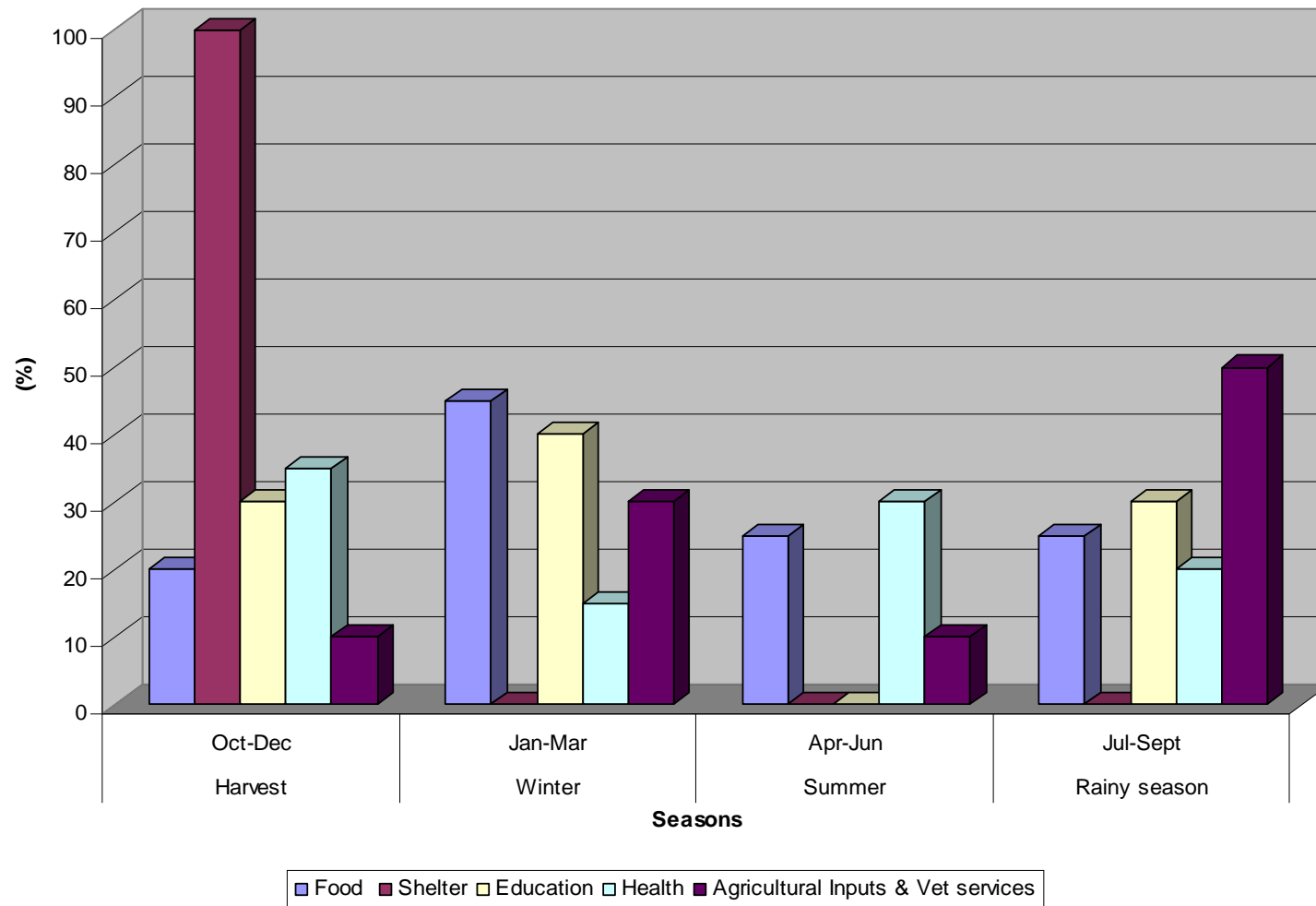


Fig 4.6

Main Expenditure utilization (pastoral -Dinka) by Season



4.1.3 Main income sources in a typical year and their utilization by season by Sedentary farm and Dinka households in Aagad village, Muglad rural area in South Kordofan

Table 3 shows income earnings by source and seasonality for a typical poor household in Agad villages, representing Sedentary farming. Income earnings come mainly from agriculture and livestock for the host households. A typical poor household was found to earn about SDG10,300 (\$1.61 per capita per day) in Agad village sedentary farming. To see the misery of these persons interviewed, compare their \$1.61 per capita per day earnings to the national per capita per day income about \$5.70.

Figs 7, 8 and 9 show the main income sources in a typical year and their utilization by season by Sedentary farm and Dinka households in Aagad village, Muglad rural area in South Kordofan.

Table4. 3. Main income sources in a typical year and their utilization by season by Sedentary farm and Dinka households in Aagad village, Muglad rural area in South Kordofan.

| Income sources | Total in percentage | | Annual income per household SDG | Harvest Oct-Dec % | Winter Jan-Mar % | Summer Apr-Jun % | Rainy season Jul-Sept % |
|---------------------------------|---------------------|-------|------------------------------------|-------------------|------------------|------------------|-------------------------|
| | Sed. | Dinka | | | | | |
| Agricultural crops | 25 | 0 | 4,000 | 50 | 30 | 10 | 10 |
| Livestock & products | 20 | 0 | 3,000 | 25 | 25 | 25 | 25 |
| Petty trading | 15 | 40 | 2,500 | 25 | 30 | 30 | 15 |
| Off farm | 40 | 50 | 700 | 0 | 50 | 10 | 10 |
| Remittances | 0 | 10 | 100 | 25 | 25 | 25 | 25 |
| Total income | 100 | 100 | SDG10,300 | | | | |

Fig 4.7

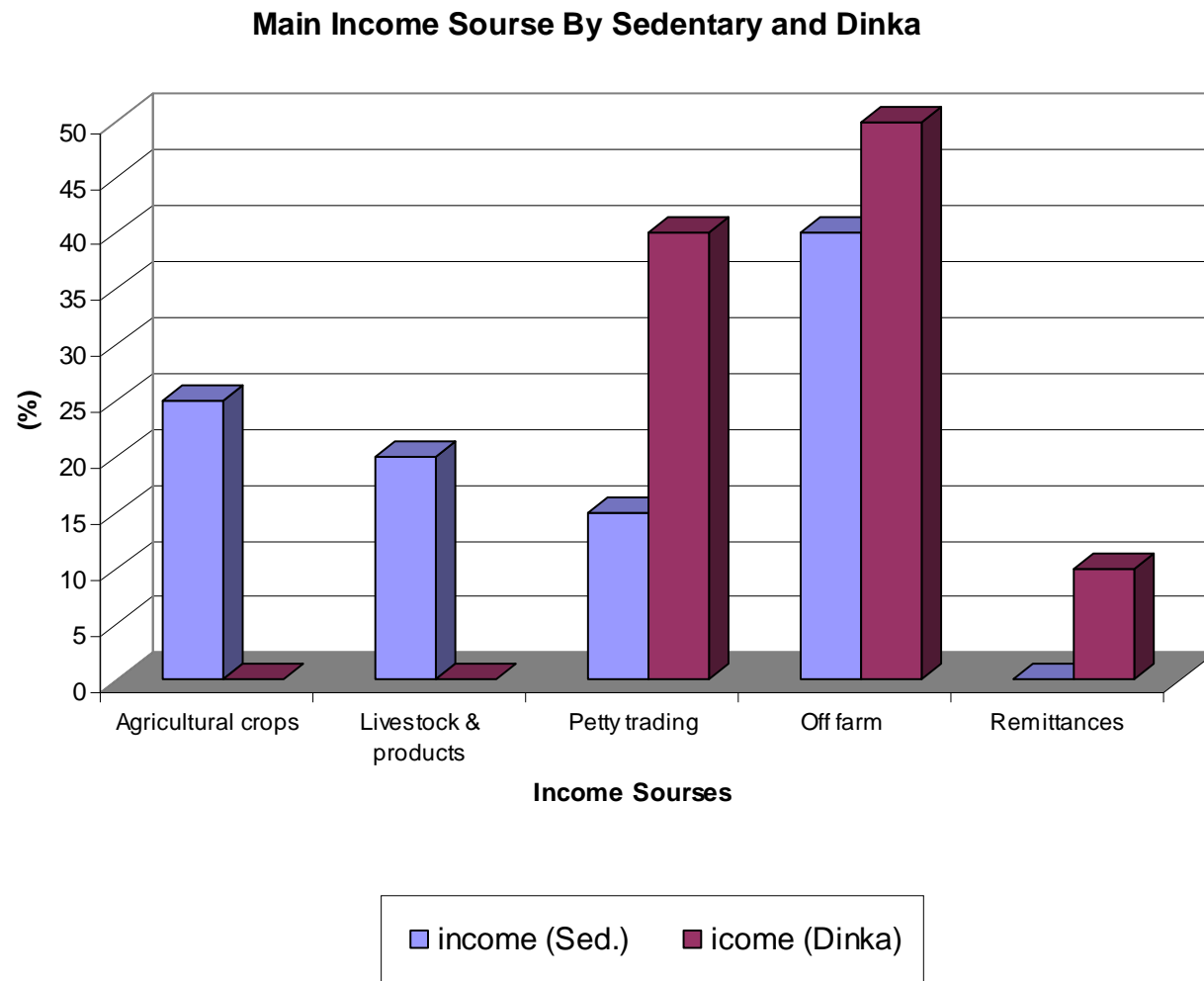


Fig 4.8

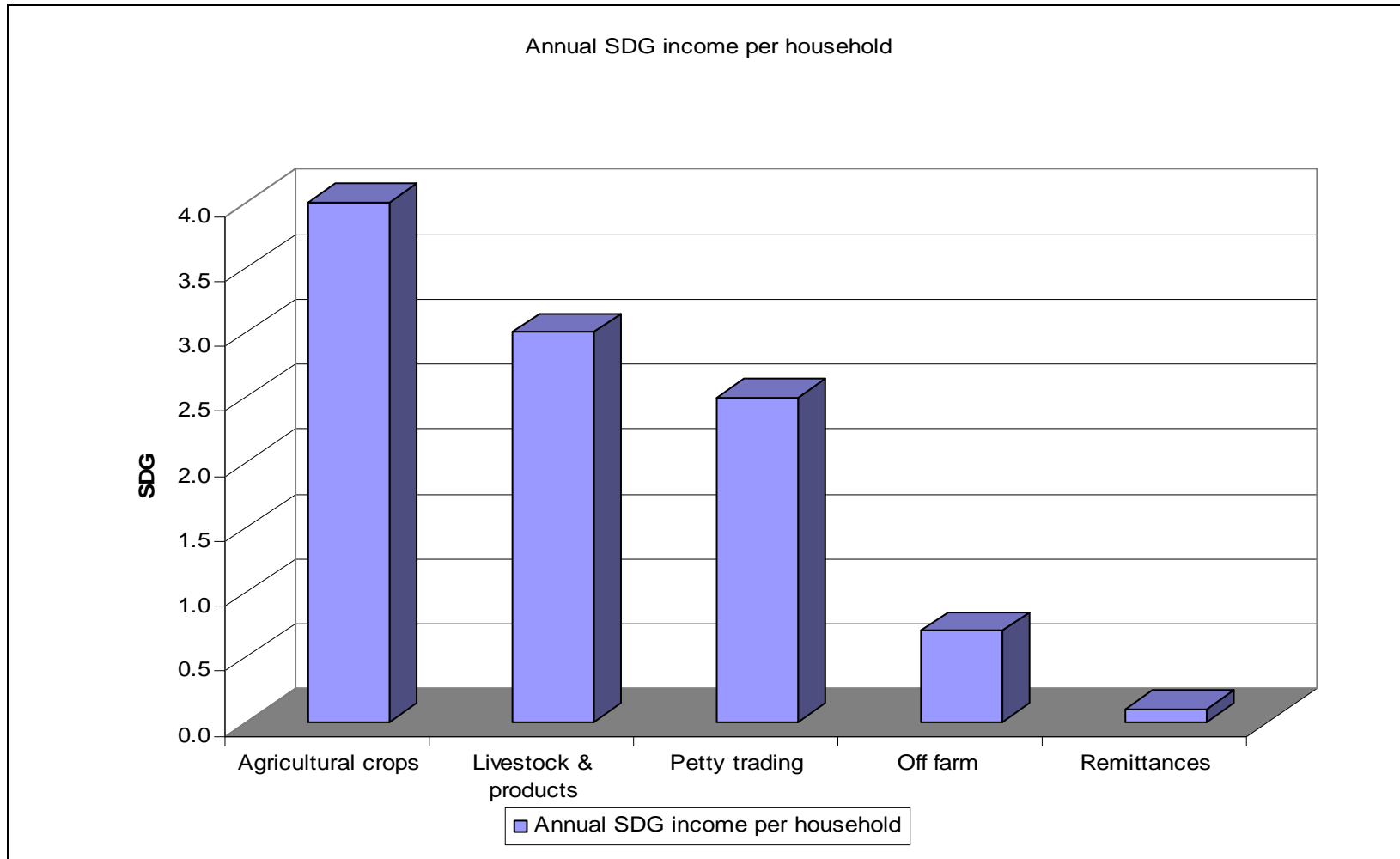
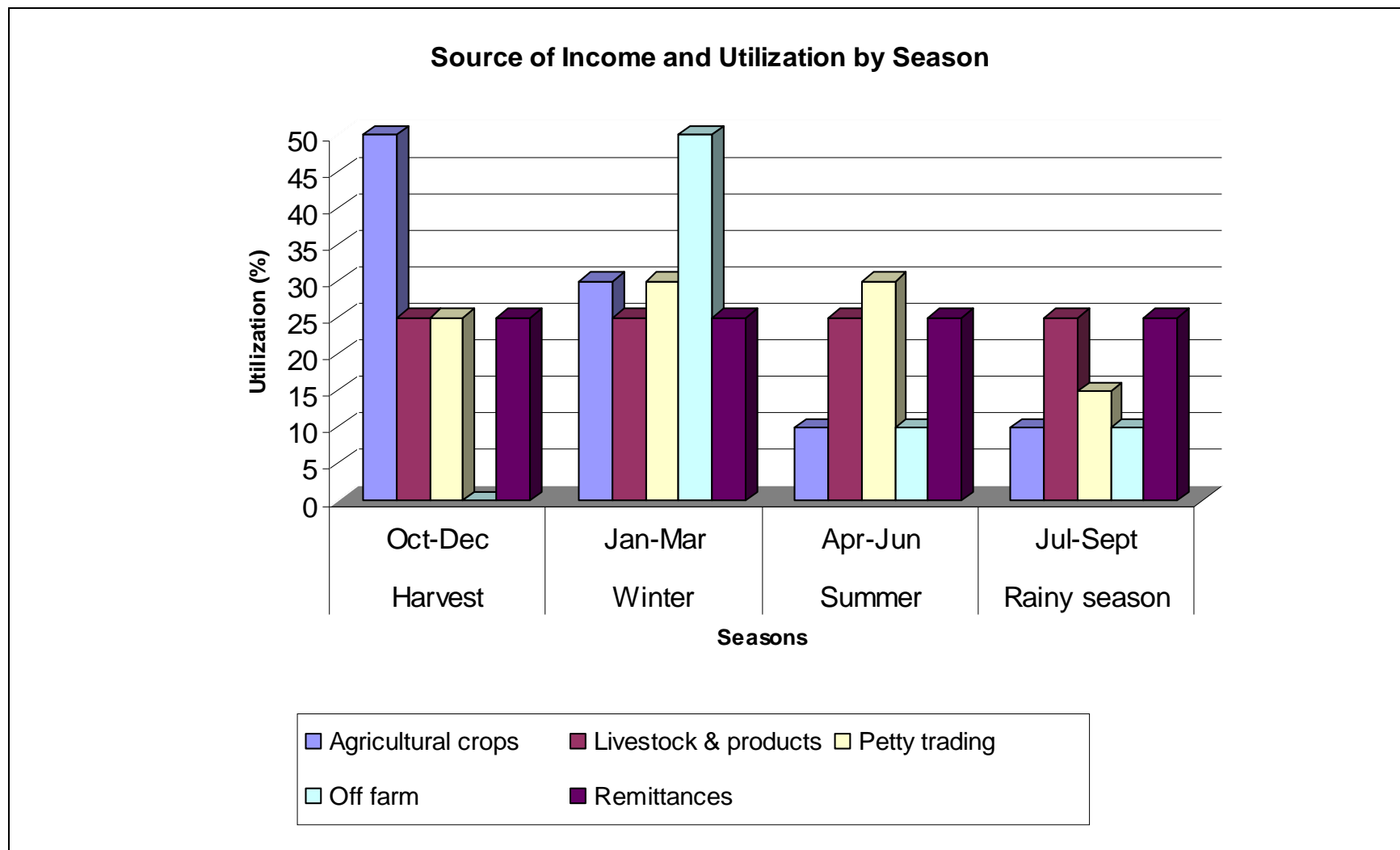


Fig 4.9



4.1.4 Main income sources in a typical year and their utilization by season by agro pastoral and Dinka households in Um Kherine village, Muglad rural area in South Kordofan

Table 4 shows income earnings by source and seasonality for a typical poor household in Um Kherine villages, representing Agro-pastoral farming. Income earnings come mainly from, labour wage and petty trading for the Dinka IDPs. A typical poor household was found to earn about SDG8,800 (\$1.37 per capita per day) in UM Kherine village agro-pastoral farming. To see the misery of these persons interviewed, compare their \$1.37 per capita per day earnings to the national per capita per day income about \$5.70.

Figs 4.10, 4.11 and 4.12 show the main income sources in a typical year and their utilization by season by agro pastoral and Dinka households in Um Kherine village, Muglad rural area in South Kordofan.

Table 4.4 Main income sources in a typical year and their utilization by season by agro pastoral and Dinka households in Um Kherine village, Muglad rural area in South Kordofan

| Income sources | Total in percentage | | Annual income per household | Harvest Oct-Dec % | Winter Jan-Mar % | Summer Apr-Jun % | Rainy season Jul-Sept % |
|---------------------------------|---------------------|-----|-----------------------------|-------------------|------------------|------------------|-------------------------|
| | Host | IDP | | | | | |
| Agricultural crops | 30 | 30 | 4,500 | 40 | 30 | 10 | 10 |
| Livestock & products | 15 | 0 | 3,000 | 50 | 30 | 10 | 10 |
| Petty trading | 20 | 0 | 1,000 | 25 | 25 | 25 | 25 |
| Off farm | 35 | 40 | 300 | 15 | 45 | 30 | 10 |
| Remittances | 0 | 30 | 0 | | | | |
| Total income | 100 | 100 | SDG 8,800 | | | | |

Fig 4.10

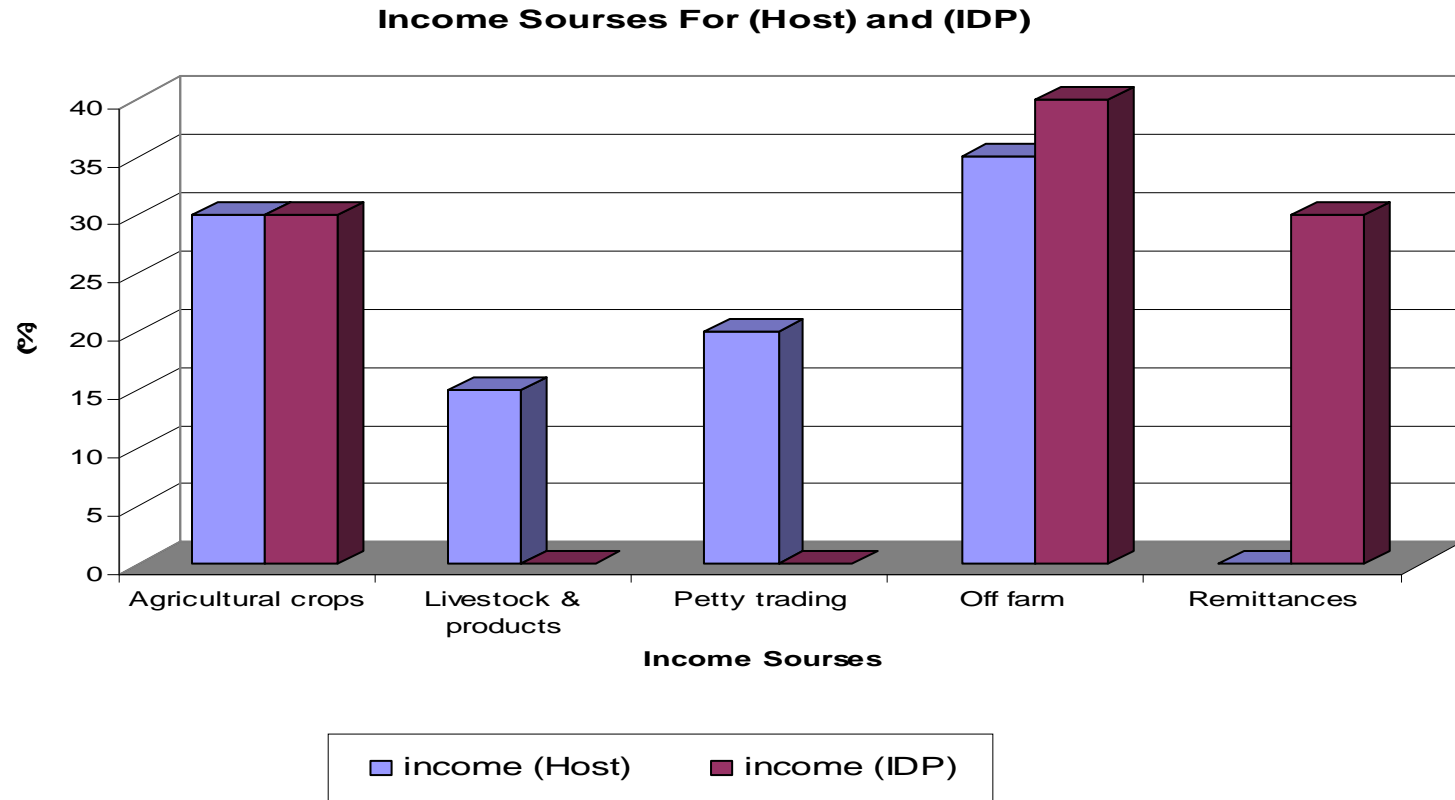


Fig 4.11

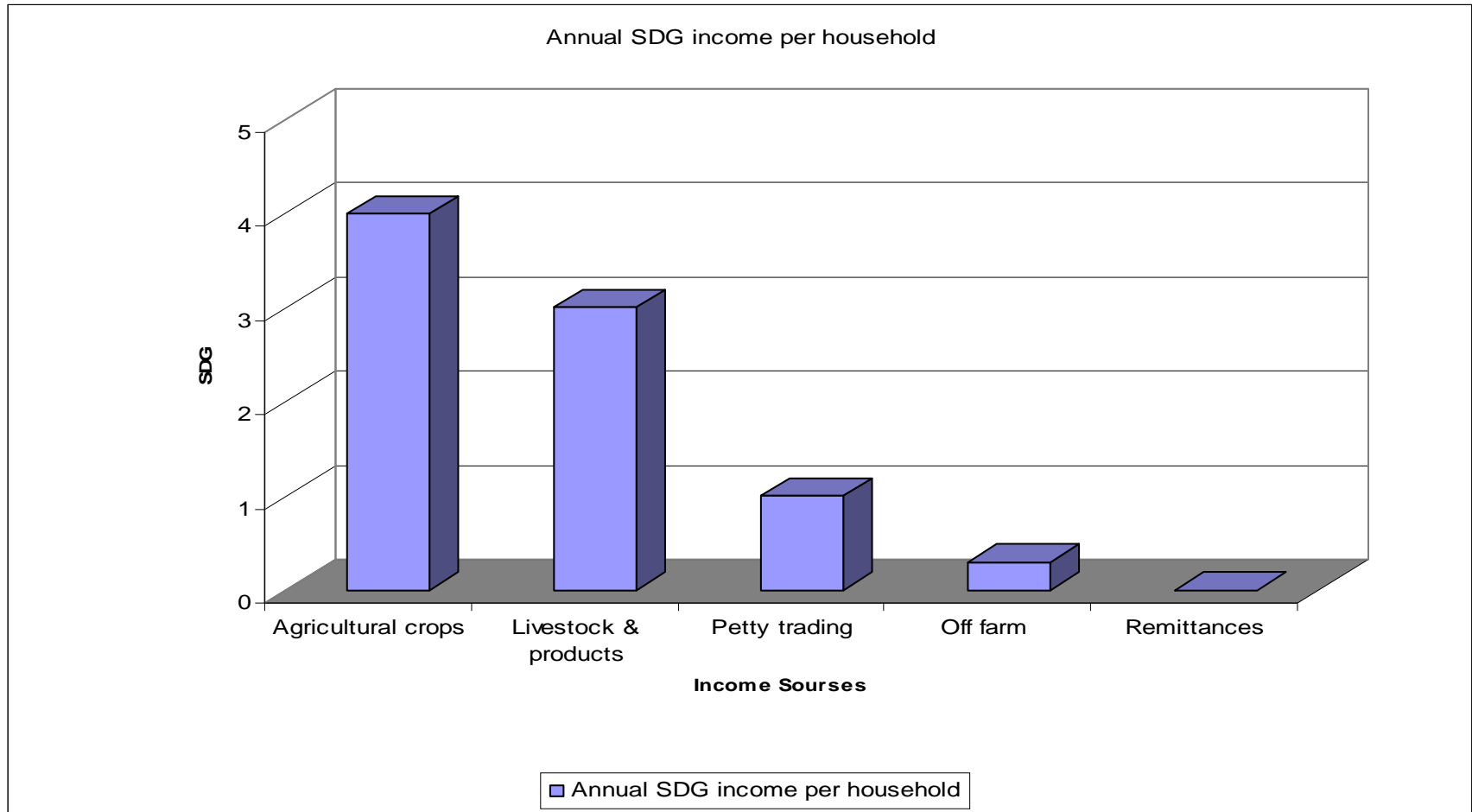
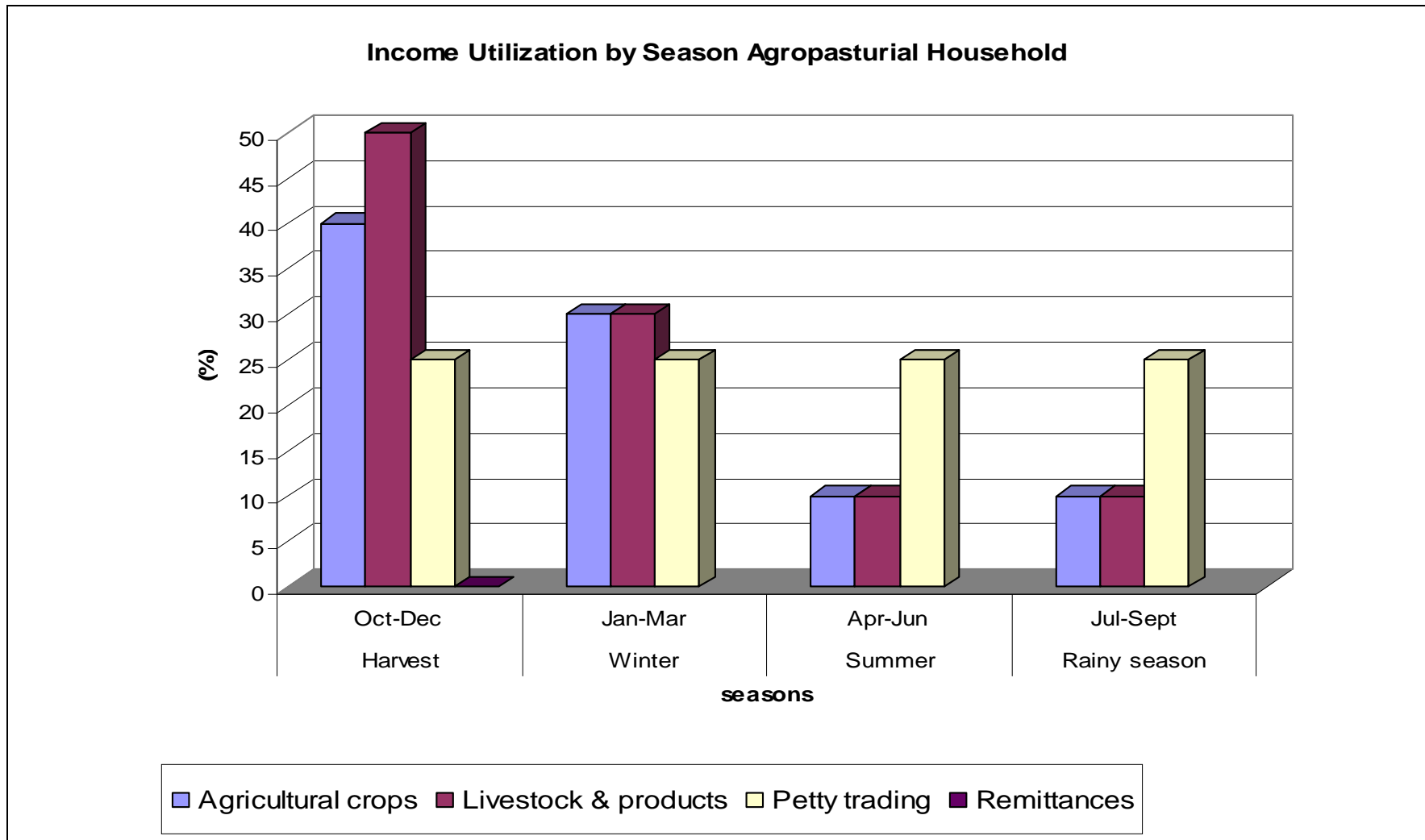


Fig 4.12



4.2 Unmet Food:

Table 4.5 shows that for the host households, their last resort coping mechanism against food hunger is migration, before they exhausted other coping mechanism of collection of wild fruits, selling of animals for exchange for grain and cutting of trees for firewood and charcoal making.

Tble 4. 5. Main coping mechanisms frequently used at times of famines in Muaglad locality in South Kordofan

| Coping Mechanism | Sedentary hosts | | Agro-pastoral hosts | |
|--------------------------------------|-----------------|-----|---------------------|----------|
| | Dinka | Sed | Dinka | Pastoral |
| Reduction in number of meals | A | A | A | A |
| Reduction in quantity of meals | A | A | A | A |
| Migration | | A | | A |
| Borrowing | | | | |
| Wild food consumption | C | | C | C |
| Slaughter of livestock | | | A | A |
| Sale of livestock | B | | A | B |
| Cutting of trees | | | B | B |
| Purchasing (trading in wild animals) | | | A | A |

State: A= low, B= moderate, C=severe

4.2.1. Estimating of unmet food and livelihood by food items and price costs for household in Muglad rural area in South Kordofan.

Tables 4.6 thru 4.8 quantify the food and livelihood poverty situations of the war affected people in Muglad rural area portrayed in figs 4.13, 4.14 and 4.15 disaggregate the food scenarios examined by food items, calories consumed food and livelihood costs. In these three tables food and food and poverty lines are imputed for the IDP and host per capita and the unmet food and livelihood needs per capita are also quantified in monetary terms, using the primary household data on food and livelihood production and consumption pattern adopted by of the rural households interviewed. Furthermore, on the bottom lines of these tables, Euro aid to cover these unmet food and food and livelihood needs are approximated in per capita, for the three social groups visited.

Taking the status quo that is the actual food consumption and livelihood scenario configuration, 2112 and 2164 and 2164 are the per day per capita Kcal food energy thresholds calculated for Dink IDPs and Sedentary farm and the Agro-pastoral households, respectively (Table 4.6 thru 4.8). These thresholds result in unmet food needs of zero Kcal food energy per capita per day for all households, an indication of a successful food security and livelihood project of in Muglad rural area. However, this not the end as the livelihood component is not met yet by the food security and livelihood project. The costs of non food basic needs of shelter, education and health, on average, equal double the costs of food acquisition; therefore more focus of the food security and livelihood in the livelihood component is highly recommended.

Table4. 6. Estimating of unmet food and livelihood by food items and price costs for Dinka IDP household in Muglad rural area in South Kordofan.

| Food security and livelihood components | Status quo Kcal/cap/ Day | Natural requirement Kcal/cap/day | Unmet Kcal/cap/ food day |
|---|---|---|---|
| Cereals | 1400 | 1373 | -27 |
| Pulses | 126 | 139 | 13 |
| Roots | 6 | 6 | 0 |
| Meat | 110 | 79 | -31 |
| Milk | 11 | 13 | 2 |
| Vegetables | 13 | 14 | 1 |
| Fruits | 2 | 2 | 0 |
| Games | 30 | 13 | -17 |
| Nuts | 63 | 69 | 6 |
| Oils | 57 | 63 | 6 |
| Sugar | 278 | 309 | 31 |
| Tea | 18 | 20 | 2 |
| Added Kcal per day per person | 2112 | 2100 | -14 |
| Food security and livelihood prices in SDG & humanitarian aid in EUR | | | |
| Status quo (SQ)food poverty line | 1.91 | | |
| Natural requirement (NR) food poverty line | | 1.90 | |
| SQ food & livelihood poverty line | 3.18 | | |
| NR food & livelihood poverty line | | 3.80 | |
| Unmet food price per capita per day | | | -0.01 |
| Unmet livelihood price per capita per day | | | 0.61 |
| Unmet food & livelihood (shelter, health & education) price per capita | | | 0.60 |
| Annual Euro humanitarian aid to meet food requirement per capita | | | -1.16 |
| Annual Euro humanitarian aid to meet food & livelihood per capita | | | 64.47 |

Fig 4.13

Estimating of unmet food and livelihood by food items Dinka IDP household in Muglad rural area in South Kordofan.

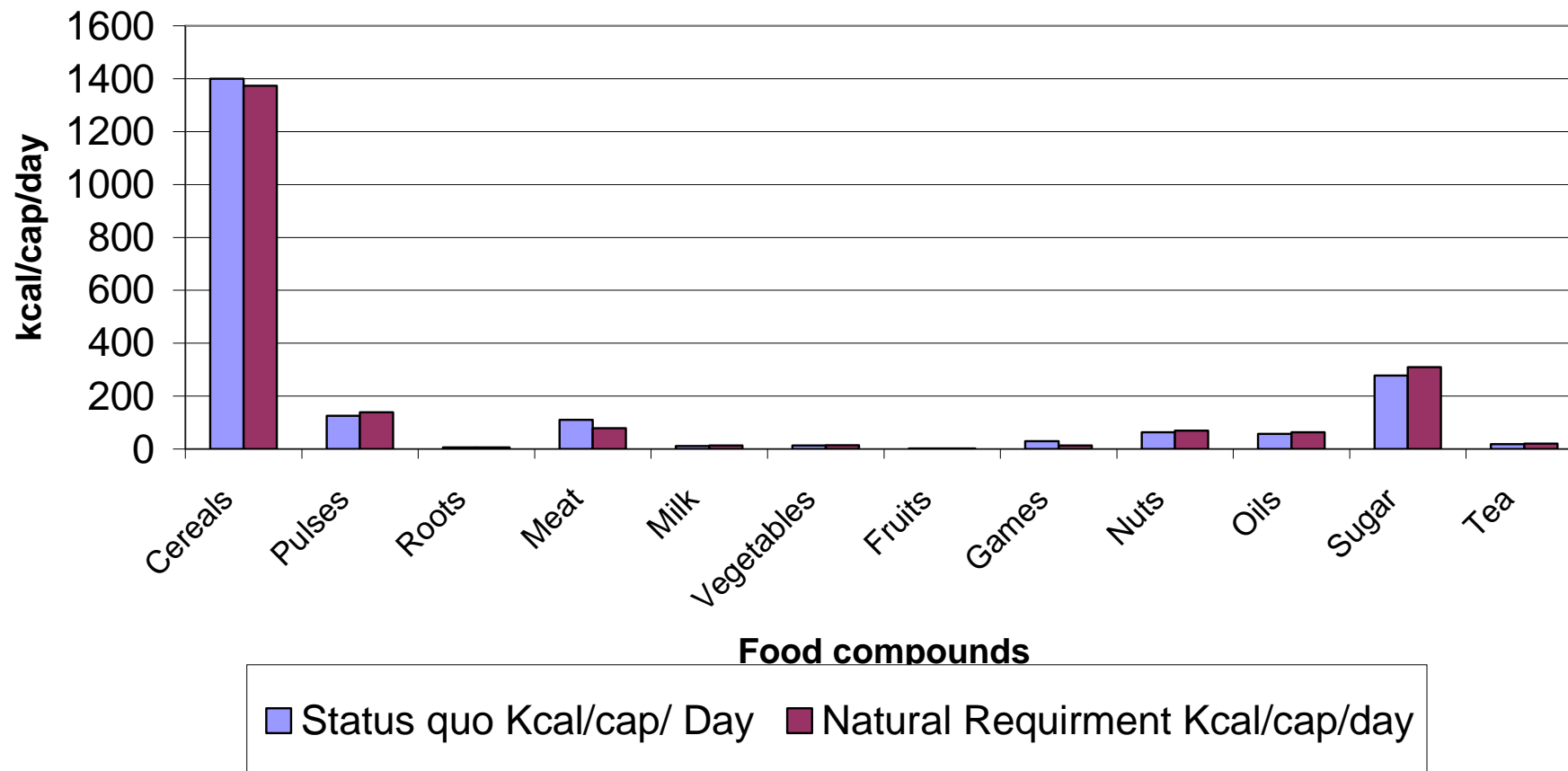


Table4. 7. Estimating of unmet food and livelihood by food items and price costs for the sedentary farm household in Muglad rural area in South Kordofan.

| Food security and livelihood components | Status quo Kcal/cap/ Day | Natural requirement Kcal/cap/day | Unmet Kcal/cap/ food day |
|--|---|---|---|
| Cereals | 1450 | 1277 | -173 |
| Pulses | 258 | 166 | -92 |
| Roots | 20 | 20 | 0 |
| Meat | 112 | 58 | -54 |
| Milk | 6 | 2 | -4 |
| Vegetables | 129 | 133 | 4 |
| Fruits | 12 | 13 | 1 |
| Games | 115 | 68 | -47 |
| Nuts | 2 | 1 | -1 |
| Oils | 57 | 59 | 2 |
| Sugar | 100 | 300 | 200 |
| Tea | 3 | 3 | 0 |
| Added Kcal per day per person | 2264 | 2100 | -164 |
| Food security and livelihood prices in SDG & humanitarian aid in EUR | | | |
| Status quo (SQ)food poverty line | 2.61 | | |
| Natural requirement (NR) food poverty line | | 2.42 | |
| SQ food & livelihood poverty line | 4.35 | | |
| NR food & livelihood poverty line | | 4.84 | |
| Unmet food price per capita per day | | | -0.19 |
| Unmet livelihood price per capita per day | | | 0.49 |
| Unmet food & livelihood (shelter, health and education) price per capita per day | | | 0.30 |
| Annual Euro humanitarian aid to meet food requirement per capita | | | -20.19 |
| Annual Euro humanitarian aid to meet food & livelihood per capita | | | 32.34 |

Fig 4.14

Estimating of unmet food and livelihood by food items and price costs for the sedentary farm household in Muglad rural area in South Kordofan.

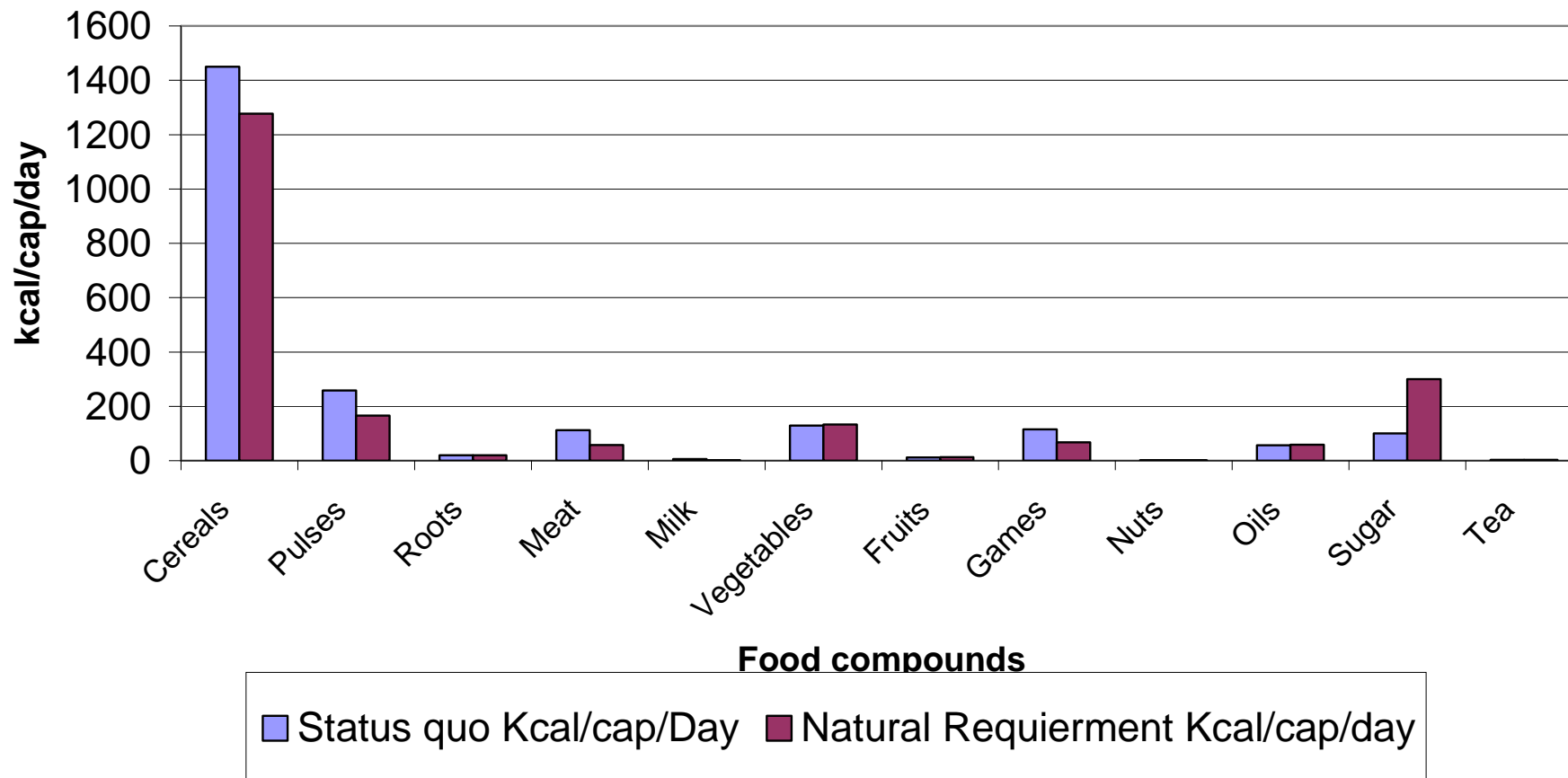


Table4. 8. Estimating of unmet food and livelihood by food items and price costs for the agro-pastoral farm household in Muglad rural area in South Kordofan.

| Food security and livelihood components | Status quo Kcal/cap/ Day | Natural requirement Kcal/cap/day | Unmet Kcal/cap/ food day |
|---|---|---|---|
| Cereals | 1352 | 947 | -405 |
| Pulses | 258 | 242 | -16 |
| Roots | 20 | 26 | 6 |
| Meat | 112 | 78 | -34 |
| Milk | 24 | 18 | -6 |
| Vegetables | 129 | 132 | 3 |
| Fruits | 12 | 11 | -1 |
| Games | 115 | 95 | -20 |
| Nuts | 2 | 42 | 40 |
| Oils | 57 | 189 | 132 |
| Sugar | 100 | 308 | 208 |
| Tea | 3 | 12 | 9 |
| Added Kcal per day per person | 2184 | 2100 | -84 |
| Food security and livelihood prices in SDG & humanitarian aid in EUR | | | |
| Status quo (SQ)food poverty line | 2.74 | | |
| Natural requirement (NR) food poverty line | | 2.63 | |
| SQ food & livelihood poverty line | 4.56 | | |
| NR food & livelihood poverty line | | 5.26 | |
| Unmet food price per capita per day | | | -0.11 |
| Unmet livelihood price per capita per day | | | 0.70 |
| Unmet food & livelihood (shelter, health and education) price per capita per day | | | 0.60 |
| Annual humanitarian Euro aid to meet food requirement per capita | | | -11.24 |
| Annual Euro humanitarian aid to meet food & livelihood per capita | | | 63.67 |

Fig 4.15

Estimating of unmet food and livelihood by food items and price costs for the agro-pastoral farm household in Muglad rural area in South Kordofan.

