Sudan University of Science and Technology

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Impact of Conflict on Livelihoods of Affected People of IDPs, Nomads and Residents in Central Darfur State during 2000 - 2015

أثر النزاع على سبل كسب العيش للمتأثرين من النازحين والرحل والمستقرين بولاية وسط دارفور في الفترة 2000-2015م

A thesis submitted for the fulfillment of the requirements of the degree of Doctor of Philosophy in Agricultural Economics

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Dedication

To the souls of my parents

To my Sons Dr. Ashraf, Abusalih, Ahmed and Mohammed

To my Daughters Eglal, Esraa, Eman and Esaad

To my beloved wives Khadega and Tayba

To my Sisters Fatima and Kaltum

I dedicate this research with my best respect

Adam Salih

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I would like to express my gratitude to my main supervisor **Prof. Hag Hamad Abdel Aziz**, for his guidance, advice, suggestions and for the invaluable and helpful comments he provided, without his help this work would not have been possible, I deeply acknowledged and appreciated his efforts. I am deeply indebted to my co-supervisor **Dr. Elrashied Elimam Elkhidir** for his patience, comments, intellectual support and many helpful ideas and discussions, which made this work presentable. Sincere thanks are due to Dr. Fayga Hussein Ballal, Dr. Khalid Siddig, Dr. Abdelateif Hassan Ibrahim, Dr Abuelgasim Abdalla Adam and Dr. Yassir Hassan Satti, I deeply appreciate the constructive ideas and support I received from them. I would like to express my gratitude to a number of institutions and individuals contributed to the successful accomplishment of this work; University of Zalingei, Sudan University of Science and Technology, University of Khartoum, Shartai Gaafar Abdulhakam Ishag, Central Darfur State governor, Azhari Alhag Adam the Speaker of Central Darfur State Legislative Council, Mohammed Musa Ahmed Central Darfur State Minister of Finance, Sobahi Kamaleddeen Central Darfur State Minister of Agriculture and Animal Resources, the staff of Ministry of Agriculture and Animal Resource who assisted me in conducting the survey, Central Darfur State Security Authorities, Central Darfur State Humanitarian Affairs Commission, Mohammed Abdalkarim Mohammed Secretary General of Central Darfur State Legislative Council, Dr. Nusraddeen Gadalla Hassan, Dr. Mohammed Ishag Haroun, Dr. Musa Adam Ismail, Prof. Dr. Thabit Ahmed Hassan, Dr. Mohammed Abdalla Teabin, Dr. Suliman Almahil Suliman, Dr. Abdul Salam Gumaa Abdul Aziz, Dr. Babiker Osman Mahgoub, Mohammed Dahab Adam, Idris Hassan Ibrahim, Abdulhameed Ibrahim Salih, Abdalla Khames Mohamed, Abdalmageed Omer Adam,

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ABSTRACT

Impact of Conflict on Livelihoods of Affected People of IDPs, Nomads and Residents in Central Darfur State during 2000 - 2015

Adam Salih Abaker Sabahelkheir

This study was aimed to evaluate the impact of conflict on livelihoods of affected people of IDPs, nomads and residents in Central Darfur State (CDS) during 2000 - 2015, to identify the livelihood strategies adopted by IDPs nomads and residents, and compare their income, assess the demographic changes and their implications and delineate the critical factors affecting income. A multi stage sampling technique was applied and 202 respondents were selected. The data collected using structured questionnaire for three time periods, (2000) period before the conflict, (2006) after the conflict, and (2012) for peace. The data analyzed using descriptive analyses to summarize the data and examine the socio-economic characteristics of the respondents, using percentages, and means. The Seemingly Unrelated Regression (SUR) model was used to delineate the relationships between household livelihood strategies and income generating activities; the dependent variable and different independent variables. The descriptive analysis results revealed that, before the conflict, about 85.6% of the respondents depend on crop production as the main livelihood strategy, diversified by livestock employment, labour, trade, income from household members share and income from secondary jobs. After the conflict Sedentary farmers became IDPs and 64% of the respondents depended on aid. New livelihood strategies emerged like tea making, charcoal and firewood collection, brick making, construction, petty trade, working with NGOs and military. In the third period, 75.2% practiced crop production, they still diversify livelihood strategies. Before the conflict, 56.4% of the respondents lived in villages,

while others lived in towns, fareegs or damras. After the conflict, the majority were IDPs. In the third period, nomads started sedentarization. Before the conflict, the highest contribution to the household total income was made by household members, crop production and livestock. Despite the importance of agriculture as a backbone of CDS economy, income from crop production and livestock was low if compared with other income sources. Other sources were, trade, secondary jobs, employment and labour. After the conflict crop production and livestock share declined. In 2012, income from crop production increased to 22%, then income from other occupations. SUR results revealed that, in pre conflict period, security and expenditure affected livelihood strategies. After the conflict, livelihood strategies were affected by insecurity, security fees and expenditure. In 2012 protection fees, university education, expenditure and production of millet affected total household income. The study recommended to: solve security issues by formulating coexistence committees, power share and wealth. Supporting crop production and livestock rearing activities by providing credit, inputs and extension services. Support IDPs by providing them with producing assets and supporting nomads by providing them with basic services.

المستخلص

أثر النزاع على سبل كسب العيش للمتأثرين من النازحين والرحل والمستقرين بولاية وسط دارفور في الفترة 2000-2015م

آدم صالح أبكر صباح الخير

تهدف هذه الدراسة إلى تقييم تأثير النزاع على سبل كسب العيش للسكان المتضررين من النازحين، البدو الرحل والمستقرين في ولاية وسط دارفور(وود) خلال الفترة من 2000-2015م، لتحديد استراتيجيات المعيشية المعتمدة للنازحيين، البدو والمستقرين، ومقارنة دخلهم، ودراسة التغيرات الديمغرافية وآثارها، وتحديد أهم العوامل التي تؤثر على الدخل. تم تطبيق تقنية معاينة الاختيار متعدد المراحل لأخذ العينات لتحديد حجم العينة والذي بلغ 202 مبحوثاً. جمعت البيانات باستخدام الإستبانة لثلاث فترات زمنية هي: (2000م) التي تمثل فترة قبل النزاع، (2006م) فترة النزاع، بينما الفترة الأخيرة (2012م) تمثل السلام. تم تحليل البيانات بإستخدام أساليب التحليل الإحصائي الوصفي لتلخيص البيانات ودراسة الخصائص الاجتماعية والاقتصادية للمبحوثين، باستخدام النسب المئوية، والمتوسطات. وتم استخدام نموذج الإنحدار غير المرتبط ظاهرياً (SUR) لتحديد العلاقة بين إستراتيجيات معيشة الأسر والأنشطة المدرة للدخل كمتغير تابع والمتغيرات المستقلة المختلفة. كشفت نتائج التحليل الوصفي بان قبل النزاع كان نحو 85.6 في المائة من المبحوثين يعتمدون على إنتاج المحاصيل كمصدر الرزق الرئيسي، مع تنويع الدخل بالاعتماد على تربية الماشية، العمل كعمال وموظفين، التجارة، الدخل من مشاركة أفراد الأسرة والدخل من الوظائف الثانوية. بعد النزاع، نزح المزارعين وبات 64% من المستطلعين يعتمدون على المعونات في كسب عيشهم، وظهرت سبل كسب عيش جديدة مثل صنع الشاي، جمع حطب الوقود والفحم، صنع الطوب، البناء، التجارة الصغيرة، العمل مع المنظمات وفي العسكرية. في الفترة الثالثة، اصبح 75.2 في المائة من

المبحوثين يمارسون إنتاج المحاصيل، مع تنويع استراتيجيات كسب الرزق. قبل النزاع، كان 56.4 في المائة من المبحوثين يعيشون في القرى، بينما يعيش آخرون في المدن، والفرقان والدوامر. بعد النزاع، اصبح الغالبية العظمى نازحين. وفي الفترة الثالثة، بدأ البدو في التوطين. قبل النزاع، كانت مساهمة دخل أفراد الأسرة هي الاعلى في دخل االأسرة ثم إنتاج المحاصيل وتربية الماشية، وبالرغم من أهمية الزراعة التي تمثل العمود الفقري لاقتصاد ولاية وسط دارفور، الا ان الدخل من إنتاج المحاصيل وتربية الماشية منخفض إذا ما قورن مع مصادر الدخل الاخرى مثل التجارة والوظائف الثانوية والعمالة. بعد النزاع انخفضت مساهمة تربية الماشية وإنتاج المحاصيل. في عام 2012، ازداد الدخل من إنتاج المحاصيل بنسبة 22 في المائة، ثم ياتي الدخل من المهن الأخرى. كشفت نتائج نموذج الإنحدار غير المرتبط ظاهرياً (SUR) بأن في فترة ما قبل النزاع، كان لعاملي الأمن والإنفاق تأثير على استراتيجيات كسب الرزق. بعد النزاع، تأثرت استراتيجيات كسب الرزق بانعدام الأمن ورسوم ونفقات التامين وفي عام 2012، تأثر دخل الأسرة بالتعليم الجامعي والإنفاق وإنتاج الدخن. أوصت الدراسة بحل القضايا الأمنية بتكوين لجان التعايش، والمشاركة في السلطة والثروة. دعم أنشطة إنتاج المحاصيل وتربية الماشية بتوفير الائتمان والمدخلات وخدمات الإرشاد. دعم النازحين بتزويدهم بالأصول المنتجة، ودعم البدو بالخدمات الأساسية.

Acronyms

ACF	Action Contre la Faim International
AEPC	Alternative Energy Promotion Centre
ALNAP	Active Learning Network for Accountability and Performance
AU	African Union
ESA	Agricultural Development Economics Division
AI	Amnesty International
CHF	Cooperative Housing Foundation
CDS	Central Darfur State
CDSIC	Central Darfur State Information Center
DAI	Development Alternatives Incorporated
DCPSF	Darfur Community Peace and Stability Fund
DFID	Department for International Development
DRC	Danish Refugee Council
EAAE	the European Association of Agricultural Economists
eJADE	electronic Journal of Agricultural and Development Economics
FAO	Food and Agriculture Organization of the United Nations
HAC	Humanitarian Affairs Commission
HHH	Household head
HHM	Household Members
HPG	Humanitarian Policy Group
HPN	Humanitarian Practice Network
HSRC	Human Science Research Council
ICG	International Crisis Group
IDP	Internally Displaced Person
IFRS	International Financial Reporting Standards
IGAD	Intergovernmental Authority on Development
IGAs	Income Generating Activities

ILO	International Labour Organization
IRIN	Integrated Regional Information Networks
JMRDP	Jebel Marra Rural Development Project
MoAAR	State Ministry of Agricultural and Animal Resources
MoANRI	State Ministry of Agriculture, Natural Resources and Irrigation
MoAF	Federal Ministry of Agriculture and Forestry
MoCA	Ministry of the cabinet affairs
NDA	National Development Agency
NGO	Non-Governmental Organization
ODI	Overseas Development Institute
PILDAT	Pakistan Institute of Legislative Development and Transparency
PIPs	Policies, Institutions and Processes
SDG	Sudanese Pound (currency)
TRF	Thomson Reuters Foundation
UN	United Nations
UNAMID	United Nations–African Union Mission in Darfur
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
UNOPS	United Nations Office for Project Services
USAID	United States Agency for International Development.
WFP	World Food Programme, UN
WES	Water, Environment and Sanitation

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CHAPTER ONE

INTRODUCTION

1.1: Background

Darfur is the western most region of Sudan and covers a vast area of 503,180 km^2, just about the size of France (WFP, 2005; WFP and FAO, 2012), or equivalent to the size of Spain (Olsson, 2010) and larger than Egypt (SudaNews, 2005). It shares international frontiers with four countries: Chad and the Central African Republic in the west, Libya in the north-west and Republic of South Sudan to the south. It borders the Sudanese states of North Kordofan and west Kordofan to the east and Northern state to the north (Morton, 1985, (Re-issued 2005, Young et al., 2005, figure (1:1)). The greater Darfur was one region with Al-Fasher being the capital. With the implementation of the federal system in 1994, the region was divided into three states, North, South and West (El-Dukheri et al., 2004). In 2012, the region was again divided and reorganized into five federal states: Central, East, North, South and West Darfur (Darfur Wikipedia; WFP, 2012/2013). Darfur lies between desert and savanna grasslands (Alix-Garcia, et al., 2012), between latitudes 9° and 20° north and longitude 16° and 30° east. It is some 650 km from north to south and 525 from east to west (Morton, 1993 and Dosa, 2015).

Darfur climate is characterized by short, mild, dry winter and long, hot, dry summer, with a rainy season of three to four months (Klugman et al., 2007; Abdul-Jalil 2008 and Desougi et al., 2016). The region comprises a mixture of climatic zones ranging from desert and semi-desert in the north, poor savannah in the middle and rich savannah in the south. (WFP & FAO, 2012).

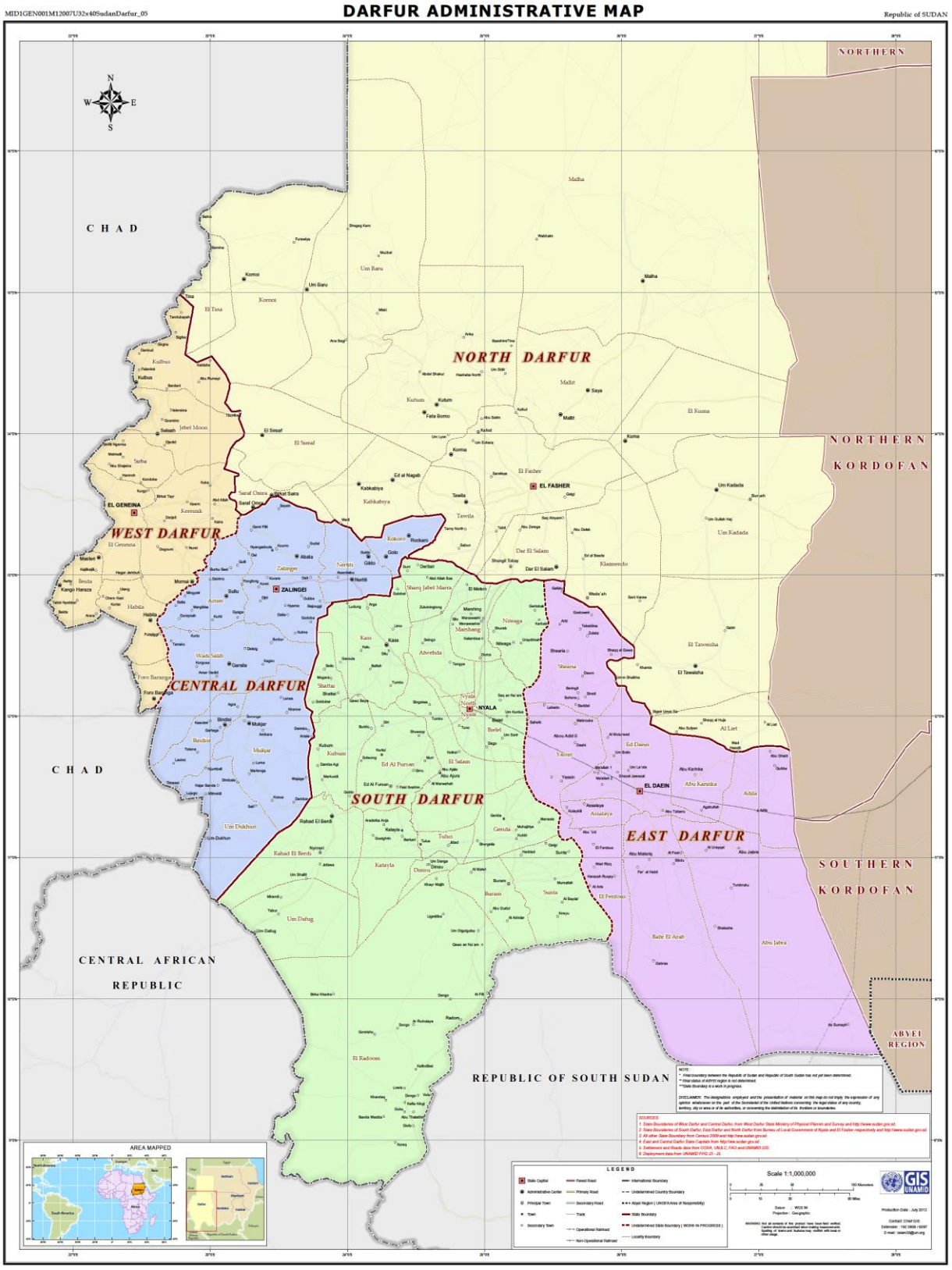

Figure 1.1: Darfur region map and geographical location
Source: UNAMID, (2012).

The Jebel Marra Mountain stands as a unique projecting plateau with cool and Mediterranean climate (Dosa, 2015). Jebel Marra constitutes a volcanic mountain range of about 115 km long and 45 km wide dominating the Midwestern part of the region, while Jebel Meidob constitutes a distinct volcanic mountain in the northeast. (Abdul-Jalil 2008).

Two main soil types exist in Darfur, namely, the sandy soils and the dark clay soils; both are suitable for cultivation. The sandy soils are mainly stabilized sand dunes known locally as *qoz* lands. Other soil types, locally known as *gardud*, a non-cracking clay soils, found in many parts of South Darfur, and the '*naga'*, a cracking clay-soil, which also exists in Southern part of Darfur region. (WFP and FAO, 2012), as well as the fertile volcanic soil in Jebel Marra area and Jebel Meidob in the north (MoAAR, 2013; CDSIC, 2015).

Darfur's total population is 7,515,445 (ICG, 2010), it is sparse and unevenly distributed (Sudan Wikipedia), and the population of the region is characterized by a rapid population growth - from 1.3 million people in 1973 to 7,515,445 in 2008. This represents an almost six-fold increase in 35 years (UN, 2010), the population density estimated to be 15.2/km^2 (Darfur Wikipedia), with some variation among different states depending on multiple of factors such as rainfall, soil type and fertility, ecological and climatic zones (Young et al., 2005), about 52% are aged 16 years or younger (Darfur Wikipedia) indicating a high dependency rate. However, population growth means more people are competing for land, which reduces the amount of land available per household (Fitzpatrick and Young, 2016). On the other hand, the increase in population density has intensified cropping and grazing, which means shorter fallow periods for fields and overgrazed rangeland (Mundt, 2011).

Before the conflict in Darfur particularly in Central Darfur the population were either living in villages and towns or following nomadic way of life, with a very few Damras and no IDP camps. After the conflict some demographic changes occurred, most of the villagers became IDPs, while nomads start to establish semi-permanent settlements (Damras). There were continuous social mixture taking place. As a result of continuous tribal and communal conflicts between Arab tribes. IDP camps had received more influxes of IDPs of Arab origin while others became refugees in Chad.

"Rural livelihoods in Darfur have gone through profound changes in the past 40 years as drought, environmental degradation, population growth and competition over natural resources have put pressure on livelihood systems and pitted livelihood groups against one another. These processes, combined with other transformative processes (including government policies and evolving tribal administrative systems) brought about major changes to livelihoods long before the current conflict and counter insurgency" (Young, 2006). Before the conflict, nearly all farmers reared livestock, while nearly all herders farmed. Most groups also supplemented their farming and livestock-rearing activities with labour migration and remittances, the collection of natural resources and trade (Young, 2005).

In 2003, Darfur conflict exploded and consequently thousands of people have been killed, hundreds of villages burned down, people became refuge in neighboring Chad and many more have left their homes and moved to more secure areas in the region (Yousif, 2009). As a result of inter-communal conflicts the state witnessed continuous influxes of IDPs, both from African and Arab origin, the general scene of Darfur was complicated.

1.2: Problem Statement

Central Darfur State witnessed a series of conflicts in the last few decades, but the most serious of all was the recent conflict flared in 2003 when rebels in Darfur region took up arms against the existing government, accusing it of neglecting the region. The government responded with a counter-insurgency campaign (TRF, 2014). While the conflict has evolved since 2003, widespread violence, massive displacement, and aerial bombardment remain dominant themes (ReliefWeb, 2013).

Darfur has undergone major demographic shifts over the last generation, UN believed that these shifts have complicated the region's ability to absorb the effects of environmental change and poor governance. The demographic shifts were chiefly visible in three areas: population growth, a youth bulge and urbanization. This causes competition to access resources, generating income and general livelihood activities (UN, 2010). The period was also characterized by widespread intertribal and intercommunal conflicts, making the security situation in the study area more complicated.

After the eruption of the recent conflict in Central Darfur, people lost their production means, assets which were used in generating income, being either looted or destroyed. Houses were burnt or abandoned. They became displaced in or around big towns. The previous livelihoods and income generating activities were either not available or risky. New livelihood strategies and economies came into existence and the total livelihoods became vulnerable and under threat.

The different livelihood groups living in the area including, IDPs, nomadic pastoralists, agro pastoralists and residents, were assumed to be affected by the conflict depending on their livelihood opportunities and security. WFP (2006) claimed that, security was clearly the main constraint facing both the

residents and the IDPs to conduct their usual livelihood activities, including food production and other income earning activities. It was believed that, the presence of large numbers of IDPs was putting a serious strain on the availability of land, grazing areas, water for animals and humans and the labour market. This might affect the livelihood strategies and income generating activities of the different livelihood groups living in the study area. Accordingly, this study evaluates the impact of conflict on livelihoods of affected people of IDPs, nomads and residents in Central Darfur State during 2000-2015.

1.3 Objectives of the research

1.3.1 Main objective

The overall objective of this study is to evaluate the impact of conflict on livelihoods of affected people of IDPs, nomads and residents in Central Darfur State during 2000-2015 with emphasis on income generating activities.

1.3.2 Specific Objectives

The study aims to achieve the following specific objectives:

1. To identify and compare the household livelihood strategies adopted by IDPs nomads and residents to diversify sources of household income in CDS
2. To assess household residence and demographic changes and their implications on livelihood strategies of IDPs nomads and residents
3. To compare the income of livelihood groups of different time periods.
4. To delineate the critical factors affecting the income of different groups

1.4 Research Hypotheses

Based on the problem stated and the objectives set out above, the following hypotheses were formulated:

1. Livelihood groups of IDPs, nomads and residents adopt different livelihood strategies to diversify their sources of household income in CDS.
2. Household residence and demographic changes has an effect on livelihood strategies of IDPs nomads and residents.
3. Income of livelihood groups of IDPs, nomads and residents differ during different time periods.
4. Conflict is the main factor affecting the livelihoods and income of different groups.

1.5 Organization of the study

The study is structured into five chapters as follows: Chapter one includes introduction giving background information. Chapter two reviews the literature on livelihoods and income generating activities (IGAs), definition of their main concepts and the impact of conflict on livelihoods and income generating activities as well as previous studies on livelihoods, IGAs and Seemingly Unrelated Regression model. Chapter three presents area of the study and research strategies and methods. Chapter four is mainly concerned with the results and discussion of descriptive statistics and Seemingly Unrelated Regression model analysis. Chapter five present summary, conclusions and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.0 DEFINITION OF THE BASIC CONCEPTS

2.1 Introduction

When doing a scientific research, reviewing of previous literature and research findings on the domain builds a basis to investigate the main concepts of the subject under study, thus putting the researcher on the right track; it reveals what has been written about the topic and provides an up-to-date understanding of the subject the researcher wishes to investigate. Therefore, theoretical and empirical literature is constructed to establish the conceptual framework. Following this, this chapter reviews the literature on income generating activities and concentrates mainly on concepts of livelihoods, income, and activities that generate income, and later examine the impact of the recent Darfur conflict on both the people's livelihoods and their income generating activities in Central Darfur state. Livelihoods and income generation are closely related, yet, they are not synonymous, they are nevertheless inseparably connected, because income at a given point of time is the most direct and measurable outcome of the livelihood process (Ellis, 2000 and Schwarze, 2004). Livelihood is more than income, it refers to earnings in cash and in kind and also encompasses social institutions, gender relations and property rights (Ellis, 1998). Livelihoods are always more than just a matter of finding or making shelter, transacting money and preparing food to put on the table or exchange in the market place. It is equally a matter of the ownership and circulation of information, the management of social relationships, the affirmation of personal significance and group identity and the interrelation of each of these tasks to the other.

All these productive tasks together constitute a livelihood (Basavaraj, 2008), although, income generating activities are frequently based upon livelihood-oriented data collection and analysis (DRC, 2008). Therefore, income generating activities are considered components of sustainable livelihoods.

2.1 Livelihoods

2.2.1 Definition of livelihoods

Most researchers while talking about livelihoods and income generating activities, they devote their studies mainly to rural community because they are more vulnerable to unstable income generation, food insecurity and poverty. In Central Darfur State, all the population had been affected by the conflict, and therefore the whole community is considered vulnerable and conflict affected, livelihoods and income generating activities are for all segments of the population whether they are nomad, rural or urban.

There are various definitions to the concept of livelihoods, but the most adopted one is the early definition made by Chambers and Conway (1992). To their view: a livelihood comprises the capabilities, assets (stores, resources, claims, and access) and activities required for a means of living. A livelihood is sustainable when it can cope with or recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels in the short as well as in the long run.

Ellis (2000) adapted the above Chambers and Conway definition with some modification; he defined a livelihood as comprising "the assets (natural, physical, human, financial and social capital), the activities and the access to these (mediated by institutions and social relations) that together determine the living gained by an individual or household.

On the other hand, according to Young et al. (2005), livelihoods comprise the ways in which people access and mobilize resources that enable them to pursue goals necessary for their survival and longer-term well-being, and thereby reduce the vulnerability created and exacerbated by conflict. Moreover, ACF (2010) think that, a livelihood comprises the capabilities, comprised of assets and strategies used by a household for means of living. It is possible to enjoy a secure livelihood for a household, if it can cope with and recover from stresses and shocks and maintain or enhance its capabilities and productive asset base.

2.2.2 Livelihood framework

The analytical tool to be used for investigating livelihoods which is adapted by Young et al (2005) in their study 'Darfur: livelihoods under siege'. However, in this study 1 used this framework to establish a good understanding of the components of the livelihoods framework and their relationship to income generating activities, therefore we might not take further deep analysis of the framework.

The adopted framework is based on the UK Government's Department for International Development (DFID)'s Sustainable Livelihoods Framework and the Collinson framework. A diagram of the adapted livelihoods framework is shown in Figure 2.1.

Serrat, (2010), argues that SLA improves understanding of the livelihoods of the poor. It organizes the factors that constrain or enhance livelihood opportunities and shows how they relate. It can help plan development activities and assess the contribution that existing activities have made to sustaining livelihoods.

However, livelihood decisions include how resources are used, what one wants to achieve with what one has, and how one will collaborate, or compete, with others to achieve these goals (Bromwich, 2014).

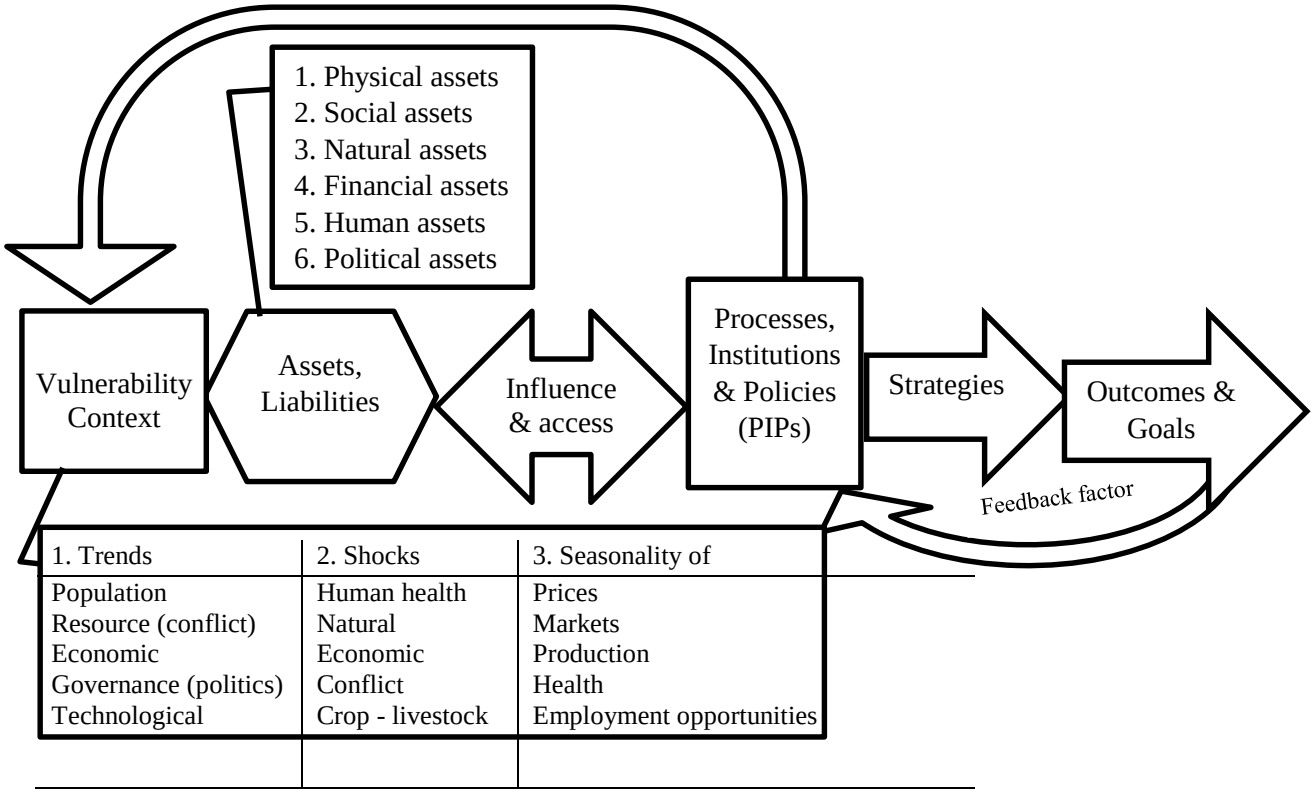

Figure 2.1: Humanitarian livelihoods framework.
Source: Adapted from (DFID 1999; Young et al 2005)

2.2.3 Main Factors and Elements of Livelihoods framework

2.2.3.1 Vulnerability context

The vulnerability context within which people pursue their livelihoods includes (1) trends such as economic or resource trends; (2) shocks such as conflict, economic or natural shocks; (3) seasonal fluctuations, includes changes in prices, production, health, employment opportunities. These factors can have a direct impact on people's assets and on the options available to them to pursue livelihood strategies (Alinovi et al, 2010). However, the vulnerability context frames the external environment in which people exist. People's livelihoods and the wider availability of assets are fundamentally affected by critical trends (e.g. resources demographic, environmental, economic, governance, and technological trends) as well as by shocks (e.g. conflict, illnesses, floods, storms, droughts, pests, diseases) and seasonality (e.g. price fluctuations, employment opportunities), over which people have limited or no control (DFID, 1999 and Serrat, 2010).

The degree of vulnerability for an individual, a household, or a group of people is determined by its exposure to risk factors and by its aptitude to confront crisis situations and to survive them (ACF, 2010).

2.2.3.2 Livelihood resources or assets

These are assets or resources available to households and they may be either directly owned or otherwise accessed (Young, et al., 2005). Livelihood assets determine both the resilience and vulnerability of people's livelihoods (Smith et al, 2006). They encompass what people have, i.e. human, social, natural, physical and financial resources. These asset categories are interlinked. No single category on its own is sufficient to yield all the many and varied livelihood outcomes that people seek. Therefore, people require a range of assets to achieve positive livelihood outcomes (FAO, 2007).

Some assets are described as accumulated wealth and reserved for times of need, while others are defined as productive assets used to generate outcomes (Fitzpatrick et al, 2015).

Livelihood resources are divided into tangible and intangible. Stores and resources are tangible assets. Stores include food, cash, credits and other valuables while resources include land, livestock farm equipment and other tools. Claims and access are intangible assets. Claims are demands and appeals that people can make on relatives, friends, communities, government or other agencies during adverse situations (Malual, 2008). However, it is worth mentioning that political asset is also incorporated to livelihood assets as proxy to power and influence.

2.2.3.3 Policies, institutions and processes (PIPs)

Policies, institutions and processes refer to the complex social, economic and political context within which people pursue their livelihood strategies. They can have a great influence on access to assets - creating them, determining access, and influencing rates of asset accumulation (Alinovi et al, 2010). Policies, institutions and processes are sometimes called transforming structures and processes (Sheheli, 2012); they are an important set of man-made external factors that shape the options that people have in achieving their livelihood goals. They influence access to assets and vulnerability to shocks and operate at all levels from the local to the international level and in all spheres from the most private to the most public (FAO, 2007).

1. Policies:

Policies can be instrumental in increasing or decreasing vulnerability to disasters. At international level, structural adjustment programmes often make it difficult for countries to support the development of local enterprise by preventing subsidies. The agricultural subsidies of western countries and

international trade rules undermine the production and export of agricultural products from developing countries (FAO, 2007).

2. Institutions:

Institutions include civic, political and economic institutions whether formal or informal governance, or any other customs, rules or common law that is an important feature of society (Smith et al, 2006). They influence the natural access to many of the capitals (assets) as well as peoples' opportunities and choices. They can help govern social relations and power structures at many scales (Morse et al, 2013).

3. Processes:

Processes include the laws, regulations, policies, operational arrangements, agreements, societal norms, and practices determining the way in which structures operate. Processes are important to every aspect of livelihoods. They provide incentives that stimulate people to make better choices. They grant or deny access to assets. They enable people to transform one type of asset into another through markets. They have a strong influence on interpersonal relations (Serrat, 2010).

2.2.3.4 Livelihood outcomes or goals

Livelihood outcome are what household members achieve through their livelihood strategies. The more choice and flexibility that people have in their livelihood strategies, the greater their ability to withstand or adapt to the shocks and stresses of the Vulnerability Context (DFID, 1999). However, Alinovi et al. (2010), mentioned some examples of livelihood outcomes such as increased income, reduced vulnerability, increased well-being, improved food security, and more sustainable use of natural resources. Furthermore, they remarked that, livelihoods outcomes are important because they help the analyst to understand the results of peoples' livelihoods strategies in a particular context, why people pursue particular strategies and what their

priorities are, and how people are likely to respond to new opportunities or constraints. Gidi (2013) categorized livelihood outcomes as:

- ❖ Economic outcome: Food and income security, i.e. the ability to acquire sufficient food and income to meet basic needs is an economic outcome.
- ❖ Biological outcomes: Mortality and malnutrition rates or levels are basically biological measures of livelihood outcome.
- ❖ Social outcomes: It is clearly a social measure and as such is hard to quantify. The right to life with dignity is one of the fundamental principles in the Humanitarian Charter but in the rush to respond to emergencies, people's dignity is often forgotten.

2.2.3.5 Livelihood strategies

Livelihood strategies are "the range and combination of activities that people choose to undertake in order to achieve their livelihood goals; they include productive activities, investment strategies and reproductive choices. A major influence on people's choice of livelihoods strategies is their access to assets and the PIPs that affect their ability to use these assets in order to achieve positive livelihoods, develop and pursue different livelihood strategy outcomes (Alinovi et al, 2010 and Gidi, 2013). Livelihood strategies are activities and choices that people normally make or undertake in stable and peaceful times in order to achieve their livelihood goals. The more choice and flexibility that people have in their livelihood strategies, the greater their ability to withstand or adapt to the shocks

Coping strategies or coping mechanisms as some time called, are short-term responses to threats to livelihoods (FAO and ILO, 2009). They are temporary responses undertaken by affected people to reduce or minimize effects of a stressful event or an unfavorable situation, access is abnormally disrupted, for instance by drought, flood, earthquake or military activity (ACF, 2010).

2.3 Income generating activities (IGAs)

2.3.1 Definition of income

According to the Cambridge Advanced Learner's Dictionary - 3rd Edition (CALD3), (2008) income is defined as money that is earned from doing work or received from investments. Additionally, Barrett et al. (2000) defined income as cash or in kind cash-equivalent yield from a household's assets. It is the end result of the transfers and capital gains garnered from nonproductive assets and the returns from the allocation of productive assets to particular activities. Moreover, Ellis, (2000) defined income as the output of activities, which measures both cash and in-kind contributions. All goods and services produced in activities are valued at market producer prices regardless of their use.

2.3.2 Income classification

Several different methods and approaches exist in the literature that characterize and classify household income sources and disaggregation. Barrett et al. (2000) argued that incomes are typically classified by their source. but the language used can be confusing. The terms; off-farm; non-farm; non-agricultural; non-traditional; etc. appears routinely and in seemingly synonymous ways. To clarify this confusion, ambiguity and variability in income classification, some of these classifications are illustrated below:

Carletto et al. (2007) defined two broad categories of income which are:
(1) Wage income: includes all activities undertaken by persons in which the income received is in the form of a wage paid out by an employer, here the income includes earnings from dependent activities.

(2) Non-wage income: this is a broader category and includes household crop and livestock production, self-employment earnings, transfer income and other non-labor income sources.

Income is also classified into seven basic categories: (1) Crop production; (2) Livestock production; (3) Agricultural wage employment; (4) Non-agricultural wage employment; (5) Non-agricultural self-employment; (6) Transfers; and (7) Other non-labour activities (Davis et al, 2010 and Valdés, et al, 2009). The first three categories make up agricultural activities and the latter are non-agricultural activities (Davis, et al, 2010 and Mabugu et al, 2013). Nevertheless, Valdés, et al, (2009) made further income aggregation in a different way into: (1) off-farm activities: including the sum of agricultural wages, non-farm income, transfers and others; (2) Non-agricultural activities: including the sum of the non-farm and transfers and other categories; (3) Agricultural activities: include the sum of on-farm and agricultural wages.

Moreover, Barrett et al. (2000) classified income into three categories depending on its composition as follows: (1) Sectoral composition: The basic classification of activities is the sectoral distinction common to national accounting systems: primary (agriculture and mining and other extractive), secondary (manufacturing), and tertiary (services). (2) Functional composition: Functional distinction: in this category income is classified into wage-employment income and self-employment income and (3) Spatial composition: With two broad categories: (a) Local spatial income: this category may either be at-home activity or away-from-home activity, when it is away from home, the activity may be at countryside or (strictly rural), or nearby rural town, or intermediate city and (b) Distant away from home spatial activity or migratory: this may be in country rural activity, in-country urban activity or foreign activity.

For the purpose of this research, the total household income will be derived from several activities and all sources of income reported by the household, accordingly, the income generating activities proposed in this study can be broken down into eight categories:

- ❖ Income from crop production activities: this category includes income generated from cultivating different agricultural crops both rain-fed and irrigated. Quantities of crops produced are valued at market price and involved in the formation of total household income.
- ❖ Income from raising livestock activities: it includes income generated from rearing cattle and other animals for milk and meat to generate income and supplement diet.
- ❖ Income from employment activities: This includes income gained from salaries, allowances, gratuity, and benefits in-kind and all other forms of remuneration or compensation for the employment. This kind of income is usually paid by an employer to an employee as reimbursement for work carried out during the reference period of the payments. Members of this group are more educated, receive higher income than labors do and comparatively enjoy higher social class. Parietti, (2015) calls members of this group white collar workers.
- ❖ Income from labour activities: members of this group include household's members with less education opportunities, and therefore undertake hard jobs and receive less income than the white collar workers
- ❖ Income from trade activities: this group includes household heads of both male and female sexes engaged in an economic activity of exchanging goods and services either locally with nearby villages and towns (Umdawerwer) or with Khartoum or neighboring states or even with neighboring countries.
- ❖ Income from purchasing food and nonfood aid activities: this category comprises mainly of IDPs or others who depend on food relief provided by

different institutions, such as NGOs and Zakat Chamber. Rations given to IDPs are valued at market price; the monetary income generated is then added to the household total income as contribution of this category.

- ❖ Income from additional or secondary activities: this category includes all activities undertaken by household head except the main economic activity that generates the income, it be source of family food security.
- ❖ Income from household members' share; this includes the household members' contribution to the total income from different activities.

2.3.3 Introduction to income generating activities

In recent years in economic and social science literature, income generating activities accepted considerably increasing importance in household's livelihoods strategies, although there is no convention in IGAs definition. Therefore, there exists some variation in the concept and definition of income generating activities. It can be viewed and defined in many ways and angles depending on the purpose of the project, researcher, program, or organization; and thus the notion of IGA is viewed differently depending on the situation under study, sometimes the concept is confusing. How it might be viewed if addressing emergency situation as a result of conflict or crisis? how can we view IGAs if dealing with an ordinary situation, are IGAs a matter of institutional intervention in order to provide job opportunities to alleviate poverty? is it a household livelihood strategy adopted in normal circumstances, or even a household coping strategy for affected people to scape adverse conditions resulted from emergency due to crisis or conflict?

In this context, some researchers used the term interchangeably to refer to how people respond to their circumstances, including livelihood strategies; household coping, adaptive or survival strategies and income generating or income earning activities (Thennakoon, 2001). However, in this study

livelihood strategies, income earning activities and income generating activities were used to mean the same thing.

IGAs contribute to poverty reduction; improving the wellbeing of the communities, empowerment, self-reliance and community development. IGAs need to focus on transferring practical skills focused on building and expanding existing knowledge and resources. (Mabugu et al, 2013). In this study, the term income generating activities will be used to refer to the above mentioned terminologies, the income generating activities proposed in this study can be broken down into eight categories which are mentioned earlier.

2.3.4 Definition of income generating activities

Income generation takes many forms, but originally, it was a term used only by economists to explain the intricacies of a nation's economy. However, it is now quite widely used to cover a range of productive activities by people in the community. Thus, income generation simply means gaining or increasing income (Basavaraj, 2008). Income generating activities are those economic activities that allow individuals and groups to employ input; labour, land and capital for positive returns (Egyir, 2007).

Moreover, AEPC, (2014) defined IGA as an economic activity, which provides partial to full employment to the engaged households. Engaged people for IGA should work for monetary benefit and not only for their household consumption and they should have willingness to take risks. (Mukasa and Abura, 2013) think that, different alternative income generating activities were proposed to supplement income, diversify sources of income and provide food. For the purpose of this study, income-generating activities will consider the above definitions, but more or less any activity from which can incur income directly or indirectly using assets or

capital, it is an IGA and not just a coping strategy used during adverse circumstance. It is more comprehensive and diversified notion.

2.4 Assets

There are various definitions to assets, but more or less they are telling the same story, therefore following are some definitions:

Assets are defined as: resources controlled by the entity as a result of a past event from which future economic benefits are expected to flow to the entity (IFRS Foundation, 2012). At the household level assets are resources available to households, which may be either directly owned or otherwise accessed (Young et al, 2005). Barrett et al. (2000) defined assets as stocks of directly or indirectly productive factors that produce a stream of cash or in-kind returns or what economic theorists typically call "endowments".

Barrett, et al., (2001) described some assets owned by individuals as: (1) non-productive assets, such as household valuables which generate income directly. (2) productive assets, such as human capital, land, livestock, they generate income only indirectly through their allocation to activities such as farming, weaving or commerce.

2.4.1 Classification of Assets

Assets were mentioned under livelihoods. They are crucial to household income generation and livelihoods, therefore, more stress on them is necessary and thus more details are needed to clarify their importance. In literature, various classifications of assets can be found, for example Ellis (2000), Schwarze (2004), FAO (2007) and Friis et al. (2011), distinguished five assets that may be available to households or individuals, these assets are the bases for the household ability to participate in activities to generate income, they are:

2.4.1.1 Human assets

Human assets represent the skills, knowledge, education, ability to work and good health that enable people to pursue different livelihood strategies and achieve their livelihood objectives.

2.4.1.2 Social assets

Social assets refer to status in society, as well as access to an extended family and other social networks. It also includes relationships of trust and reciprocity that facilitate co-operation, reduce transaction costs and can provide the basis for informal safety nets amongst poor people.

2.4.1.3 Natural assets

They comprise natural resource stocks, which people can access and use to build livelihoods, and generate income e.g. land, forests, and water resources.

2.4.1.4 Physical assets

They include livestock, land, shelter, tools, equipment but may also be community-owned, e.g. road infrastructure.

2.4.1.5 Financial assets

They include income but also access to credit and investments. They may include available stocks which can be held in several forms, e.g. cash, bank deposits, livestock and jewellery. They may also include regular inflows of cash including pensions and remittances.

2.4.1.6 Political assets

They are appropriate in the context of conflict (Young et al, 2005); and can be interpreted as proximity to power (Smith et al, 2006). Political assets enable households to influence policy and the processes of government and claim rights to assistance after a disaster (FAO and ILO, 2009), such as awareness of elections, respondents the rights, participate in elections, and

attend all meetings in village, became a member and involvements in the political party and the structure of relationships that govern the access present in the community by the households (Sreekumaran, 2009).

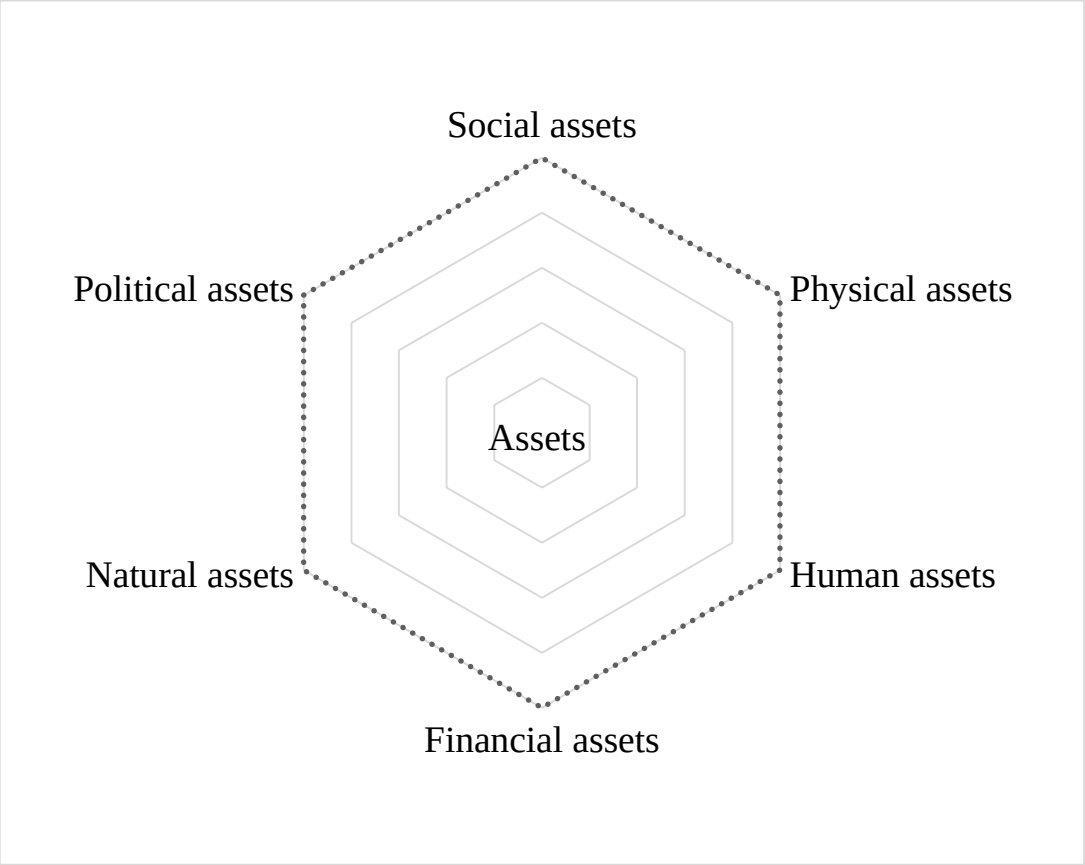

Figure 2.2: Classification of Assets
Source: Longley et al, (2003); Young, et al., (2009); and Friis et al, (2011).

2.5 Activities:

Activities are the particular uses to which productive assets are put. All activities that generate income flows; such as livestock can be allocated to crop production in form of plowing and manuring or as mean of transportation or milk production, or for calf breeding. Land can be allocated to crop production, livestock production, manufacturing, commerce, or services (Barrett et al. (2000). The activities of rural (or urban) households, their degree of specialization or diversification and most importantly the incomes that they can derive from their activities, depend on the assets

available to them **(**Valdés, et al, 2009). Activities use productive assets, often a combination of multiple complementary assets to generate incomes. Activities are a convenient intermediate measure; the means by which productive assets and incomes are linked (Barrett et al., 2000).

2.6 Livelihoods and IGAs in Central Darfur:

De Waal (1984 -1985) conducted a research on Darfur, where he described the livelihoods of the people; the great majority of the population were farmers, though most households also engage in off-farm income-generating activities and own livestock, including camels, cattle, sheep, goats and donkeys. Large herds of cattle and camels are herded on a semi-nomadic basis. The pastoralists eat chiefly millet and sorghum; they keep animals primarily to sell for grain, only secondarily to supply milk and meat.

So for, although the situation was changed, the economy of Darfur region is still heavily based on farming and livestock keeping, with more than 70 percent of the population relying on traditional subsistence agriculture and livestock. The majority of which are dependent on rain fed agriculture and natural grazing (FAO, UNOPS & ILO, 2016). It forms the region's social and political foundation (Osman, et al., 2013), Central Darfur State is an agrarian State, it is known by its agricultural potentiality and therefore the population rely essentially on rain-fed subsistent production system and livestock raising to generate income and for their livelihoods. This was emphasized by WFP, (2012-2013) when stated that most households in Darfur region depend on crop production and livestock rearing for their livelihoods. Traditional rain-fed agriculture is the dominant seasonal farming activity across the region. Millet is the main staple food cultivated in the northern and eastern parts of the region while sorghum is cultivated in the south and in the lowlands (*wadi*).

A research carried out by Fitzpatrick et al. (2016) focused on two predominant and preferred livelihood activities are rain-fed cultivation and raising livestock. They assured that usually households are engaged in both and specialize in one. However, by cultivating, pastoralists reduce their need to sell livestock during good years, allowing their herds to multiply faster, aiming to have sufficient stores to feed the household for two to three years. Therefore, both livelihoods have unique strategies for building resilience.

Generally, in Darfur and particularly in central Darfur, most traditional livelihoods are a direct function of the environment. Environmental resources are livelihood assets, both for sedentary and pastoralist communities, so the distribution of resources and the efficiency with which they are managed are key to understanding Darfur's demography, economy and the resource-based dimension of the conflict (Tearfund, 2007).

It is observed that, agricultural production, even during normal times, is highly volatile and crop yields have remained low and unpredictable due to erratic rainfall, pest infestations and the lack of appropriate agricultural implements. Livestock has also dwindled due to pasture and water scarcity. The local labour force has continued to migrate to urban centers and mechanized schemes in central Sudan to search employment (WFP, 2005).

It is worth mentioning that in Central Darfur State, women play a crucial role in the household economy and livelihoods. They were the main food producers, through undertaking agricultural activates, they produce cash crops and engaged in livestock rearing activates and contribute to household income generating as well as doing household every day activities.

It was stated earlier that, a key feature of livelihoods in Darfur is the mix of farming and herding strategies for most households (WFP, 2005).

Moreover, prior to the conflict, households in the study area diversify their livelihood strategies and they were able to generate income from applying a

variety of activities given the appropriate assets and resources. Besides the agro-based IGAs, households in CDS could derive their income from engaging in trading, employment, petty trade, migration, charcoal collection, firewood collection and wild food collection.

2.7 Conflict

2.7.1 Definition of conflict

Conflict is defined as a disagreement that lead to tension among people on an issue; it can be small between two people or large and complex as among two or more countries **(**PILDAT, 2009 and Bjarne et al, 2011). Or it may be defined as a situation in which two or more parties strive to acquire the same scarce resources at the same time (Niklas, et al., 2005). Yet, several studies indicate that internal armed conflict breeds conflict and creates conditions that increase the chances of conflict breaking out again (Havard, et al, 2011). Conflict escalates when allowed to develop without intervention or when the parties involved fuel the conflict; it often happens that the conflict evolves in a negative way. As the conflict escalates one resorts to personifications, accusations, destructive actions or worse (Bjarne et al, 2011).

2.7.2 Potential targets and victims during conflict

Internal conflict may entail large asset losses for certain segments of the civilian population. During internal conflict, the main victims of war are civilians, who are targeted by armed groups seeking to consolidate territorial strongholds, expand territorial control, and seize valuable resources. However, physical assets are destroyed, abandoned or seized illegally by armed groups and financial markets may be disrupted by war activities, access for particular households may become difficult; and informal risk sharing mechanism are generally undermined. Therefore, losses of physical, financial, social and human capital are substantial (Ibáñez, and Moya, 2009).

Looting or overall devastation generate the destruction of public and private capital, and assets thereby decreasing the productive capacity of firms and households. Moreover, conflict imposes costs beyond destruction, violence increases uncertainty and risks, non-state actors may impose governance structures in the regions they control by enforcing rules of conduct, taxing households and production, obliging households to grow certain crops (i.e. illegal crops), or favoring some groups over others (Arias et al., 2013).

This was the case in some parts of greater Darfur such as Jebel Marra area in Central Darfur State, or along the way from Algenena, Zalingei, Nyala to Alfashir, where the unauthorized illegal check points were set by pro-government forces, or rebel groups throughout main roads, where they charge taxes on passing cars. Moreover, another kind of imposed governance structures in the study area emerged; repeatedly, different armed groups mainly guerrilla, paramilitary or government backed forces, kidnapped civilians and request ransom in order to free them or keep them alive. Thus, these activities became income generating activities for the groups involved within the areas where they have control on. In such situations, assets losses may compromise the future welfare of households by contributing to the generating of income and acting as insurance mechanisms. Assets are important determinants of the present and future welfare of households (Ibáñez and Moya, 2009).

2.7.3 Conflict in Central Darfur State

The roots of the current conflict dated back to the nineteenth century or even earlier (Young, et al., 2006). But the most recent major conflict in Darfur is usually described as having been initiated in February 2003 when two rebellion movements namely Sudan Liberation Army/ Movement (SLA/M) and Justice and Equality Movement (JEM) launched an insurgent against the government claiming for equal power and wealth sharing in the region. They

announced their opposition to the government in Khartoum and soon started attacking government outposts in the area (Olsson, 2010 and Satti, 2015).
But more specifically, Central Darfur state was the start point of Darfur conflict, where SLA/M first declared opposition after two successive events: first; a police station in Golo; the capital of Central Jebel Marra Locality (created recently) has been attacked by the rebel groups in 2002. Second; two months later, Thour village attacks followed in West Jebel Marra Locality, the village is located on the main paved road between Nyrtete and Kas Town. After attacking targets in Golo and Thour, SLM/A left a leaflet declaring the birth of their movement, but under Darfur Liberation Front (DLF). Later they changed the name to SLM/A (Khames, 2017).
After a period of confusion, the government mobilized a militia of loyal Arab tribes; the Janjaweed and assisted them in a massive counter-insurgency campaign (Olsson, 2010).

Consequently, the results were destructive in Central Darfur State. The conflict had an impact on a large proportion of the population, many people were forced to leave their homes, lands and livelihoods as a result of the conflict and become IDPs or refigures and household assets that generate income were seriously eroded either by looting or by direct intentional destruction. Urban areas were less affected by the armed conflict and its consequences of displacement than rural areas, although they became hosting communities and suffered sharing the limited services with new comers and insecurity situation due to presence of large amounts of population in one place.

The nature of the conflict has changed considerably. In 2003–2004, it was characterized by violent attacks, destruction and large-scale displacement (Jaspars et al 2010). At the onset of the conflict in Central Darfur, nearly all villages in the lowlands were displaced, except headquarters of the localities

of the state and some administration units but some of the dwellers were paying protection fees to stay and undertake income generating activities and other livelihood activities. On the other hand, nomads and pastoralists were also affected by the unstable situation, to cope with the situation, some of them joined military and became pro government forces, while others either dodging the rebels to save lives and livestock, or left to neighboring countries for the same reason.

Most villages in upper lands in Jebel Marra area were still present except for those displaced to Nyrtete, but some of the remaining villages became under rebels control where they impose taxes on the people. Therefore, people are capable to carry out their income generating activities, namely working in farms; cultivating cereal crops, tomato, potato or manage citrus orchards.

The conflict in Darfur continues and despite a decrease in intensity of organized fighting between the government and the armed groups, violence continues at the community level (Goffey, 2012).

Darfuri communities have a long history of safeguarding the rule of law and solving community- level conflict through negotiation and mediation. Conflict has eroded these community institutions, but the foundation for peace is there (DCPSF, 2015).

2.7.4 Levels of the conflict in Darfur

The conflict in Darfur region (including Central Darfur State) can be understood as having three levels: (1) local level conflict between tribal groups in which natural resources are significant (2) national level conflict between rebel groups and the ruling government of Sudan (3) international or regional level conflict in which regional dynamics are prevalent (Bromwich, 2014).

On the other hand, the "*Darfur - Four Conflicts in One*" is the terminology coined by Brosché, (2015) in indication to four levels of Darfur conflicts, explaining the different actors working within each category which can be illustrated as:

1. Local Communal Conflicts: Both between nomads and farmers, and between nomads and nomads.
2. Conflicts between Local Elites: Rebel groups split and fight against each other, traditional leaders versus new leaders.
3. Centre against periphery conflict: Darfur is very marginalized and has been so for a long time, one of the main reason for SLM/A and JEM taking up weapons against the government in 2003.
4. Cross-border Conflict (Chad-Sudan …etc.)

Bromwich, (2014) further summarized the suggested three levels model of conflict and conflict resolution in Darfur in table: (2.1) below:

Table 2.1: Three levels model of conflict and conflict resolution in Darfur

Level of conflict	Actor engaged	Reconciliation process
Regional conflict / tension	- Republic of Central Africa, Chad, Libya, South Sudan, Uganda	- Bilateral international relation, AU, UN, IGAD
National conflict	- Government of Sudan - Rebel Movements - Militia	- Darfur Peace Agreement 2008 - Doha Document for Peace in Darfur 2011 - UN / AU Political Affairs
Local conflict	- Tribal groups - Militia	- Local reconciliation processes - Darfur Internal Dialogue and Consultation - UNAMID Civil Affairs - Others

Source: Bromwich (2014).

2.7.5 Causes of Darfur conflict

The current conflict erupted in Central Darfur State in 2003; armed movement against the existing regime. It was found to be the most serious of all conflict the region ever experienced. Consequently, assets lost, lives and livelihoods became targets for conflicting parties mainly in rural areas and a mass displacement and influx of people occurred, both internally in Darfur or all over Sudan, or externally in the neighboring countries mainly the Republic of Chad, Southern Sudan and the Central African Republic. Scholars and researchers made substantial endeavor to explore and uncover the root causes of the current conflict in Darfur region in general and Central Darfur in particular from their different perspectives.

The causes of the current conflict cannot be easily traced to one factor; there are many factors that led to the current conflict (Satti, 2014), but the key causes are the economic and political marginalization of Darfur by the central government (UNDP, 2007) as well as conflict that arise over shrinking resources, primarily land, water, and grazing (Tubiana, et al, 2012). Another explanation for the origins and causes of the present conflict, involves the land disputes between semi-nomadic livestock herders and those who practice sedentary agriculture. Water access has also been identified as a major source of the conflict (War in Darfur Wikipedia, 2017), i.e. natural resources based conflict. But this opinion does not show the other face of the coin. Moreover, Morton, (2008) put emphasis on competition over natural resources, stresses on land as important, even the most important driver of conflict in Sudan, especially in Darfur, and he further suggests reforms which will include the registration of rural land to secure the rights of rural people and modernized customary land administration institutions which should be community-based rather than simply grounded in tradition.

In Darfur region, (without exception to Central Darfur), no part of the region can be said to be ethnically homogenous and there has traditionally been a degree of movement and inter-marriage between these groups and social classes resulting in a blurring of ethnic distinctions. Nonetheless, in recent years, tension in the region has assumed an increasingly ethnic and racist dimension with population groups defining themselves as Arab or Zurqa (black) (Youngs, 2004).

The current conflict has its origins in decades of economic and political marginalization and tension over increasingly scarce farmland and water resources. Prolonged drought and desertification in northern Darfur pushed nomadic groups south where they came into conflict over water resources with the farming tribes of the center. An influx of modern weaponry in recent decades has increased the loss of life in these disputes. Youngs (2004) and Wesley (2008) stated that the ongoing conflict in Darfur is an incredibly complex one with numerous contributing causes, including ethnic and religious tensions, local and global politics, and complex historical factors. As a result of the complexity and number of contributing factors, identifying a solution for the current conflict in Darfur is a daunting task, if not an impossible one, and no "easy fixes" are immediately obvious. Furthermore, Young, et al., (2006) noted that the roots of the current conflict dated back to the nineteenth century or even earlier. Thus they explained that these historical factors are intricate and intertwined, and continue to influence the current context in a series of dynamic and shifting inter-relationships. They gave some detailed causal factors of the current conflict that may be suitable to be mentioned which include:

2.7.5.1 Economic and political marginalization:

Perceived inequalities have stimulated resentment among Darfuris towards the central Government authorities. Over time, this developed into armed

resistance that sparked the current hostilities and humanitarian crisis. On the local level, the economic and political marginalization of Darfur lead to weakened social institutions and failed economic development interventions by the Government of Sudan (GoS).

2.7.5.2 Environmental, demographic and ecological effects:

Including erratic rainfall, drought, and sporadic but severe famine episodes have led to massive pressures on ever increasing populations. These pressures triggered social and resource-based conflict within Darfur and leading to increased localized insecurity and ethnic rivalries setting the stage for the current crisis.

2.7.5.3 Ethnic conflicts and government inaction or partial support:

The 1984/85 drought and region-wide famine affected farmers and herders. This period was shortly followed by the Fur Arab tribal conflict in the late eighties which played out particularly in the Jebel Marra, Zalingei area.

2.7.5.4 Wider regional conflicts:

At the regional level, Darfur has remained closely tied with the people and governments of Chad, Libya and Central African Republic. For more than thirty years, various Chadian and Libyan groups fought proxy wars in and from bases in Darfur. Flint, (2010) argued that the conflict in Darfur is the product of a complex set of factors including disputes over access to and control of natural resources; the inequitable distribution of economic and political power; the absence of strong, just governance; militarization; and the proliferation of small arms.

2.7.6 The impact of Darfur conflict on livelihoods and IGAs

There are two major economic activities in the savannah both of which depend on land as a crucial resource (a) rain-fed cultivation (sorghum, millet, sesame, groundnuts) and (b) livestock breeding (camels, cattle, sheep and

goats). Between them there are other activities like craft and trading (Abdul-Jalil, 2008). Generally speaking, the economy is agriculture-dominated. Before the conflict, in the study area, nearly all farmers reared livestock, while nearly all herders farmed. Most groups also supplemented their farming and livestock-rearing activities with labour migration and remittances, collection of natural resources and trade (Young et al, 2005), In fact, being a nomad or a sedentary refers only to the overwhelming economic practice that a given individual or group normally engages (Abdul-Jalil, 2008). classifications based on a divide between sedentary and nomadic might put the emphasis in the wrong place (Baverio et al, 2013).

After the conflict onset, the situation was completely different. Farms, homes and wells have been destroyed, livestock killed or looted and tools and supplies looted, informal taxes have been levied, and movement restrictions impede transhumance. Access to land and markets, economic migration and the transport of goods, combined with the effects of recurrent floods and drought, and endemic and epidemic livestock diseases. The result has been a 'virtual collapse' of Darfuris' traditional livelihood strategies. Most people lost assets and access to their previous livelihoods and livelihoods options as well as the means of generating income were collapsed. In recent years, the livelihoods of farmers and herders in Darfur have converged". Young et al (2005)

In Darfur, pre-conflict livelihood strategies that have persisted are now operating at much reduced levels. All are directly affected by levels of insecurity and the restricted movement of people, livestock and trade. Income earning opportunities remain very limited for most of the conflict-affected population of Darfur (Smith et al, 2006). The conflict in Darfur has had a negative impact on the overall security of livelihoods and caused socioeconomic and social disintegration. Its impact on the sedentary

population has been particularly devastating, as many small-scale farmers have lost their properties and assets resulting in large-scale displacement. Accordingly, about 77% of the farmers have become IDPs or refugees. Having lost their productive assets and been displaced from their homes, many former farmers now depend on humanitarian aid for survival (UNDP, 2011). Consequently, large numbers of IDPs are competing for the very few job opportunities or sources of income (Young et al, 2005), while some of them are still out of production circle.

Smith et al, (2006) described the devastating situation after the conflict. They pointed out the main ways in which the conflict has devastated livelihoods and according to them, human capital has been badly affected by displacement, loss, looting or destruction of assets, livestock losses by looting or distress sales, crop production has been badly affected because of the destruction of agricultural infrastructure, loss of public infrastructure, including health centers, schools and water supplies. Labour migration, a mainstay of Darfur's economy, has more or less stopped or migrant suffer difficulties in sending back remittances. Darfur's natural resource base has been badly affected. In this context, food aid was found to be the main livelihoods option available for conflict affected population.

In general, incomes from non-agricultural and agricultural wage labour represent the main sources of income for a majority of households across all states and residence categories. Fuel wood/charcoal, sale of cash crops and petty trade are the other important income sources for households. As can be expected, income from the sale of cereals is higher among resident households. Sale of food aid is very small for all groups but slightly higher for IDPs in camps (HAC, MOAF, WFP and FAO, 2009) and later sale of food aid became a very significant source of income mainly for IDPs.

The impact of the conflict on the greater Darfur community is very obvious as well as in Central Darfur. Many traditional leaders were separated from their communities and social networks within and between communities have contracted and changed. Pre conflict markets in grain and livestock are barely functioning, while new institutions have emerged, such as camp markets, informal taxes and various agreements between opposing groups over access to land and markets (Jaspars et al, 2010).

One of the important impacts of the conflict on Darfurians, particularly IDPs is that, they have adjusted to the new, more urban order in several key respects, underscoring the likelihood that many will remain permanently in urban areas of displacement (Mundt, 2011). Moreover, in camps, IDP committees are responsible for coordination with international agencies, representing the interests of IDPs and assisting with the distribution of assistance. Many IDP leaders are not traditional leaders, and in some cases are thought to be linked to rebel groups or the government (Jaspars et al, 2010). This was also emphasized by Mundt, (2011) who indicated that livelihoods and social structures have changed dramatically. Traditional leaders have been swept aside in favor of new camp sheikhs, who exercise enormous authority over aid resources and, to varying extents, over land, commerce and security. Reconstituting the traditional order is impossible. In many respects, the IDP camps have already become de facto townships.
Moreover, conflict and continuing insecurity have transformed Darfur from a collection of interacting agrarian and pastoral societies based in villages and sparsely populated countryside into an economy and society increasingly shaped through interactions in large cities, small towns and along the main roads (Jeremy et al., 2012).

In general, farmers and herders have both resorted to non-sustainable land use and coping practices. These included cutting trees and over-cultivation

of fragile soils leading to deforestation, desertification and declining yields. Over-grazing in turn has contributed to degradation of pasture, while horizontal expansion of farmland has led to over-cultivation in fertile areas and increased conflict between pastoralists and farmers over grazing rights (Klugman, et al, 2007). Threats to livelihoods and protection persist: IDPs and rural farming populations continue to face risks to their safety, and all groups face restrictions to their freedom of movement, be it to collect firewood, farm, access markets or herd livestock ALNAP (2005) cited in (Jaspars and O'Callaghan, 2008). A major problem for the agrarian sector in Darfur is the continuous and marked decline in yields per unit area (ProAct Network, 2010).

To cope with the situation, after the conflict, nearly all households attempt to diversify their sources of income by engaging in petty trade, firewood and grass collection and sales, domestic labour, long-distance labour migration and remittances and gathering of wild foods (WFP, 2012-2013). In this context, IDPs and sedentary farmers were restricted to be dependent on humanitarian aid and in some locations they depend on farming because most of them lost their animals during or after the conflict.

2.7.7 Inter-communal conflicts in Central Darfur state

Another kind of conflict emerged in Darfur region, the clashes that have mostly been as a result of inter-tribal disputes over grazing land and gold-mining rights (IRIN 2013), as well as political power, or a competition over ownership or access of natural resources. These conflict have a very bad effect on assets that generate income and therefore on income generating activities. The conflict and violence since 2003 have severely affected farmers' and herders' everyday lives (Mundt, 2011).

There was numerous inter-communal conflict in greater Darfur. Tubiana, et al, (2012) argued that, the current conflict broke out in the early 2000s with a spate of rebel attacks on government targets, but earlier conflict in the 1980s (Fur-Arab) and 1990s (Masalit-Arab) foreshadowed the violence to come. By the time the world took notice of the conflict in 2003 and 2004, large areas of Darfur had been in a state of open war for several years. The violence of the past decade may have been new in scale but it was not unprecedented. The most recent conflicts were more localized violence pitting Arab militias against non-Arab communities included attacks by Beni Halba Arabs against the South Darfur Gimir community in 2013 over land; by *abbala* Rizeigat militias against Gimir and Tama communities in Saref Omra in North Darfur in 2014, over local disputes; and between Habbaniya Arabs and Fellata in the Buram area in South Darfur in 2014 (ICG, 2015) or *abbala* Rizeigat and Beni Hessain in Gabel Amir gold mines.

In Central Darfur State, there were many inter-communal conflicts; the traditional conflict between farmers and herders continued especially after the recent conflict of 2003, but this time round animal herders carry weapons and in some cases deliberately destroy farms and therefore conflicts occur. The study area witnessed very serious conflicts among different Arab groups. According to (AI, 2014) inter-communal violence between different tribes has become a major source of insecurity for the civilian population in Darfur in general and central Darfur in particular. Below are three examples of such conflicts that took place between Arab ethnic groups in CDS.

2.7.7.1 Conflict between Hottiyya and Nawaiba

In 2005, the conflict between the Hottiyya (cattle herders) and Nawaiba (camel herders) erupted in Zalingei locality (Satti, 2009 and Satti, 2015). The explicit cause that triggered the conflict was the rape of a Nawaiba girl in Serif Omra, by a Hottiyya tribe's member (Flint, 2010), but implicitly it

was actually a competition over natural resources; the land from which the Fur, the original owners of the land, had been driven from pasture and water resources. Destructive power of the government weapons being employed was apparent (Flint, 2010 and Satti, 2015). Consequently, the initial result disclosed that, 249 people dead and 300 wounded from both sides, mass displacement occurred, destruction of livelihoods of the two tribes. The Hottiyya were displaced to Tayba IDPs camp in Zalingei. Eventually, the customary law of conflict resolution between the two tribes was set up and a reconciliation agreement was signed between them (Satti, 2015).

2.7.7.2 Conflict between Misseriya and Rizeigat

A second example of bloody conflict was between Misseriya and Rizeigat Arab tribes in 2010, where hundreds of people died. The conflict was first triggered and ignited by armed robbery where some Rizeigat while robbing a car that belonged to Water and Sanitation Institution killed a Misseriya tribe man. The conflict quickly spread all over the state with concentration around Jebel Marra areas in Khur ramla, around Zalingei, Wadi Salih and Mukjar localities. it then spread to other Darfur states (Satti, 2015). Finally, the two tribes reached to a reconciliation agreement in June 2010 to set diya (blood money) for 423 Misseriya killed at 6,345,000 SDG (USD 2.7 million) and for 272 Rizeigat at 4,080,000 SDG (USD 1.7 million). Total costs awarded to the Misseriya amounted to 9,164,035 SDG (USD 3.9 million); the Rizeigat received 7,189,431 SDG (USD 3 million) (Flint, 2010).

2.7.7.3 Conflict between Salamat and Misseriya

The third and recent example was the conflict between Salamat and Misseriya in 2013, a conflict was reportedly triggered by theft of a Salamat's motorbike by Misseriya, followed by mutual killings (International Crisis Group, 2015). The conflict began with a series of large-scale attacks predominantly in Umdokhon locality and spreading to Rehad al Berdi in

South Darfur. The Misseriya, supported by the Ta'aisha, deliberately targeted civilians and used scorched earth tactics leaving villages burned to the ground (AI, 2014). Consequently, mass population movement was caused in and out of the locality border either as IDPs in Umdokhon town or as refugees to the neighboring Chad (TGH, IMC, IOM, HAC and WES, 2016). Abujeradil, Biltebe, and Umdokhon towns were the most affected. In some instances, the attackers predominantly targeted young men and in other low-scale attacks and they looted and destroyed property but did not physically harm civilians (AI, 2014).

Livelihoods and social structures of the nomads, pastoralists and agro pastoralists also assumed to be changed, where they were engaged in agricultural activities more than before. They became pro government and joined military forces, monopolizing animal markets, undertake traditional gold mining, running local transportation network, abducting of civilians and demand ransom to free them, hijacking cars, or even engaged in illegal income generating activities such as smuggling or trade of modern weapons.

2.8 Research issues and previous studies:

2.8.1 Livelihoods and income generating activities

Research issues and previous studies concentrated mainly on livelihoods, income, and IGAs, putting in mind the close relationship between them, as well as studies on below are some of these studies:

In their research "Darfur Livelihoods under siege," Young et al (2005) investigated the effects of the current conflict on the livelihoods of selected communities in Darfur, in order to refine strategic humanitarian interventions. The study focused on labour migration, livestock production and trade and conclude that livelihood strategies of all groups have been affected either directly or indirectly by conflict consequences include:

production failures, market failures, inability to access natural resources and inability of migrant workers to send back remittances. The previous view was supported by Smith et.al. (2006), who described the Darfur crisis as one of the world's worst humanitarian crises. The report was investigating how livelihoods have been affected and how they have changed during the conflict years and how livelihoods have been impacted by food aid, both positively and negatively. However, a detailed examination of market and trade by Smith and Fadul (2008) concentrated on trade as the lifeblood of the economy of Darfur, and market transactions are an essential part of household livelihoods. Trade is one of the main ways in which different livelihood groups interact with each other, especially farmers and pastoralists. Thus, normal trading patterns have been seriously affected by devastating conflict.

Jaspars, et al., (2009) illustrated how conflict affects all aspects of livelihoods and deliberately undermine livelihoods. They pointed out that war economies may develop where a powerful elite benefits from war by using violent or exploitative practices. Then they indicated how war directly impacts on livelihoods through the destruction, looting and theft of key assets, and indirectly through the loss of basic services and access to employment, markets, farms or pastures. However, this is in line with the research by Jaspars and O'Callaghan in 2008, prepared in cooperation with the DRC in Zalingei area which focused on livelihoods and protection, in particular on threats to physical safety, freedom of movement and access to adequate means of subsistence. The aim of the research was to understand how greater complementarity between humanitarian protection and livelihoods approaches might strengthen analysis and intervention in order to reduce the risks facing conflict-affected populations, the research addressed very important issue; the security in terms of physical safety and

freedom of movement and their impact on livelihoods. However, these researches do not take into account long-term issue.

The first systematic study on the Livelihoods and Vulnerability of the Northern Rizaygat, Darfur, Sudan was by Young et al., (2009) in which they pointed out that," little is known about the lives and livelihoods of the Northern Rizaygat, the group of camel-herding nomads (abbala) who are seen as one of the main protagonists in the conflict as many are members of the irregular armed forces, pejoratively known as the Janjaweed, they analyzed the evolving vulnerability of pastoralist livelihoods in Darfur, in order to:

1. promote understanding and raise awareness about the livelihood challenges facing specific pastoralist groups in Darfur
2. engage a broader group of stakeholders and promote dialogue in order to broaden participation in processes around peace and recovery
3. sharpen the focus and effectiveness of strategic humanitarian action aimed at supporting the livelihoods of these groups now and in the future.

UN (2009) indicated that it needs a coherent and effective policy for making employment, a key element of peacebuilding. However, describing that in a post-crisis situation, employment is vital to short-term stability, reintegration, economic growth and sustainable peace. The critical contribution of employment and income generation to reintegration and peacebuilding is now being acknowledged. Davis et al (2007) on the other hand, analyzed the rural income generating activities in order to examine the full range of rural income generating activities carried out by rural households in order to determine:

1. The relative importance of the gamut of income generating activities.
2. The relative importance of diversification versus specialization in rural income generating activities at the household level.

3. the influence of rural income generating activities on poverty and inequality.

But Chikina (2007) described the IGAs manual which was prepared to introduce a set of tools for identifying and conducting IGAs that will be flexible enough to respond to market variations (including the transition from conflict to post-conflict settings), taking into consideration protection, social and environmental concerns. It was designed to help individuals and communities to diversify their options, reducing dependency on IGAs that threaten personal safety and the environment. He stated a few simple rules that should be kept in mind:

1. What generates income today may not generate income tomorrow.
2. Supply must be flexible enough to respond to fluctuations in demand.
3. Influenced by their environments, markets change constantly, calling for flexibility and creativity.

Though indicating a kind of uncertainty and vulnerability by claiming diversity of options. Likewise, Barrett, et al. (2001), agreed income diversification idea for risk reduction when stated that, asset, activity and income diversification lie at the heart of livelihood strategies in rural Africa. they emphasized that, very few people collect all their income from any one source, hold all their wealth in the form of any single asset, or use their assets in just one activity. Multiple motives prompt households and individuals to diversify assets, incomes, and activities.

Similarly, DRC (2008) illustrated the very negative impact of conflict on the economy of a region; displacement frequently results in the loss of key livelihood assets, such as land, production materials, infrastructure or financial capital. Without access to their regular asset base, including the means for income generation, refugees and IDPs become dependent on the passive reception of relief aid and support from the host community. DRC

concluded that, income generation is a key programmatic strategy to address the need to find alternative means to make a living in a dignified way among people of concern.

Saparamadu. (2010). Evaluated critically reviews of small livelihood projects for their relevance, design and strategy, outcome and impact and sustainability. She recommends that, for better overall results, future livelihood projects must be designed with the objective of generating an income, further; project strategies must be holistic and comprehensive and must necessarily include training and start-up capital. Further, the projects must be formulated following a comprehensive gender assessment that identifies the specific vulnerabilities of women beneficiaries. Therefore, the current study was expected to create data profile of livelihood assets, strategies and income issues and mechanisms for Darfur as general and Central Darfur in particular, so that useful lessons could be learned and applied to ensure for policies that are more effective. Thus, it is assumed to add to the previous work in these domains, mainly studies on livelihoods and income generating activities which were rare for Central Darfur

2.8.2 Seemingly Unrelated Regression (SUR) Model

Thus, SUR models are often applied when there may be several equations, which appear to be unrelated; however, they may be related by the fact that: (1) some coefficients are the same or assumed to be zero; (2) the disturbances are correlated across equations; and/or (3) a subset of right hand side variables are the same.

Moon et al. (2006) figured out two main motivations for use of SUR. The first one is to gain efficiency in estimation by combining information on different equations. The second motivation is to impose or test restrictions that involve parameters in different equations.

Literature on Seemingly Unrelated Regression (SUR) suggest that the model has the potentiality to be used in many domains, below are some selected usages of the model: for instance, Tanuwidjaja, (2006) used the SUR in event study analysis to study mergers and acquisitions in Singapore's financial industry and to study the cross-sector domestic acquisition in Singapore's financial industry. it is found that OLS method seems to underestimate the value of the sample cumulative abnormal returns as compared to SUR. The study also found that post mergers and takeovers in banking and insurance industries tend to have high possibility of negative returns.

Cadavez et al. (2011/12) used the model for predicting the carcass composition of lambs. They reported that the models for carcass composition were fitted using the SUR estimator. The results were compared to OLS estimates and evaluated by several statistical measures. The results obtained showed that the SUR estimator performed better than the OLS estimator.

Widyaningsih et al studied the world gasoline demand data using the regression analysis. One possible way to make estimates was to apply the least squares method but relationships among the errors in the response of other estimators are not allowed. To overcome this problem is Seemingly Unrelated Regression model (SUR) in which parameters are estimated using Generalized Least Square (GLS). he obtained that SUR using GLS is better than OLS because SUR produce smaller errors than the OLS.

SUMER, K. (2012). Utilized the SUR model with the primary objective to test the joint validity of the growth models, introduced by Solow, Harrod - Domar, Barro and Romer, for the Turkish economy. Results revealed that the estimated growth models introduced by Solow, Harrod - Domar, Barro and Romer, prove their validity for the Turkish economy.

In order to study land use policy, Sènakpon et al. (2013) investigated on the driving forces that determine the decision making on land allocation within the West African farms, giving evidence of farms in the Municipality of Banikoara in Northern Benin. Agricultural lands were mainly allocated among cereal, legume and cash crops. The seemingly unrelated regression of land allocated among these three categories. The findings revealed that the main determinants of land allocation were the location (village), the household head characteristics, the household size, the number of household's members working in agriculture, the agricultural wage labor use, the household's capital, and the access to credit. Compared to cereal and legume crops, land allocated to cash crops was determined by access to credit and household's capital. Recommending that agricultural policy has to focus on enhancing household's capital by facilitating the access to credit. In line with this, and provide extension service.

Recently, Wolfersberger e al., (2015) used the Dynamic panel seemingly unrelated regression (SUR) model in environmental issue in developing countries, with an objective to identify the macroeconomic determinants of ending deforestation and to explain cumulative deforestation and other land uses. The estimation results revealed that economic development and institutions play a significant role in long-term deforestation. Results further revealed that after the first development stage, agriculture and forest are not always competing land uses. These results gave new insights into public policies.

CHAPTER THREE

STUDY AREA AND RESEARCH METHODOLOGY

3.1 Location:

Central Darfur is one of the states of the Sudan, and one of five states comprising the Darfur region. It was created in January 2012. The state was formed from land that was previously part of the state of West Darfur. Zalingei is the state's capital (Darfur, Wikipedia). CDS is situated to the west of Sudan's Darfur region. It lies between latitudes 11º 15′-13° 30′ North and longitudes 22° 30′ - 24° 30′ East (MoANRI, 2016). Central Darfur's boundaries touch Chad to the west and Central African Republic to the southwest. Within Darfur, Central Darfur State borders South Darfur State to the south and east, North Darfur State to the north and West Darfur State to the northwest (Figure. 3.1). The state covers an area of 44,748 km^2 (CDSIC, 2015), and is home of University of Zalingei and embraces the headquarters of Jebel Marra Rural Development Project.

Literature on central Darfur is very few because it was established recently, however, the state is on the western part of Sudan and is remote from the Sudan's capital Khartoum. It is connected to West Darfur State capital Algenena by a 175 km long paved road. Reaching to Khartoum is possible either via Shaheed Sebeira airport which is located in Algenena, or through Nyala, using direct flight or otherwise take a bus or railway. The State is known to be mountainous, characterized by steepness giving way to several water courses (*wadis*) to run across the state such as Azoum, Barei, Arebo, Faro, Dabarei, Wadi Salih, Toro, Roai, Namari, Fundololong, Kotore and Magara. Along these *wadis*, soil erosion caused by water runoff is common.

The most important economic activity practiced by the majority of the population is agriculture and livestock keeping, although affected by the recent conflict. However, according to the MoANRI (2016), the state is very rich by fertile soils, and the arable land is estimated to be 6,435,000 feddans, giving room to agricultural activities and livestock rearing. The State is known by its high animal population of different types, dominated by cattle.

3.2 Administration

Central Darfur State was split from the former West Darfur State, after successive administrative changes. The State contain nine localities, which are: Wadi Salih, Mukjar, Umdokhon, and Bindsi which are popularly referred to as greater Wadi Salih as well as Zalingei and Azoum localities known as greater Zalingei, while the three Jebel Marra localities include, West Jebel Marra, Central Jebel Marra and North Jebel Marra. The state consists of 29 administrative units (MoCA, 2012; CDSIC, 2015). Table 3.1.

Table 3.1: Localities and area of Central Darfur State

Locality	Capital	Area (km^2)
Zalingei	Zalingei	8307
Azoum	Sulu / Rongatasa[1]	4230
Wadi Salih	Garsilla	7880
Mukjar	Mukjar	8231
Bindisi	Bindisi	3300
Umdokhon	Umdokhon	7100
Central Jebel Marra	Golo	0800
West Jebel Marra	Nyrtete	3400
North Jebel Marra	Rokiro	1500

Source: CDIC, 2015

[1] Recently Rongatasa became the capital

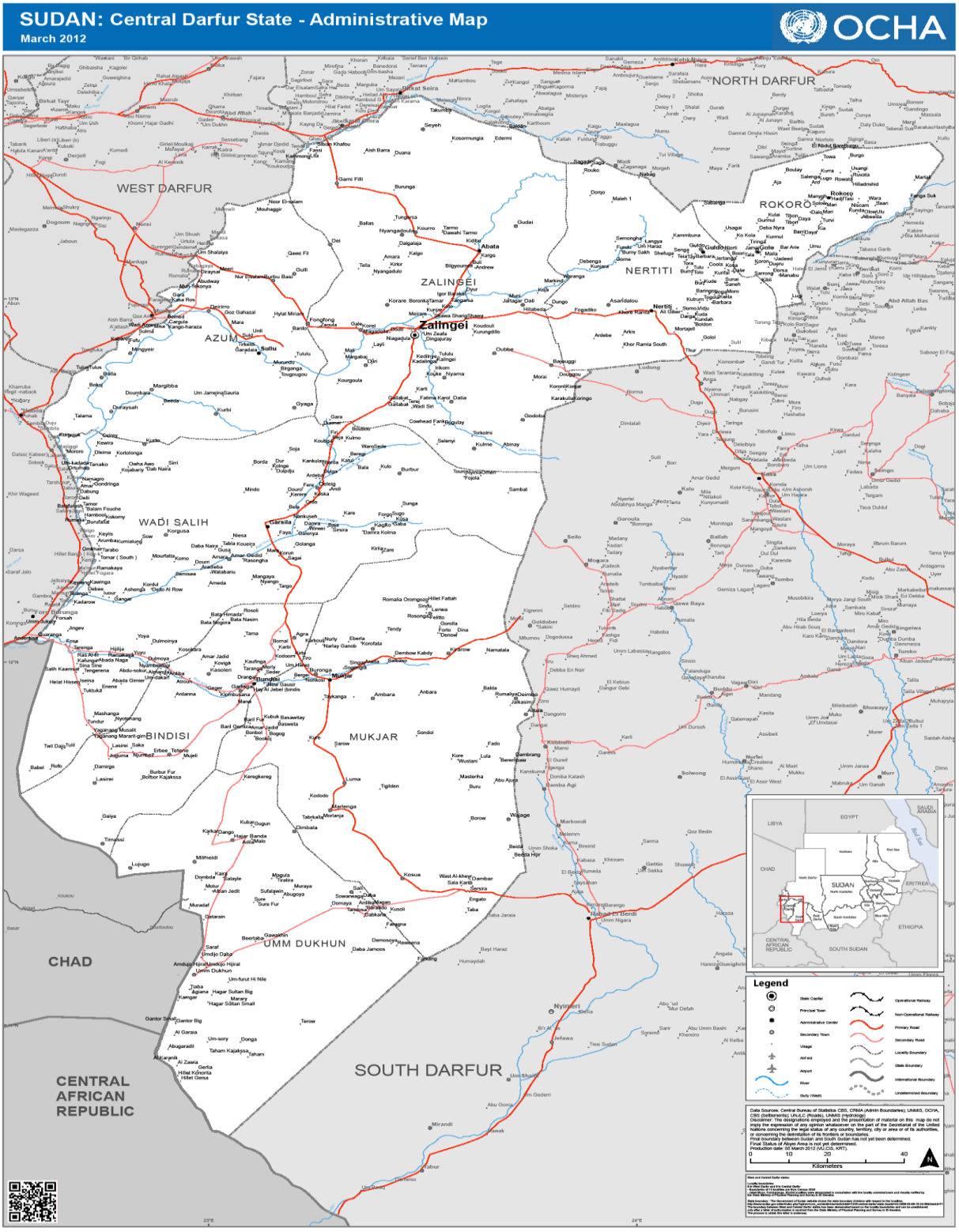

Figure 3.1: Central Darfur State Administrative map
Source: OCHA, 2012

3.3 Population:

According to the Sudan fifth population census held in 2008, central Darfur state's official population was 553,515 people. This figure does not reflect the actual population number of the State, because about 50% of the population or even more was not counted in this census. The state is rich in natural resources; therefore, its population density is comparatively high being 46 people per km^2. The demographics of the state according to the last population census was 270,473 males (49%) and 283,042 females (51%) with an average family size of six people per household and annual population growth rate of 2.5% (CDSIC, 2015).

The projected population of 2012 based on the 2008 census was1,500,000 (WFP, 2012/2013), while the recent population projection made by Central Darfur State statistical authorities in 2016 revealed that the population jumped to 1,908,553 people. This shows that the State is characterized by a very fast population growth, but for the purpose of this study, the State population is 1,030,229 people, in which the 2008 (553,515) population estimates were considered, plus the IDPs (476,714) who were not included in the last census.

3.4 Climate:

The State is characterized by a variety of climates ranging from semi-desert in the north to the rich-savanna in the south (Salih et al., 2002). The Jebel Marra massif is characterized by a temperate climate with high rainfall and permanent springs of water (Marrah Mountains, Wikipedia).

The climatic conditions were described by Salih et al., (2002) where the average rainfall varies between 300 to 1000 mm, with single short rainy season and a very long drought of seven or more months, normally spans from May to October with 75% of the rain concentrated in the months of

June to August. The monthly average temperature varies between 30° in April and May prior to the onset of the rainy season and 20°C in the winter months of December and January (Salih et al., 2002).

Periodical drought cycles were common and drought years were characterized by reduction in rainfall, crop failure and livestock losses. Table (3.2) depicts the variations for five years' average rainfall records in selected stations in Central Darfur State for four metrological stations Zalingei, Nyertete, Garsila and Umkhair.

Table 3.2: Central Darfur State five years' rainfalls records (mm)

Station	Year					5 years average
	2011	2012	2013	2014	2015	
Zalingei	370.5	797.5	393.5	585.4	466.3	522.6
Nyertete	595.8	955.4	555.5	829.5	562.6	699.8
Garsila	635.1	801.4	571.1	746.9	456.9	642.3
Umkhair	480.5	704.8	569.9	693.9	420.2	573.9
Location average	520.5	814.8	522.5	713.9	476.5	609.65

Source: JMRDP metrological station, 2015.

Considering the average of five years, variation in rainfall across different localities could easily be observed from table (3.2) where rainfall in the years 2011, 2013 and 2015 was comparatively low while the years 2012 and 2014 received considerable amounts of rain.

There are three main seasons. The *Kharif*, or rainy season as stated earlier, starts sometimes as early as April but more normally in May and it extends through to October. Temperatures at first fall after the hot dry summer and then climb again as the rains taper off. The time of the harvest, called *Darat*. The cool dry winter season, the *Shita*, lasts from December to February. After that, the main summer dry season, the *Sayf*, sees much higher temperatures (Morton, 1993).

3.5 Land use and livelihoods in CDS:

Land use is a complex of livestock grazing and rain fed cropping for sorghum and millet, and fallow grazing lands that are regenerating with thorn savannah. In some areas, erosion is severe along *wadi* lines with gullies penetrating into cropland. In Jebel Marra area, mixed farming is found. Terracing and concentration of runoff water, as well as the existence of some perennial streams, allows simple irrigation (*shadouf*) systems to work. People cultivate millet and sorghum, combined with irrigated citrus, onions, and okra, small quantities of wheat and also groundnuts (Manger, 2006).
Livelihood strategies are developed in the face of a wide range of challenges, the impact of conflict, the challenge of poverty, a changing climate and more. In this context, farmers need to adapt their livelihoods, cope with risks and provide a better and more resilient living for their families and community (Bromwich, 2014).

Livelihoods were therefore significant in that they were the point at which individuals and communities make decisions in response to the concurrent challenges they face (Bromwich, 2014). In addition, livelihood assets determine both the resilience and vulnerability of people's livelihoods (Smith et al, 2006). Therefore, livelihood assets dictate activities to generate income. During conflict, household members were subjected to different hazards and vulnerabilities, their livelihoods were under threat and income generating opportunities were limited. In such situation, livelihood diversification could protect households from environmental economic and insecurity shocks, trends and seasonality, this might be why household heads in Central Darfur State were engaged in many jobs.

3.6 Soils:

The soils of the area are rather shallow and compact derived from the basement complex rock and volcanic material with rock close to the surface or expose mainly along water courses. In many cases, transported soil material overlies a weathering zone, becoming a part of depositional layering. The predominant top soil is sandy loam, becoming loam or sandy clay. Other soils range from grey to brown gravely clay of pedi plains to alluvial and colluvial soils (clay loam) in depressions and along the main valley and water courses to volcanic ash and sandy loam pediments plains (Desougi et al, 2016),). The Goz Salsilgo of Umdokhon is a vegetated sand sheet, there is also large sheets of cracking clay soils (typical cotton soils) in great Wadi Salih Locality (Salih et al., 2002). The soils of the three Jebel Marra localities, are of volcanic type. The soils of the state are known to be very fertile notably the volcanic soil and those along *wadis*, thus supporting crop production and livestock keeping livelihoods. During autumn, watercourses run along *wadis* causing severe *wadi* bank erosion and large trees fall down, large amounts of silt is continuously swept out to neighboring countries mainly Chad. The process that lead to shrinkage of farm land over time leading to desertification.

3.7 Vegetative cover:

The vegetative cover ranges from dense to medium woody, long grass with medium cover in south and scattered bushes in north. The vegetation in some areas is drought degraded deciduous Savannah woodland, and in some areas, *Acacia albida (Haraz) and Balanites egyptiaca* dominate (Abaker, 2006). There is a good acreage of forests planted in Jebel heights with soft-wood almost all, *Cupressus spp*. and hard wood area mainly *Eucalyptus spp* (Salih et al, 2002). There are few young trees of *Acacia albida*; any young seedlings

that germinate are killed during their first year of growth by such factors as fire, insects and trampling. Eventually, *Haraz* is replaced on the drier soils by the more xerophytic *Balanites aegyptiaca*. There is virtually pure stands of *Acacia seyal* and on eroded areas *Albizia amara* subsp. *sericocepha* dominates, while *Boswellia papyrife* is noticeable on slopes of steep hills (Radwanski and Wickens, 1967), and *Borassus aethiopium* in Wadi Salih region. On the southern part of the state which still keeps its vegetation, but in general, the vegetation has been much reduced by drought years and recent conflict consequences such as deforestation, overgrazing, wild fires and overcutting. Following the Radwanski and Wickens, (1967) report, the land use is reflected in the grass species present. In the cultivated areas, the first grasses to appear after the start of the rains are *Eleusine africana*, *Dactyloctenium aegyptium* and *Digitaria horizontalis*.

3.8 Research Methodology:

The value of any research depends basically on the process by which the researcher underpins the work on a subject of interest, from the very beginning until the end, thus, choosing of appropriate research methodology is a vital part of any research.

3.8.1 Methods of data collection:

A mixture of both quantitative and qualitative methods were used to collect the data on target population. Almost the whole people of Central Darfur state were entirely affected by the conflict whether they are IDPs, residents or nomads (pastoralists or agro pastoralists).

3.8.1.1 Primary data collection:

Primary data were collected by means of a structured questionnaire, discussion groups with identified livelihoods groups in the target population and informal meetings with relevant people, mainly IDPs, returnees, host

communities, nomads, local leaders, officials, and NGOs, and personal observations.

Intentionally, the questionnaires were designed and prepared in two languages, Arabic and English in order to facilitate interaction and reduce communication barriers with respondents, especially in remote rural areas and IDPs camps. The unit of the study was the household head. The household heads of both sexes were targeted and interviewed using a structured questionnaire depending on face-to-face interviews. Household survey was used to collect direct information from respondents about their socio-economic characteristics, their income, livelihoods strategies and the conflict. The data was collected for three periods from 2000, 2006 and 2012, to evaluate the impact of conflict on livelihoods of affected people of IDPs, nomads and residents in Central Darfur State during 2000-2015 with emphasis on income generating activities.

The first period represents the situation before the conflict. The second period represents the severe situation after the conflict was erupted, while the last period represents the situation in which IDPs start to return voluntarily; after Darfur Peace Agreement signed in Doha in 2011 after which people enjoyed comparative peace and security conditions became relatively conducive for undertaking economic activities.

The data collected were of a longitudinal data type (sometimes referred to as panel data); a dataset is said to be longitudinal if it tracks the same type of information on the same subjects at multiple points in time. The longitudinal data extend into the past as well as the present and thus have both time series and cross-sectional dimensions (Brooks, 2013). A longitudinal data generates repeated measurements on each subject under investigation and it was balanced longitudinal (panel**)** data because each subject has the same number of observations (Gujarati et al., 2009).

Therefore, in order to evaluate the impact of conflict on livelihoods of affected people of IDPs, nomads and residents in Central Darfur State during 2000-2015, 202 households from seven localities of central Darfur State were interviewed. They were asked to give information about their household income generating activities, expenditure and the potential factors affecting the household livelihoods and income generating activities and opportunities; and to reveal determinants that shape the situation of income generating activities for three periods.

3.8.1.2 Secondary data collection:

The primary data were complemented by secondary data gathered through a comprehensive desk review of relevant documents, focused mainly on previous studies, researches and reports carried out by individuals, NGOs', governmental reports, records, registers and other related sources.

3.8.2 Sampling technique:

A multi-stage sampling technique was done in two stages as follows:

1. Convenience sampling which is a type of nonprobability sampling where members of the target population that meet certain practical criteria, such as easy accessibility, geographical proximity, availability at a given time, or the willingness to participate are included for the purpose of the study (Ilker *et al.* 2016). Convenience sampling was used to select localities and administrative units.
2. Random sampling was applied to select villages, camps, towns and nomad's settings and finally the household heads as units of interest. `

3.8.3 Sample size:

Central Darfur State total population number is estimated to 1,030,229 people, this figure constitutes the 2008 population census number (553,515), plus estimates of uncounted IDPs and nomads (476,714) made by Central

Darfur Humanitarian Aid Commission (HAC) in 2014. The population is distributed in nine localities: Zalingei, Azoum, Wadi Salih, Mukjar, Umdokhon, West Jebel Marra, Central Jebel Marra, North Jebel Marra and Bindisi, among which seven localities with 22 administrative units were selected for this study. North and Central Jebel Marra localities were excluded for inaccessibility problem due to current conflicting situations.
Then the Attribute Sample Size was applied to calculate the sample size. An attribute sample is used to statistically estimate how many or what percentage of items in a population have a certain characteristics or attribute, the key attributes might be: they were conflict affected and vulnerable, what are the livelihood strategies they pursue, their social and economic attributes, the impact of insecurity on their livelihood strategies, their residence ….

A desired precision range of 2% for a sample with a 95% confidence level means that the sample will reflect the characteristics of the entire population with a certainty of between 93% and 97%. According to these attributes, the number of items to be randomly selected for evaluation as calculated using the Attribute Sample Size Technique was achieved by the following formula:

$S = Z^2 * N * E(1 – E) / [(A^2 * N) + (Z^2 * E(1 – E))]$

S = Required sample size (202)

Z = Factor for the desired confidence level (95% = 1.961)

N = Population size (1,030,229)

E = Expected error rate (5%)

A = Precision range (±3%)

Then the sample was distributed among different categories of the population as follows:

Table 3.3: Distribution of interviewees

Locality	Admin unit	Sample size	distribution			
			Admin unit	IDPs	Nomads	residents
Zalingei		48				
	Zalingei		22	9	6	7
	Abata		14	3	6	5
	Teraig		12	5	3	4
Azoum		18				
	Solo		5	2	2	1
	Umshalaya		5	1	2	2
	Rongatas		5	2	2	1
	Deraisa		3	1	1	1
Wadi Salih		39				
	Garsila		13	5	3	5
	Deleig		13	5	3	5
	Umkheer		13	5	5	3
West Jebel Marra		14				
	Nyrtete		8	3	2	3
	Goldo		6	2	2	2
Umdokhon		35				
	Umdokhon		11	4	3	4
	Abugaradil		9	3	3	3
	Kabar		8	2	3	3
	Magan		7	3	2	2
Bindisi		19				
	Bindisi		7	3	2	2
	Juguma Algarbia		6	2	2	2
	Goimana		6	2	2	2
Mukjar		29				
	Mukjar		12	4	4	4
	Artala		9	3	3	3
	Dambar		8	3	3	2
Total		**202**	**202**	**72**	**64**	**66**

3.8.4 Methods of data analysis:

Methods of data analysis applied were regression analysis, namely the Seemingly Unrelated Regression (SUR) Model, participatory approaches, and descriptive statistics. They were used to analyze and examine the characteristics of respondents, different relationships between variables and the socio-economic impact of the conflict on household livelihoods and income generation.

3.8.4.1 Descriptive analysis:

The first analytical tool used was descriptive analysis and frequency tables were used to summarize the data to examine the socio-economic characteristics of the respondents, using percentages, and means.

3.8.4.2 Regression analysis:

The second analytical tool used was the Seemingly Unrelated Regression (SUR) model; the model that first introduced and conceptualized by Zellner (1962). The Basic idea of the model is that, error terms of different equations are correlated amongst each other (Zellner, 1962 and Matthias, 2010). The model is simply a generalization of a linear regression model that consists of several regression equations, each having its own dependent variable and potentially different sets of exogenous explanatory variables. Each equation is a valid linear regression on its own and can be estimated separately (Olamide and Adepoju, 2013).

When dealing with SUR, each equation satisfies the assumptions of the standard regression model. These assumptions are not always satisfied mostly in economics, social sciences and agricultural economics, which may lead to adverse consequences on the estimator parameters properties (Olanrewaju and Ipinyomi, 2014). Therefore, SUR model comprises several individual relationships that are linked by the fact that their disturbances are correlated (Moon and Perron; 2006 and Arashi, 2011). Under the SUR approach, one would allow for the contemporaneous relationships between the error terms in the equations by using a generalized least square (GLS) technique to transform the model so that the error terms become uncorrelated (Brooks, 2013). The correlation among the equation disturbances can come from sources like correlated shocks to household income or from other variables involved in the model.

The Chi-Square-test; the overall significance of the regression model, is the measure to fit a statistical model to observed data, and to show how well the model actually reflects the data, it evaluates the goodness of fit of the overall model. It examines the null hypothesis that all regression coefficients of the model are equal to zero versus the alternative hypothesis that at least one doesn't.

The SUR model used as a tool of analysis and the relationship between dependent variable and independent variables was depicted by the following general mathematical specification:

$Y = f(x)$, or $Y = f(X_1, X_2, X_3, \dots, X_n)$ (Pedace, 2013), where Y is the dependent variable and the (Xs) or $(X_1, X_2, X_3, \dots, X_n)$ represent the independent variables, n = number of independent variables.

To develop the econometric specification of the model i.e. the functional form of the specification:

$$E(Y|X_1, X_2, X_3, \dots, X_n) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \dots + \beta_n X_n)$$

However, to specify the random nature of the model; the stochastic population regression function can be written as:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \dots + \beta_n X_{ni} + \varepsilon i$$

where, the i subscripts denote any randomly chosen observation and εi represents the stochastic (or random) error term associated with that observation.

In the case of several explanatory variables, to save time we can walk with the model by writing using some mathematical shorthand. With algebraic notation; summation notation, it would look like the following functions:

$$y_i = \alpha_0 + \sum_{i=1}^{n} \beta_i x_i + \varepsilon_i$$

The basic seemingly unrelated regression (SUR) model is characterized by a system of *n* equations, given by the following common multiple equation structure, which can be compactly written as (Olamide and Adepoju, 2013):

$$\begin{aligned} y_1 &= X_1\beta_1 + \varepsilon_1 \\ y_2 &= X_2\beta_2 + \varepsilon_2 \\ \vdots &\quad \vdots \quad\quad \vdots \quad\quad \vdots \\ y_n &= X_n\beta_n + \varepsilon_n \end{aligned}$$

In regression equations (SUR) model, each of them satisfies the assumptions of the standard regression model (Olanrewaju and Ipinyomi, 2014). Therefore, the model above can further be expressed compactly in matrix form as follows (Olamide, and Adepoju, 2013):

$$y = X\beta + \varepsilon$$

3.8.5 SUR Model Specification

SUR model is used to evaluate the impact of conflict on livelihoods of affected people of IDPs, nomads and residents in Central Darfur State during 2000-2015, with emphasis on different income generating activities. A set of nine equation models was considered in the study area as follows:

1. The first group of equations examine the total household income generated from different activities for three periods (2000, 2006 and 2012). They were compiled in one gigantic SUR equation.
2. The second group of equations embraces eight equations, each of them contain three equations capturing the periods; (2000, 2006, 2012), and representing the eight income generating activities mentioned earlier.

Therefore, each of the eight equations contain in it three equations. Table (3.4) bellow makes furthers clarification for these equations.

Table 3.4: SUR Model Specification

Dependent variable		Specification
Dependent variable vector of observation on the dependent variable y and where: y_1, HHT income 2000 y_2, HHT income 2006 y_3 HHT income 2012	y_1, y_2, y_3	The household total income in SDG is the dependent variable
	y_1, y_2, y_3	The Household income from crop production activity in SDG
	y_1, y_2, y_3	The Household income from livestock activity in SDG
	y_1, y_2, y_3	The Household income from employment activity in SDG
	y_1, y_2, y_3	The Household income from labour activity in SDG
	y_1, y_2, y_3	The Household income from trade activity in SDG
	y_1, y_2, y_3	The Household income from aid and subsidies in SDG
	y_1, y_2, y_3	The Household income from secondary activity in SDG
	y_1, y_2, y_3	The Household income from HH Member share in SDG
Parameter vector coefficient associated with *x* at each observation	$\alpha_0, \beta_1, \ldots, \beta_1$	The coefficients of variables to be estimated;
	α_0	The intercept;
Independent variable Matrix of the regression, where we have five quantitative numeric Independent variable and five qualitative (categorical); dummy independent variable	x_1	Gender; dummy variable which has the value zero when Female and one when Male
	x_2	Age of the respondent (years)
	x_3	HHH Residence; dummy variable which has the value zero when Village and one otherwise; (Town, IDPs camp, Fareeg, Damra)
	x_4	HH marital status; dummy variable which has the value zero when single and one otherwise; (Married, Divorced, Widow)
	x_5	Education level; dummy variable which has the value zero when illiterate and one, otherwise; (Khalwa, Basic, Secondary, University)
	x_6	HH Family size (Numbers)
	x_7	Security status; dummy variable which has the value zero when (No/bad) not suitable for undertaking economic activities and one when (Yes/good) suitable for undertaking economic activities
	x_8	Size of cultivated land area (feddans)
	x_9	Total production of millet in sacks (90 kg)
	x_{10}	Household expenditure (SDG)
Vector of unobservable disturbances	ε_i	The "noise" term – the error term representing the statistical error and reflecting other factors that influence respondent's income, which are beyond the respondent's control or other factors not included in the model

In SUR, we have two kinds of independent variables in the model, the dummy variables and continuous variables. The analysis of continuous variable is straightforward, while for dummy variables are somewhat different, we have two categories, the category for which the dummy variable is assigned taking value of (1) and the category for which no dummy variable is assigned taking value of (0), Gujarati et al, (2009) call it the base, benchmark, control, comparison, reference, or omitted category. All comparisons made to be in relation to the benchmark category. The intercept value represents the mean value of the benchmark category.

Gujarati et al, (2009) further called the coefficients attached to the dummy variables as differential intercept coefficients, because they tell by how much the value of the category that receives the value of (1) differs from the intercept coefficient of the benchmark category; (category that receives the value of (0)). SUR Model will furthermore be specified to show the introduction of dummy variable into the model, thus we consider full model for the three periods.

It may be written in more detailed form as follows:

$$y_{1\begin{bmatrix}2000\\2006\\2012\end{bmatrix}} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \beta_8 x_8 + \beta_9 x_9 + \beta_{10} x_{10} + \varepsilon_1$$

$$y_{2\begin{bmatrix}2000\\2006\\2012\end{bmatrix}} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \beta_8 x_8 + \beta_9 x_9 + \beta_{10} x_{10} + \varepsilon_2$$

$$y_{3\begin{bmatrix}2000\\2006\\2012\end{bmatrix}} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \beta_8 x_8 + \beta_9 x_9 + \beta_{10} x_{10} + \varepsilon_3$$

$$y_{4\begin{bmatrix}2000\\2006\\2012\end{bmatrix}} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \beta_8 x_8 + \beta_9 x_9 + \beta_{10} x_{10} + \varepsilon_4$$

$$y_{5\begin{bmatrix}2000\\2006\\2012\end{bmatrix}} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \beta_8 x_8 + \beta_9 x_9 + \beta_{10} x_{10} + \varepsilon_5$$

$$y_{6\begin{bmatrix}2000\\2006\\2012\end{bmatrix}} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \beta_8 x_8 + \beta_9 x_9 + \beta_{10} x_{10} + \varepsilon_6$$

$$y_{7\begin{bmatrix}2000\\2006\\2012\end{bmatrix}} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \beta_8 x_8 + \beta_9 x_9 + \beta_{10} x_{10} + \varepsilon_7$$

$$y_{8\begin{bmatrix}2000\\2006\\2012\end{bmatrix}} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \beta_8 x_8 + \beta_9 x_9 + \beta_{10} x_{10} + \varepsilon_8$$

$$y_{9\begin{bmatrix}2000\\2006\\2012\end{bmatrix}} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \beta_6 x_6 + \beta_7 x_7 + \beta_8 x_8 + \beta_9 x_9 + \beta_{10} x_{10} + \varepsilon_9$$

I used the notation D in place of X to denote the dummy variable with corresponding coefficients ranging from α_1 up to α_5 , whereas we use the conventional X to denote the quantitative or numeric variable, with corresponding coefficients ranging from β_1 up to β_5, while α_0 represents the model intercept as follows:

$$Y\begin{bmatrix}2000\\2006\\2012\end{bmatrix} = \alpha_0 + \alpha_1 D_{1i} + \alpha_2 D_{2i} + \alpha_3 D_{3i} + \alpha_4 D_{4i} + \alpha_5 D_{5i} + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \mathrm{u}_i$$

Although the model is linear in the parameters, but in order to narrow down the variation in the original data, the data was transformed by applying the semi-log model using the natural log, which can be illustrated as:

$$Lny_{2000} = \alpha_0 + \alpha_1 D_1 + \beta_1 LnX_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + \beta_2 LnX_2 + \alpha_5 D_5 + \beta_3 LnX_3 + \beta_4 LnX_4 + \beta_5 LnX_5 + \mathrm{u}_i$$

$$Lny_{2006} = \alpha_0 + \alpha_1 D_1 + \beta_1 LnX_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + \beta_2 LnX_2 + \alpha_5 D_5 + \beta_3 LnX_3 + \beta_4 LnX_4 + \beta_5 LnX_5 + \mathrm{u}_i$$

$$Lny_{2012} = \alpha_0 + \alpha_1 D_1 + \beta_1 LnX_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + \beta_2 LnX_2 + \alpha_5 D_5 + \beta_3 LnX_3 + \beta_4 LnX_4 + \beta_5 LnX_5 + u_i$$

The above three models were replicated for the total household income and for the eight sources of household income.

3.8.6 SUR Model Estimation

A method that can be used to obtain a good estimation in the regression analysis is Ordinary Least Squares Method. The Least Squares Method is used to estimate the parameters of one or more regressions but relationships among the errors in the response of other estimators are not allowed. One way to overcome this problem is Seemingly Unrelated Regression model (SUR) in which parameters were estimated using Generalized Least Square (GLS) (Widyaningsih et al., 2014). Stata version 10 was used to estimate SUR model equations.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Socio-economic characteristics of the respondents:

4.1.1 Gender of the household head

The results of the descriptive analysis of the socio-economic characteristics of the respondents, revealed that the majority of the interviewed respondents were males, they constitute about 52% (106), while 48% (96) were females. The high percentage of female headed households gives an indication of the role played by women in acting as household heads and contributing in income generating activities and food security. Women in the study area in addition to contributing to the household income generating activities, they bear additional family responsibilities in the absence of the husband, who usually migrates searching for a better life for his family, and hence women act as household heads (Abaker, 2006). After the conflict, the number of women being widowed or divorced increased, they were acting as household heads and bearing additional responsibilities. In fact, women in Africa gained a paramount importance, they contribute to food production and food security of their households, not only that, they are often the main food producers, income earners, and guardians of family health and nutrition, they taken care of the elderly family members (Alamgir and Arona, 1991).

4.1.2 Age of the respondents:

Age is an important factor that can determine, influence and shape human income generated, productivity, output and overall individual livelihoods. It may also affect human mental and physical abilities.

The age distribution of the respondents in the study area (table 4.1.2) revealed that first period (2000) was characterized by prevalence of young respondents less than 20 years old, throughout this period, respondents were dominated by young people who are active and hence the majority are within the productive age group.

Table 4.1.2: Age of the respondents in Central Darfur State

Age	2000	2006	2012
	%	%	%
less than 20	4.5	0	0
20 – 25	10.9	5	0
26 – 31	18.3	9.9	5.3
32 – 37	15.8	18.8	9.9
38 – 43	26.7	15.3	19.3
44 – 49	14.9	27.2	14.4
50 – 55	4.5	15.3	27.2
56 – 61	4.0	3.5	14.9
62 – 67	0.5	5	4
Above 67	0	0	5
Total	100	100	100

Source: field survey, 2015.

In the second period (2006), the age distribution of the respondents in Central Darfur State after the conflict has erupted. This period was characterized by disappearance of younger respondents with less than 20 years old and appearance of an age group within 62-67 years. So far, the majority were in production age.

The third period (2012) shows the age distribution of the respondents in the study area after relative peace. The period was characterized by the disappearance of younger respondents with less than 20 years old, the youngest age group falls within 26-31years, in this period people with an age above 67 years old appeared.

These findings agree with those obtained by Nem, et. al. (2011) where the majority of people are in the range of age groups (26 -55) that are

economically more active and productive. During conflict young people are usually vulnerable to be engaged in wars this is why human capital become in danger and is most likely to be misused by warlords, therefore they will no longer be able to generate income or pursuit other livelihood strategies and basic human needs.

4.1.3 Education level of the respondents

The analysis of the pre conflict education level of the respondents depicted in table 4.1.3a showed that 25.2% of the respondents were illiterate, 29.7% having *Khlawa* education which is considered as informal education, however the two group constitute about 54.9% (111) of the total respondents.

Table 4.1.3a: Education level of the respondents

Household head education level	2000	2006	2012
	%	%	%
Illiterate	25.2	24.3	20.8
Khalwa	29.7	28.7	27.2
Basic	26.7	20.8	24.8
Secondary	15.3	21.3	14.9
University	3	5	12.4
Total	100	100	100

Source: field survey, 2015.

The percentage of those not having a formal education was comparatively high if compared with the rest of interviewees, for instance 26.7% having basic school, 15.3% secondary school and 3% university education.

In spite of unstable conditions prevailing during conflict, the situation of education among respondents was slightly changed, the total percentage of respondents having informal education decreased to 53%; (24.3% and 28.7%

for illiterate and *Khalwa*, respectively), basic education became 20.8%, secondary education 21.3%, and university education was 5%.

In table 4.1.3a for the third period in 2012, after people enjoyed peace, they became more exposed, more aware concerning education and knowledge in general. Therefore, illiterate and *Khalwa* groups changed to 48% with 97 respondents, and basic education 24.8%, secondary education to 14.9% and university education jumped to 12.4%, with majority of female respondents being illiterate (table 4.1.3b).

Table 4.1.3b: Cross tabulation of HHH gender and education level

Education level	Gender of the house head								
	2000			2006			2012		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Illiterate	15	36	51	15	34	49	13	29	42
Khalwa	51	9	60	50	8	58	46	9	55
Basic	23	31	54	14	28	42	19	31	50
Secondary	14	17	31	22	21	43	12	18	30
University	3	3	6	5	5	10	16	9	25
Total	106	96	202	106	96	202	106	96	202

Source: field survey, 2015.

The results were consistent with a recent research conducted by Merghani (2016) who indicated that, women headed household were characterized by high illiteracy rates estimated by 63.6%.

Women account for roughly half the world's population, perform two-thirds of the hours worked, receive one-tenth of the world's income, and have less than one hundredth of the world's property registered in their names (Kingdon 2002). Moreover, according to Kingdon (2002), human capital theory suggests that just as physical capital for instance machines boosts people's economic productivity, so human capital acquired through education improves the productivity of individuals, thus women require

human capital development. However, Junior, (2003) added that education is critical since the better-paid local jobs require formal schooling.
Furthermore, Strawiński, (2011) believed that, in today's world, education is a necessity, and for that reason, it has assumed an increasingly important role in future plans, especially for young people. During the educational process people gain necessary skills and competencies to be able to function on different competitive markets. Higher levels of education are associated with higher income, a more prestigious career, lower risk of unemployment and an improved well-being. Education is also a key factor in promoting and sustaining economic growth and technological development.

A survey conducted by Penitsch and Scherbaum (2006) in Darfur region before the split of the region into five states, revealed very surprising results, they found that about 74% of the interviewees have not attended any type of school. The highest proportion of illiteracy was found in the locality of Wadi Salih in CDS which was about 82%. These figures reflect the situation in rural Darfur where illiteracy is generally very high, especially among women.
However, in the study area, women need special attention, a more recent survey carried out by Abaker, (2016) commissioned by UNEP affirmed the role played by women, in the absence of the husband, they act as household heads responsible of all household day-to-day activities. In fact, this spot lights on the importance of women contribution to household food security. In spite of this, they lack basic needs and rights such as education.

4.1.4 Marital status and family size:

Pre conflict in CDS namely in 2000, the majority of the respondents were married, while the rest were either single or widowed (table 4.1.4a). Within

this period, the majority of married male respondents have one wife, with the rest either having two wives or single.

Table 4.1.4a: Marital status of household

Marital Status	2000	2006	2012
	%	%	%
Single	13.4	3	0.5
Married	86.1	87.6	94.1
Divorced	0	2.5	1.5
Widowed	0.5	6.9	4.0
Total	100	100	100

Source: field survey, 2015

After the conflict in 2006 the percentage of married and widowed respondents increased and the percentage of single respondents decreased while a new group of divorced emerged. This may be attributed to the conflict and the situation of instability and its adverse implications and consequences. Concerning the percentage of married male respondents who have one wife decreased if compared to the first period while the number of those having two wives increased. After peace in 2012, the percentage of married respondents was the highest which may be an indication of comparative peace people enjoying, and the group of single and divorced male disappeared and the number of widows decreased (table 4.1.4a).

Results revealed that, before the conflict in the study area, most of the sampled household's family members fall within the group 2-5 members/household constituting 56.9% with a total number of 115 households, the second group in the same period constitute 40.1% with a family size within the group 6-9, (81) and 6 households with 3% having family size ranging between 10-14 members. After the conflict 52.5% of household's family members fall within the group 6-9 members per

household while 41.6% fall within the age group of 2-5 members per household, showing an increase in family size per household. After 2012 when the situation become more stable, it is found that, about 46% of the family size fall in the group of 6-9 members, 38.1 in the age group of 2-5 members while 14.9% were found to have family members ranging between 10-14 members (table 4.3b).

Table 4.1.4b: household's family size

Family size	2000	2006	2012
	%	%	%
2-5	56.9	41.6	38.1
6-9	40.1	52.5	46
10-14	3	5.9	14.9
15-18	0	0	1
Total	100	100	100

Source: field survey, 2015

A study conducted by WFP (2012-2013) found that the average household size was 6 members compared with the results obtained by Teabin (2014) in Wadbanda town, North Kordofan State which found the average family size was seven persons. A more recent survey made by Abaker in 2016 in West and Central Darfur States found the average family size of the households was seven members, however, it is above the conventional family size that usually studies used to report which is six people per household. Another research conducted by Abaker and Hassan (2015) in the study area appears to support the third period of 2012 concerning family size which found to be ranging between 6-9 members.

According to the last population census, on average a Sudanese woman gives birth to five to six children in her lifetime, with some decline in fertility

trends during the last three decades compared to seven children per woman in 1973 population census (UNFPA (n.d)).

Results also showed that polygamy is well known in the study area, this indicate peoples' willingness to have large family size which may reach four wives per a single male (table 4.1.4c).

Table 4.1.4c: Percentage of wives/male household head in CDS

period	% of wives/male				Not applicable			Total
	1	2	3	4	single	divorced	widow	
	%							
2000	80	8	0	0	11	0	0	100
2006	60	27	0	0	4	4	5	100
2012	58	35	3	1	0	0	3	100

Source: field survey, 2015

The Results obtained were in line with those reported by Hassan (1987) who reported that one of the important factors underlying traditional attitude to having large families is social prestige. However, from economic point of view large family size means, more productive capacity in terms of labor input. This coincides with the fact that male household heads in the study area make use of the members of the household as farm labors especially during peace in order to increase their production by increasing the household member's contribution, and thus increase household income. However, in some cases, marriage decision may be simply because the wife has large fertile land which is an important asset through which family may increase its income and achieve food security and eventually the household livelihoods.

4.1.5 Residence of the respondent

Before the conflict, the results revealed that 15.3% of the respondents live in town, 56.4% live in village, 27.2% live in fareeg and 1% live in damra while with no one living in IDP camps. After the conflict, the previous demographic set up was completely changed, percentage of population living in town increased to 19.3% as a result of population influx from surrounding country sides escaping conflict, on the other hand village and Fareeg dwellers decreased for the same reason and therefore their percentage became 8.4% and 11.9%, respectively. Furthermore, in this period, the conflict caused mass displacement of population from their original places to large IDP camps usually around big towns and in this period their percentage jumped from zero before the conflict to 45%, (table 4.1.5).

Table 4.1.5: Residence of the respondent

Residence	2000	2006	2012
	%	%	%
Town	15.3	19.3	19.3
Village	56.4	8.4	11.9
Fareeg	27.2	11.9	7.9
IDPs camp	0	45	41.6
Damra	1	15.3	19.3
Total	100	100	100

Source: field survey, 2015.

The implications of this demographic movement was adverse as people abandoned their original villages. However, people lost previous assets such as human, physical, natural, social, and political assets and other sources of income generation and became idle without jobs, depending mainly on humanitarian aid provided by NGOs. However, many studies clarified the implication of receiving food aid, for instance Siyoum (2012) argued that, Long-term provision of aid to people in need of assistance has been

associated with fear of creating a dependency syndrome. The primary concerns are that beneficiaries will lose the motivation to work to improve their own livelihoods after receiving benefits, or that they will deliberately reduce their work efforts.

In this period, nomads tend to establish new Damra settlements where they were able to construct schools for their children, and enjoy other basic services and became more agro pastoralist than before. However, as villagers residence shifted to IDP camps and towns, nomads residences were too changed the pasioralists way of life, and many scholars pointed out these were conflict consequnces on the population. For istance, Tubiana, (2007) mentioned that nomad elders often stay in the Damra, while the younger men travel with the herds. The point was emphasized by Fitzpatrick et al, (2015), who indicated that, camel pastoralism was traditionally associated with a nomadic way of life, with no fixed or permanent residence, this is rapidly changing, with increasing sedentarization where families settling in one place while the herds continue to practice seasonal mobility. Nomads frequently claim land in order to be able to develop, export their camels and cows, have villages where they can educate their children and so they can go to universities (Tubiana, (2007). But the mobiling nomads youth are migrating and responsible of feeding animal, occasionally destroy farms and cause conflict during harvesting time, they may sometimes lead elders to join them and cause conflict.

Jaspars and O'Callaghan, (2008) pointed out that, pastoralist communities are also affected by increasing commodities prices. Nonetheless, there is strong evidence that some pastoralist groups or individuals were also deriving benefits from the conflict. On the other hand, Badreldin et al, (2016) described IDPs situation after the conflict, generally IDPs lose their social, legal and economic ties, thus suffer considerable physical and psychological

hardship. The majority of them were living under the poverty line as they do not have enough income to treat illnesses including malnutrition, respiratory and gastro-intestinal infections, scabies, parasitic infestations and malaria. Further, they face food shortages, food insecurity, unsafe water, insufficient healthcare, poor sanitation, poor housing and re-establishing livelihoods in areas of temporary settlement or reintegration in unstable areas where the traditional means of livelihoods were no longer viable". Within the third period (2012), people started to return voluntarily, this was indicated by decreasing number (84) and percentage (41.6%) of IDPs, but this period was essentially characterized by increase and development in numbers and percentages of Damra settlements (19.3%), which reveals the nomads' new perspectives and policies towards their future residence and related issues, the main characteristic of this perspective was nomadic sedentarization.

4.1.6 Security situation and economic activities

Table 4.1.6a explores the security situation in the study area throughout the three periods of the study.

Table 4.1.6a: Security situation

Security situation	2000	2006	2012
	%	%	%
Yes	99.5	43.6	78.2
No	0.5	56.4	21.8
Total	100	100	100
Pay security fees	%	%	%
Yes	1	15.8	28.2
No	99	84.2	71.8
Total	100	100	100

Source: field survey, 2015.

Respondents were asked to respond whether security situation is suitable for undertaking economic activities, before the conflict in 2000, about 99.5% of

interviewed replied by “yes” with only 0.5% replied by “no”, this was an indication of good security situation they used to enjoy at that time. After the conflict erupted mainly in 2006, the situation was entirely different, 43.6% replied to the same question by “yes”, while the majority (56.4%) replied by “no”. These figures reflect the prevailing deteriorated security situation at that period, income generating activities other livelihood strategies were assumed to be affected by instability, restriction of movement and assets loss or inaccessibility. However, Kagwanja and Mutahi (2007) believed that, the protection of civilians in Darfur was a challenge for both the AU and its international partners. This period was characterized by payments imposed for protection or security fees charged. About 15.8% of interviewed replied that they pay security fees in order to keep their lives and be capable of undertaking different economic activates peacefully.

In 2012 and later years, the security became to some extent conducive for the different livelihood groups in the study area to undertake economic activities, where about 78.2% of the respondents answered the security situation question raised above by “yes” against 21.8% who answered by “no”. Although this period was of comparative peace, it is assumed that people enjoy stability but surprisingly, the percentage of people paying protection fees increased to become 28.2%, this might be attributed to the fact that, more people were able to go to the outskirts of towns, villages or IDP camps for different activities and therefore more people were been charged protection fees.

Following this in Central Darfur State, a farmer reported to Radio Dabanga from Ki Beih and Kubri El Nahal areas near Nyrtete town, West Jebel Marra locality, that militiamen have imposed protection fees on farmers. they ordered to pay 80 SDG for every two acres (an acre = $4046.9\ m^2$), besides 3.145 kg of sorghum a week.

Likewise, in North Darfur state for instance, a sheikh of the Fata Borno camp for the displaced reported to Radio Dabanga that, each displaced family has to pay 10 SDG and three bowls of sorghum for the protection of their farms. He mentioned that the militiamen were located at the police station of Fata Borno, since the police withdrawn from the locality.

One more thing that needs to be highlighted is to answer the question - "who receive the protection fees?". Respondents mentioned various answers, some mentioned that they pay to the government, other think to local leaders, or nomads who are able to move freely on the countryside, or even coexisting committees, who were usually formulated locally in order to intervene when conflict occur between the different livelihood groups. While some of the respondents were indifferent and cannot differentiate these groups, in such a situation where things look like each other, they were not able to distinguish WHO is WHO (table 4.1.6b).

Table 4.1.6b: Who receives security fees?

Receiver of security fees	2000	2006	2012
	%	%	%
Government	0	1.5	0.5
Local Leaders	1	11.9	8.9
Government & Local Leaders	0	0.5	0
Nomads	0	1.5	9.4
Coexisting committees	0	0.5	9.4
Not applicable	99	84.2	71.8
Total	100	100	100

Source: field survey, 2015.

4.1.7 Economic activities:

In Central Darfur State, people undertake a variety and diversified activities by which they can generate income and eventually achieve their livelihoods, among these activities include the main economic activities, which are the

basic livelihood activates upon which the State's population depend on as sources of income and survival and secondary or minor additional activities which their contribution was found to be very effective. Households were asked to mention all livelihood strategies and income generating activities and the contribution to total income, listed below were the most essential and basic activities:

- Income from crop production (agriculture)
- Income from raising livestock
- Income from employment
- Income from labour
- Income from trade
- Income from selling food and nonfood aid (relief)
- Income from additional or secondary activities
- Income from household members' share

Prior to the conflict in Central Darfur State, the population depended principally on agriculture as a main source of income followed and supported by livestock production. People do not specialize on one job, rather they tend to diversify income sources. The survey results in pre conflict period, revealed that agriculture accounted for 21.8%, livestock for 5.4%, and those practicing agriculture and raising livestock, accounted for 38.6%. These two activities dominate livelihoods and income source pre conflict and account for 65.8%.

Other economic activities contributing with considerable share of income and account together for 34.2% were trade, wage labour, government employment. Combination of different activities is usually practiced as safeguard from risks, crisis and other adverse conditions likely to face the household (table 4.1.7)

Table 4.1.7: Main economic activities

Main economic activities	2000	2006	2012
	%	%	%
Agriculture	21.8	3	4
Livestock	5.4	1.5	1
Trade	0.5	2.5	.5
Employment	6.9	6.9	6.4
Labour	1.0	1.5	.5
Aid	-	21.8	3.5
Agriculture & trade	8.9	2	4.5
Agriculture & employment	9.4	3	4
Agriculture & aid	-	5	20.8
Aid & employment	-	13.9	9.4
Agriculture, employment & aid	1	1	5.9
Agriculture & livestock	38.6	25.2	24.3
Aid & labour	-	4.5	3.5
Agriculture, labour & livestock	0.5	-	-
Agriculture, trade & livestock	-	-	0.5
Agriculture & labour	5.9	1.0	2.5
Aid &trade	-	3.5	0.5
Employment, aid & trade	-	0.5	0.5
Agriculture, aid & labour	-	3.0	4.0
Agriculture, aid & trade	-	0.5	4.0
Total	100	100	100

Source: field survey, 2015

After the conflict has set up, agriculture & livestock still maintain their importance as most activities practiced but with less percentage than the previous period (25.2%). The People who used to practice crop production were sedentary farmers who used to farm and keep animals, they became displaced in IDP camps as consequences of the recent conflict which caused mass displacement from their original settlements. In this period, a considerable percentage of the people of the State became dependent on humanitarian relief (21.8%), they lost their producing capitals, (money, animals, land …etc.). In this situation, mainly sedentary farmers deprived of

their production means and became unable to generate income effectively. Nomads practiced agricultural activities more than before besides livestock and became agro pastoralists.

People in the study area used to diversify their livelihoods and sources of income, besides the main economic activities. The majority (54.5%) practiced secondary economic activities while 45.5% depended on the main economic activities only. Broadly speaking, the most important secondary economic activities reported by household heads were: tea making mainly for women, charcoal and firewood collection, brick making, construction, petty trade, working with NGOs and working with Popular Defense Forces (PDF); Border Guards Forces (BGF) and recently the Rapid Support Forces (RSF). Flint (2010) described them as paramilitary, the majority recruited were of Arabs origin mainly pastoralist.

4.1.8 Livestock ownership

Livestock raising rank second after agriculture as an economic activity in the study area. People of different livelihood groups possess animals for different purposes whether social or economic. Livestock is an important kind of asset, sometimes people consider it as a form of savings. Either people practice it separately or in conjunction with other income generating activities especially crop production.

In 2000 before the conflict in central Darfur, 51.5% of the respondents keep livestock while 48.5% of them replied that they do not rear livestock.

After the conflict, the percentage of interviewees keeping animal decreased to only 28.2% and the majority that constitute about 71.8% of the respondents were not able to keep animals, because of multiple reasons with insecurity being the first. Within this period, 21.8% of the respondents lost livestock as a consequence of conflict in the area at that time.

In the period of 2012, where people relatively enjoyed peace, they started re-stocking their animal folks, but it was noticed that changes in figures and percentages of animal were too slight (table 4.1.8).

Table 4.1.8: livestock ownership in Central Darfur State

Livestock ownership	2000	2006	2012
	%	%	%
Yes	51.5	28.2	26.7
No	48.5	71.8	73.3
Total	100	100	100
When you lost livestock	0.5	21.8	3

Source: Field survey, 2015

Cows dominate livestock in the study area, then sheep come next, goats, camels and others. However, looting, stressed or forced selling and animal death due to diseases or adverse conditions were the main means for losing livestock in CDS.

4.1.9 Land; ownership and utilization:

land is a symbol of prestige and a major support to livelihoods in rural areas, therefore, people stick with it for the sake of pride, food production and income (Mahmood et al., 2014). In Darfur, land is the key natural resource, it is primarily used for production of crops and raising livestock (Olsson, 2010). In Darfur in general and particularly in CDS, land ownership, access, and utilization are matters of power, economy, political and social status, all are imbedded on land, therefore, conflict occur frequently and fundamentally on land ownership and access throughout the Darfur recent history, including the three periods under study.

Based on the importance of land mentioned above, during the first period, table 4.1.9a, 4.1.9b and 4.1.9c explain that, about 81.2% of the respondents

own land while only 18.8% don't own land. Land holdings are relatively small, the majority (51%) of farm size within 1-5 feddans (one feddan = 4200 m^2) and 6-10 feddans constitute 31.2%. Some respondents don't practice agriculture either because of land unavailability or they shifted to other jobs.

Table 4.1.9a: land ownership in CDS

Land ownership	2000	2006	2012
	%	%	%
Yes	81.2	83.7	86.1
No	18.8	16.3	13.9
Total	100	100	100

Source: Field survey, 2015

Table 4.1.9b: Practicing agriculture in CDS

Practice agriculture	2000	2006	2012
	%	%	%
Yes	85.6	44.1	75.2
No	14.4	55.9	24.8
Total	100	100	100

Source: Field survey, 2015

In the pre conflict period, before 2003, most households were characterized by having multiple fields. However, according to Fitzpatrick et al, (2015), some were near a wadi where they were often more fertile and less at risk for drought, but more at risk for insects and flooding. The second period was characterized by a sharp drop in the number and percentage of people who depended on agriculture to generate income or make a living (44.1%) against 55.9% who were not practicing agriculture and depended on other sources of income and livelihood strategies.

Table 4.1.9c: Farm size and why not practicing agriculture in CDS

Farm size	2000	2006	2012
	%	%	%
0	14.4	55.9	254.8
1-5	51	31.7	47.5
6-10	31.2	10.9	25.2
11-15	2.5	0.5	1.5
16-20	0.5	0.5	0.5
1bove 20	0.5	0.5	0.5
Total	100	100	100
Reason for not practice agriculture	%	%	%
Security	0	39.6	8.9
Security & destruction by animal	0	2,5	2
No land	4	0.5	0
Shifted to another job	10.4	13.4	13.9
Not applicable	85.6	44.1	75.2
Total	100	100	100

Source: Field survey, 2015

This may be attributed to the fact that, after the onset of the conflict, security situation was the major reason behind declining farmers' numbers and percentage. However, people to resorted to more secured and available alternatives for income generating activities among them was dependency on humanitarian relief aids. In the third period, the number of farmers increased 152 (75.2%) with only 50 respondents (24.8%) not cultivating for different reasons and security situation was not the important and significant determinant that hinder agricultural activities.

4.2 Household annual income

In Central darfur State, when analysing and evaluating different income generatimg activities and their contribution to the household total income throughout the three periods, it is found that, before the conflict in 2000, the highest contribution to the household total income was made by household members share which reached 31% of the total household annual income. This emphasizes our previous justification of the advantage of having a large family in CDS and so male respondents tend to have more than one wife.

Income from Agriculture (crop production) ranked as a second livelihoods and income source before the conflict (21%), indicating the importance of agriculture in the family income. Income from livestock came third in importance with 13%. However, both crop production and livestock together constitute 34%, therefore, the results came in line with FAO, UNOPS and ILO, (2016) when they argued that, the economy of the Darfur region is heavily based on farming and livestock.

Despite the importance of agriculture as a backbone of Central Darfur State economy, income incurred from crop production and livestock per year was particularly low in comparison with other sources of income, this may be attributed to the fact that agriculture is practiced traditionally and for subsistence purposes, it is rain fed and characterized by low productivity and consequently low income.

Average income from trade was 13%, it equals livestock share, and secondary income source 9%, employment 8%, labour 5% while contribution of aids, relief and humanitarian food assistance was negligible (table 4.2.1).

Table 4.2.1: Average HH annual income contribution (three periods).

Income generating activity	Average Annual Contribution (SDG)					
	Pre conflict		After conflict		Peace	
	Amount	%	Amount	%	Amount	%
Income from agriculture	577.6931	21	1138.243	10	5480.243	22
Income from livestock	371.2624	13	817.896	8	1252.772	5
Income from employment	231.9802	8	1586.634	15	4414.356	18
Income from labour	122.7723	5	551.4851	5	1118.317	5
Income from trade	369.802	13	871.2871	8	1915.842	8
Income from aid	0.7426	0	1680.446	15	2217.673	9
Income from secondary Jobs	257.2277	9	2259.455	21	4972.03	20
Income from HHM share	860.396	31	1907.426	18	3242.079	13
Household total income	2791.8763	100	10812.8722	100	24613.312	100
Household total expenditure	2415.074	87	8843.965	82	20213.16	82

Source: field survey, 2015

After the conflict; in 2006, people were not able to undertake the daily income activities they used to for many reasons, insecurity being the most important of them. Sedentary farmers; the most crop producers became IDPs and lost the main assets of producing income; land and livestock.

During this period, people's movement was either restricted or limited. In this circumstances, crop production and livestock share to annual household income of the respondents sharply declined and jointly became 18% (10% and 8%, respectively). The decrease reached 47% compared to their share before the conflict. Alternatives for livelihoods and income were described as rare, dangerous or risky, thus humanitarian food assistance was one alternative which accounted for 15%. Other alternatives were, dependence on secondary occupations, share of household members which accounted for 21% and 18%, respectively, while employment shared by15%, trade by 8% and labour by 6%.

Jeremy and Alan, (2012) assured that, trade has long been the backbone of the Darfuri economy and provides the main way in which different livelihood groups interact.

After the conflict, rural markets have been restricted by attacks, transaction costs like, informal taxes or protection fees. Pre-conflict informal credit arrangements have broken down or become more ethnically determined (Smith and Fadul 2008, cited in Jeremy and Alan, 2012).

Eventually, trade was affected adversely by the conflict. Smith et al. (2011) thinks that, even some Darfuri traders face bankruptcy and losses, and on the contrary, business booms for others.

In 2012, income from agriculture was able to attain its usual position in central Darfur economy, its contribution boomed to 22%. Income derived from secondary occupations ranked second (scoring 20%) indicating the scarcity or unavailability of main jobs by which people used to incur money and pursuit their livelihoods. Employment was the third main occupation in this period 18%, income from household members share 13%.

This period witnessed a reduction of humanitarian assistance and relief contribution, it has retreated to 9% as a result of rations cut-of made by providing organizations. Trade 8%, labour 5%. This period was also characterized by a sharp decline of livestock income sources contribution; this may be due to inability of sedentary farmers who used to rear livestock in conjunction with agriculture, they still unable to keep animals because they are subjected to looting.

On the other hand, pastoralists who were main animal keepers now resort to easier and comfortable jobs such as joining military force, gold mining, cars trading from West Africa and Libya, etc. and therefore causing decrease of livestock share to family annual income.

One more word to be said; during the three periods under study, household expenditure is kept very close to their total income, and on average, about 87%, (2000), 82% (2006) and 82% (2012) of total income is consumed in different aspects such as cereals, meat, sugar, health, education, milk, vegetables, cooking oil, onion etc. It was showing the tendency of households to save even during adverse conditions of 2006.

4.3 SUR results and hypothesis testing:

4.3.1 Preamble:

As stated before, Seemingly Unrelated Regression, is a single model that contains a set of linear equations that has contemporaneous cross-equation error correlation, thus the error terms in the regression equations are correlated. A SUR is so-called because the dependent variables may seem unrelated across the equations at first sight, but a more careful consideration would allow us to conclude that they are in fact related after all (Brooks, 2013). They are related through the correlation in the errors. In this study, the sample selected contains 202 respondents from seven localities, out of the total number of nine localities constituting Central Darfur State. Three periods were selected to be investigated, with an interval of six years between each adjacent years as follows:

The first period (2000) represents pre conflict; the second period (2006) represents conflict and the third period (2012) represents relative peace.
The study examined first the impact of the recent conflict erupted in the study area on the household total income generated from different activities. Three equations were formulated, one for the total household income in the first period, second for the total household income in the second period and third, for the total household income in the third period.

Income in each period was predicted by ten variables, five of them were dummy variables with different categories while the other five variables were continuous, the total number of model regressors was 18. (Y_i) is the dependent variable predicted by (Xi); the independent variables modeling the relationship between(Y_i) and (X_i) by the virtue of the so called Seemingly Unrelated Regression, where the three equations are linked, then a more efficient estimator can be obtained by estimating the three equations jointly as one equation, and the process may be elucidated as follows:

Table 4.3.1a: Specification of SUR equations for the total HH income

(Y_i)	(X_i	Variable name
Y [HH total income in the first period (Pre conflict 2000) HH total income in the second period (Conflict 2006) HH total income in the third period (Peace 2012)]	X_1	HHH Sex
	X_2	HHH Age
	X_3	HHH Residence
	X_4	HHH Marital status
	X_5	HHH Education level
	X_6	HH Family size
	X_7	Security status
	X_8	Area cultivated
	X_9	Production of millet
	X_{10}	HH Expenditure

To examine and study the impact of the recent conflict erupted in the study area on the household total income generated and track it activity by activity, each activity was predicted individually for the three periods 2000, 2006 and 2012, exactly like the total household income. Each activity was regressed against ten independent variables; dummy variables have categories ending with 18 regressors for the three periods. However, three regression equations were established for each activity, and then by using the SUR model, a one equation was formulated imbedding three periods to capture the impact of conflict on household income generating activities in the study area. The

default level of significance set throughout this study is $\alpha = 0.05$. Equations for the total household income and following income sources from different activities were estimated. The estimated coefficients represent change in the dependent variable caused by changes in the explanatory variables (4.3.1b).

Table 4.3.1b: Specification of SUR equation for each IGA

SUR No	Y_i The dependent variable	The independent variable	
		X_i	Variable name
1	Y_i Income from crop production 2000; Y_2 Income from crop production 2006; Y_3 Income from crop production 2012	X_1	HHH Sex
2	Y_1 Income from livestock 2000; Y_2 Income from livestock 2006; Y_3 Income from livestock 2012).	X_2	HHH Age
3	Y_1 Income from employment 2000; Y_2 Income from employment 2006; Y_3 Income from employment 2012	X_3	HHH Residence
4	Y_1 Income from labour 2000; Y_2 Income from labour 2006; Y_3 Income from labour 2012	X_4	HHH Marital status
5	Y_1 Income from trade 2000; Y_2 Income from trade 2006; Y_3 Income from trade 2012	X_5	HHH Education level
6	Y_1 Income from aid relief 2000; Y_2 Income from aid relief 2006; Y_3 Income from aid relief 2012;	X_6	HH Family size
7	Y_1 Income from secondary activities 2000; Y_2 Income from secondary activities 2006; Y_3 Income from secondary activities 2012	X_7	Security status
8	Y_1 Income from HHM share 2000; Y_2 Income from HHM share 2006; Y_3 Income from HHM share 2012	X_8	Production of millet
		X_9	Area cultivated
		X_{10}	HH Expenditure

4.3.2 Total Household Income:

The results of regression analysis using Seemingly Unrelated Regression (SUR) model, to examine the effect of a set of independent variables on total annual income of the household in Central Darfur State.

In the pre conflict period, the results showed that the value of Chi-Square was 968.28, with its corresponding p-value equal to 0.000, it was less than the significance level of 0.05, rejecting the null hypothesis and thus the model provides a better fit.

The R^2 is another measure of the goodness of fit of a regression equation (Gujarati et al, 2009), however, the value of R^2 was 0.83, this means that, about 83% percent of the variation in household total income for the first period (2000), which is pre conflict period, is explained by the independent variables included in the model, whereas the R^2 term for the remaining two period (is 0.31 for 2006 and 0.56 for 2012) denoting that the variation on the dependent variables during these periods were explained by 31% and 56%, respectively

From the information in the SUR regression model output, I can write a set of equations for total household income and income generated from different activities with respect to the dependent variables. There are many ways and scenarios by which the SUR regression model results could be displayed, but will be confined by the problem stated and the research objectives, the hypotheses and the significance of the values of z and p.

4.3.2.1 Pre conflict

In this period, only two variables were found to have an impact on total household income, fareeg variable and household total expenditure. (table 4.3.2).

Table 4.3.2: SUR results summary: household total income

Variables	Pre conflict 2000	Conflict 2006	Peace 2012
Gender	0.021073	-0.0506592	0.030453
Age	-0.0447117	-0.0361618	0.0822065
Town	0.0027605	0.0976015	0.0288507
IDPs camp	(dropped)	-0.2830575	-0.0291971
Fareeg	-0.0555915*	0.0218142	-0.0408013
Damra	0.1502302	-0.0086232	-0.0641105
Married	-0.0185462	-0.1126885	0.1328001
Divorced	-0.1499569	-0.0613798	-0.0167757
Widow	-0.0765506	-0.0095981	0.2487112
Khalwa	0.0031166	0.0229642	0.0097571
Basic	-0.0288404	0.0444307	0.0217546
Secondary	-0.0343237	-0.0123962	0.0966883
University	-0.0858015	-0.9347573***	0.1580897**
HH family size	0.0483551	-0.0164429	-0.0411868
Security	0.0818846	-0.565556**	-0.0292073
Total area cultivated	-0.009409	0.1092131	0.0169667
Production of millet	0.0068668	0.0787814	0.044805***
Household expenditure	1.322399***	1.118233***	1.009978***
Constant	-2.388446***	-0.4983538	-0.4191602
R^2	0.83	0.31	0.59
Chi square	968.28***	84.74***	285.83***
N	202	202	202
* Significant at 10%	** Significant at 5%		*** Significant at 1%

Source: Field survey, 2015

1. Fareeg residence

Residence village ($D_2 = 0$) $Lny_{2000} = \alpha_0 + \alpha_1 D_1 + \beta_1 LnX_1 + \alpha_3 D_3 + \alpha_4 D_4 + \beta_2 LnX_2 + \alpha_5 D_5 + \beta_3 LnX_3 + \beta_4 LnX_4 + \beta_5 LnX_5 + u_i$

Residence village ($D_2 = 0$) $Lny_{2000} = -2.39 + \alpha_1 D_1 - 0.04\, LnX_1 - 0.06(0) + \alpha_3 D_3 + \alpha_4 D_4 + 0.05 LnX_2 + \alpha_5 D_5 - 0.009 LnX_3 + 0.007 LnX_4 + 1.32\, LnX_5 + u_i$

The effect of the omitted category was reflected by the intercept (equal 2.39)

While if the residence is fareeg ($D_2 = 1$) then the equation will be:

Residence fareeg ($D_2 = 1$) $Lny_{2000} = (\alpha_0 + \alpha_2) + \alpha_1 D_1 + \beta_1 LnX_1 + \alpha_3 D_3 + \alpha_4 D_4 + \beta_2 LnX_2 + \alpha_5 D_5 + \beta_3 LnX_3 + \beta_4 LnX_4 + \beta_5 LnX_5 + u_i$

The estimated regression equation gives rise to the effect made by fareeg dummy variable which will be:

Residence fareeg $(D_2 = 1)\ Lny_{2000} = (-2.39 - 0.06) + \alpha_1 D_1 - 0.04\ LnX_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.05 LnX_2 + \alpha_5 D_5 - 0.009 LnX_3 + 0.007 LnX_4 + 1.32\ LnX_5 + u_i$

Residence fareeg $(D_2 = 1)\ Lny_{2000} = -2.45 + \alpha_1 D_1 - 0.04\ LnX_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.05 LnX_2 + \alpha_5 D_5 - 0.009 LnX_3 + 0.007 LnX_4 + 1.32\ LnX_5 + u_i$

Therefore, the effect of fareeg was reflected by the intercept plus the corresponding coefficient equal to (-2.39 -0.06 = -2.45).

People living in fareeg has total income less by 6% than village residence has. The p-value was 0.078 and not significant at 0.05 level of significance accepting the null hypothesis.

2. Household total expenditure

$Lny_{2000} - 2.39 + \alpha_1 D_1 - 0.04\ LnX_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + 0.05 LnX_2 + \alpha_5 D_5 - 0.009 LnX_3 + 0.007 LnX_4 + 1.32\ LnX_5 + u_i$

The household total expenditure was statistically significant under the 5% significant level telling that, if the household expenditure increased by one percent the household total income will increase by 1.32%. The p-value was 0.000 and significant at 0.05 level of significance rejecting the null hypothesis.

4.3.2.2 Conflict period

In the conflict period, the results in table 4.3.2 depicts that, three independent variables had statistically significant effect on the total household income which were university, security situation and household expenditure.

1. University education:

SUR model output revealed a negative impact of university education on total household income, which was surprising and interesting.

Education level (illiterate) $(D_4 = 0) Lny_{2006} = (-0.5) + \alpha_1 D_1 + \alpha_2 D_2 - 0.04\ LnX_1 + \alpha_3 D_3 - 0.02 LnX_2 + \alpha_5 D_5 + 0.11 LnX_3 + 0.08 LnX_4 + 1.12 LnX_5 + u_i$

Education level (University) (D_4 =1) $Lny_{2006} = (-0.5 - 0.9) + \alpha_1 D_1 + \alpha_2 D_2 - 0.04\, LnX_1 + \alpha_3 D_3 - 0.02 LnX_2 + \alpha_5 D_5 + 0.11 LnX_3 + 0.08 LnX_4 + 1.12 LnX_5 + u_i$

Education level (University) (D_4 =1) $Lny_{2006} = (-1.4) + \alpha_1 D_1 + \alpha_2 D_2 - 0.04\, LnX_1 + \alpha_3 D_3 - 0.02 LnX_2 + \alpha_5 D_5 + 0.11 LnX_3 + 0.08 LnX_4 + 1.12 LnX_5 + u_i$

During conflict, being a university graduate will have on average reduction in income by 1.4, equal to SDG 0.25, while university graduate will have total household income less by 90% than illiterate, the p-value was 0.000 and significant at 0.05 level of significance rejecting the null hypothesis and accepting the alternative hypothesis. However, the result contradicted the a priori and findings by Nem, et al. (2013) who indicated that the respondent with higher educational level can increase their household income rather than those with lower educational level.

Based on the hypothesis testing results, the differences in income between educated and uneducated respondents might be one of the apparent impacts of the conflict in the study area. The possible explanation for the unexpected output might be that, during the conflict especially for IDPs, many people were competing for few jobs, the kinds of the jobs available may not be suitable for their skills. While the illiterate has more ability to cope with the new unusual situation at least in the short run. Moreover, the case might be attributed to many hidden undetected factors emerged during the conflict that need more investigation.

2. Security situation:

During conflict period, the security situation was deteriorated, availability and accessibility to assets that generate income and support other livelihoods strategies became scarce.

Security situation (bad) ($D_5 = 0$) $Lny_{2006} - 0.5 + \alpha_1 D_1 - 0.04\, LnX_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 - 0.02 LnX_2 + 0.11 LnX_3 + 0.08 LnX_4 + 1.12 LnX_5 + u_i$

Security situation (good) $(D_5 = 1)$ $Lny_{2006}\,(-0.5 - 0.57) + \alpha_1 D_1 - 0.04\,LnX_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 - 0.02LnX_2 + 0.11LnX_3 + 0.08LnX_4 + 1.12LnX_5 + \mathrm{u}_i$
Security situation (good) $(D_5 = 1)$ $Lny_{2006}\,(-1.07) + \alpha_1 D_1 - 0.04\,LnX_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 - 0.02LnX_2 + 0.11LnX_3 + 0.08LnX_4 + 1.12LnX_5 + \mathrm{u}_i$

Following this, respondents during conflict period have total household income less by 57% than they have when good security situation prevail. The results suggest that insecurity has a negative impact on total household income. The coefficient was statistically significant at 0.05 level of significance rejecting the null hypothesis.

The a priori supports these results, they were very straightforward outcomes, because during the conflict where people were unwillingly left their homes to elsewhere, mainly sedentary farmers who settled in large IDP camps, or to some extent pastoralists, where they lost assets and consequently lost income generating activities in their new settlements and their mobility was restricted due to the deteriorated security situation.

3. Household expenditure:

$Lny_{2006} = -0.5 + \alpha_1 D_1 - 0.04\,LnX_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + 0.02LnX_2 + \alpha_5 D_5 + 0.11LnX_3 + 0.08LnX_4 + 1.12LnX_5 + \mathrm{u}_i$

The coefficient of household expenditure was highly significant under the normal significant levels. As household total expenditure increases by one percent, the total household income increases by 1.12%. The p-value was 0.000 and significant at 0.05 level of significance rejecting the null hypothesis.

4.3.2.3 Peace period

Table 4.3.2 displays SUR results for the third period of 2012 where three independent variables (university variable, production of millet and total household expenditure) had significant effect on the total household income.

1. University education:

The findings revealed that bad security condition has an adverse effect on the education level as stated before, in contrast, when security situation improved, the coefficient for university category was found to have a positive sign.

Education level illiterate (D_4 =0) $Lny_{2012} = (-0.42) + \alpha_1 D_1 + \alpha_2 D_2 + 0.08\, LnX_1 + \alpha_3 D_3 - 0.04 LnX_2 + \alpha_5 D_5 + 0.02 LnX_3 + 0.04 LnX_4 + 1.01 LnX_5 + u_i$

Education level University (D_4 =1) $Lny_{2012} = (-0.42 + 0.16) + \alpha_1 D_1 + \alpha_2 D_2 + 0.08\, LnX_1 + \alpha_3 D_3 - 0.04 LnX_2 + \alpha_5 D_5 + 0.02 LnX_3 + 0.04 LnX_4 + 1.01 LnX_5 + u_i$

Education level University (D_4 =1) $Lny_{2012} = (-0.26) + \alpha_1 D_1 + \alpha_2 D_2 + 0.08\, LnX_1 + \alpha_3 D_3 - 0.04 LnX_2 + \alpha_5 D_5 + 0.02 LnX_3 + 0.04 LnX_4 + 1.01 LnX_5 + u_i$

The university graduated respondents during stable period have total household income higher by about 16% than illiterates. The a priori supports such results. The coefficient was significant under 5% level of significance.

2. Production of millet

Production of millet was significant under normal significant levels, a 1% increase in production of millet will cause the total household income to increase by 0.04% equivalent to SDG1.04,

$Lny_{2012} = -0.42 + \alpha_1 D_1 + \alpha_2 D_2 + 0.08\, LnX_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.04 LnX_2 + \alpha_5 D_5 + 0.02 LnX_3 + 0.04 LnX_4 + 1.01 LnX_5 + u_i$

The P-value was 0.009 and was significant at 0.05 level of significance the null hypothesis was rejected indicating that people were able to cultivate crops specifically millet.

3. Household expenditure

Household expenditure was significant under normal significant levels, a one percent increase in household expenditure leads total household income to increase by 1.01% which in terms of money equal to SDG 2.75

$Lny_{2012} = -0.42 + \alpha_1 D_1 + \alpha_2 D_2 + 0.08\, LnX_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.04 LnX_2 + \alpha_5 D_5 + 0.02 LnX_3 + 0.04 LnX_4 + 1.01 LnX_5 + u_i$

The p-value was 0.000 and significant at 0.05 level of significance indicating that the predictor was not equal to zero, therefore, rejecting the null hypothesis. The results assumed that as conflict situation gets stable, people tend to increase their expenditure which eventually will increase the total household income increase demand

4.3.3 Household income from agriculture (crop production):

SUR results displayed the situation before the conflict, household income from agriculture (crop production) is the dependent variable while the variables; household head gender, age, residence, marital status, education level, family size, security situation, cultivated farm size, millet production and expenditure were independent variables. The results for the first period (2000), results presented the value of Chi square which was 678.16, indicating the goodness of fit of the model at the p value 0.000. The value of the R^2 was 0.75 and meaning that about 75% of the variation in household income from agriculture (crop production) was explained by the independent variables included in the model. In conflict period (2006), chi squared value was 2721.77, at p-value of 0.0000 indicating the goodness of fit of the overall regression model.

The R square of model in this period has the value of 0.93 suggesting that 93% of the variation in household income from agriculture (crop production) was explained by the independent variables included in the model.

After the security situation was improved, and relative peace prevailed, SUR results presented in table (4.3.3) showed the value of Chi square was 1598.59. It reflects the goodness of fit of the model at the p-value 0.000. The value of the R^2 was 0.88 showing that 88% of the variation in household income from crop production was explained by the independent variables included in the model.

4.3.3.1 Pre conflict period

In this period, four independent variables were found to have an effect on income incurred from crop production which were the variables of fareeg, widow, total area cultivated and production of millet.

Table 4.3.3: SUR results summary: Income from crop production

Variables	Pre conflict 2000	Conflict 2006	Peace 2012
Gender	-0.0809956	0.3677944**	-0.1342083
Age	0.0925948	1.071449**	1.07064**
Town	-0.1658476	-1.282307***	-0.7312504**
IDPs camp	(dropped)	-1.285143***	-0.5576556*
Fareeg	-0.5509633**	-0.6773862*	-1.304848***
Damra	-0.668714	-0.754163**	-1.153583***
Married	0.2239348	0.2270297	2.622815**
Divorced	0.0906879	-0.4816747	2.258554
Widow	-4.900391***	-0.1875513	2.232064
Khalwa	0.2420504	0.1392502	0.350589
Basic	-0.2976879	-0.0599255	0.3281868
Secondary	-0.3976259	-0.1409407	-0.2914303
University	-0.69684	-0.1511109	-0.6351521
HH family size	0.2213596	-0.7195211**	-0.8074891**
Security	-1.337299	-0.2020061	.6926645***
Total area cultivated	1.864599***	2.920771***	2.825486***
Production of millet	0.6480351***	0.7468171***	0.7430979***
Household expenditure	0.5062974	0.4905204*	0.3524855
Constant	-2.330928	-5.982034**	-7.534405
R^2	0.75	0.93	0.88
Chi square	678.16***	2721.77***	1598.59***
N	202	202	202
***** Significant at 10%	****** Significant at 5%	******* Significant at 1%	

Source: Field survey, 2015

1. Fareeg residence

Residence village $(D_2 = 0)$ $Lny_{2000} = (-2.33) + \alpha_1 D_1 - 0.09\, LnX_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.22 LnX_2 + \alpha_5 D_5 + 1.86 LnX_3 + 0.65 LnX_4 + 0.51 LnX_5 + u_i$

Residence fareeg $(D_2 = 1)$ $Lny_{2000} = (-2.33 - 0.55) + \alpha_1 D_1 - 0.09\, LnX_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.22 LnX_2 + \alpha_5 D_5 + 1.86 LnX_3 + 0.65 LnX_4 + 0.51 LnX_5 + u_i$

The results suggested that, people living in fareeg settlement has income from crop production less by 55% than people living in village residence and this was equal to 0.58 SDG. The p-value was 0.013, since, it was significant at 0.05 level of significance rejecting the null hypothesis and concluding that people living in fareeg settlement has household income from crop production less than people living in villages.

2. Marital status (widow)

Marital status (single) $(D_3 = 0)$ $Lny_{2000} = (-2.33) + \alpha_1 D_1 - 0.09\, LnX_1 + \alpha_2 D_2 + \alpha_4 D_4 - 0.22 LnX_2 + \alpha_5 D_5 + 1.86 LnX_3 + 0.65 LnX_4 + 0.51 LnX_5 + \mathrm{u}_i$

Marital status (widow) $(D_3 = 1)$ $Lny_{2000} = (-2.33 - 4.9) + \alpha_1 D_1 - 0.09\, LnX_1 + \alpha_2 D_2 + \alpha_4 D_4 - 0.22 LnX_2 + \alpha_5 D_5 + 1.86 LnX_3 + 0.65 LnX_4 + 0.51 LnX_5 + \mathrm{u}_i$

To analyze the marital status of the respondents, the results revealed that a widow has income from crop production less by SDG 0.007 than of single. The p-value was 0.000 and statistically significant resulting in the rejection of null hypothesis and accepting the alternative hypothesis. This means that widow has income from crop production less than single respondent. This may be because widow after missing couple, may not be able to manage enough land to produce income as before, or may have resorted to other alternative jobs reducing income derived from agriculture.

3. Total area cultivated

$Lny_{2000} = -2.33 + \alpha_1 D_1 + 0.09\, LnX_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + 0.22 LnX_2 + \alpha_5 D_5 + 1.86 LnX_3 + 0.65 LnX_4 + 0.51 LnX_5 + \mathrm{u}_i$

Total area cultivated showed a positive sign, suggesting that, if the total area cultivated increased by 1%, on average, the income from crop production goes up by about 1.86%. The coefficient was statistically significant rejecting the null hypothesis.

4. Production of millet

$Lny_{2000} = -2.33 + \alpha_1 D_1 + 0.09\, LnX_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + 0.22 LnX_2 + \alpha_5 D_5 + 1.86 LnX_3 + 0.65 LnX_4 + 0.51 LnX_5 + \mathrm{u}_i$

The coefficient of the total area cultivated tells that if the total area cultivated increased by 1%, income from crop production will increase by 0.65%. The coefficient was statistically significant rejecting the null hypothesis.

4.3.3.2 Conflict period:

The variables in the model have an effect on the household income generated from crop production, out of which ten variables were significant including five dummy variables (gender, Town, IDPs camp, Fareeg, Damra), and five continuous variables (age, family size, total area cultivated, production of millet, household expenditure).

1. Gender

Gender female $(D_1 = 0)\ Lny_{2006} = (-5.98) + 1.1\ LnX_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 - 0.72 LnX_2 + \alpha_5 D_5 + 2.92 LnX_3 + 0.75 LnX_4 + 0.49 LnX_5 + u_i$

Gender male $(D_1 = 1)\ Lny_{2006} = (-5.98 + 0.37) + 1.1\ LnX_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 - 0.72 LnX_2 + \alpha_5 D_5 + 2.92 LnX_3 + 0.75 LnX_4 + 0.49 LnX_5 + u_i$

The results showed that male headed household has positive and significant effect on income generated from crop production. Male respondents have income from crop production more by about 37% than female respondents have and equal SDG 0.69. The coefficient was found to have a p-value of 0.039 at 5%, level of significance rejecting the null hypothesis. These results reaffirmed the findings by Beyene, et al. (2010) who found that, male-headed households have more access to agricultural technologies and more security to farmland as compared to female-headed households.

2. Town Residence:

Residence (village) $(D_2 = 0)\ Lny_{2006} = (-5.98) + 1.1\ LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.72 LnX_2 + \alpha_5 D_5 + 2.92 LnX_3 + 0.75 LnX_4 + 0.49 LnX_5 + u_i$

Residence (town) $(D_2 = 1)\ Lny_{2006} = (-5.98 - 1.28) + 1.1\ LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.72 LnX_2 + \alpha_5 D_5 + 2.92 LnX_3 + 0.75 LnX_4 + 0.49 LnX_5 + u_i$

The results showed that people living in town settlement has income from crop production less by 128% than people living in village residence. The

results were justified by that, town residence in fact were not farmers and therefore the contribution of crop production in town residences total income was less than village dwellers who were essentially rural farmers and crop production was their main occupation.

The p-value was 0.000, and was significant at 5% level of significance rejecting the null hypothesis meaning that people living in town settlement has income obtained from crop production less than people living in villages.

3. IDPs camp residence

Residence (village) $(D_2 = 0)$ $Lny_{2006} = (-5.98) + 1.1\ LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.72 LnX_2 + \alpha_5 D_5 + 2.92 LnX_3 + 0.75 LnX_4 + 0.49 LnX_5 + u_i$

Residence (IDPs camp) $(D_2 = 1) Lny_{2006} = (-5.98 - 1.29) + 1.1\ LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.72 LnX_2 + \alpha_5 D_5 + 2.92 LnX_3 + 0.75 LnX_4 + 0.49 LnX_5 + u_i$

The results revealed that people living in IDPs camp settlement has income from crop production less by 129% than people living in village residence. The justification was straightforward, during the conflict period, sedentary farmers lost their land and got confined in IDP camps, and therefore, contribution of income from crop production in total household income reduced considerably if compared to those still living in villages and practice agricultural activities. The p-value was 0.000 and significant at 0.05 level of significance rejecting the null hypothesis.

4. Fareeg residence

Residence (village) $(D_2 = 0)$ $Lny_{2006} = (-5.98) + 1.1\ LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.72 LnX_2 + \alpha_5 D_5 + 2.92 LnX_3 + 0.75 LnX_4 + 0.49 LnX_5 + u_i$

Residence (fareeg) $(D_2 = 1)\ Lny_{2006} = (-5.98 - 0.68) + 1.1\ LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.72 LnX_2 + \alpha_5 D_5 + 2.92 LnX_3 + 0.75 LnX_4 + 0.49 LnX_5 + u_i$

SUR results revealed that people living in fareeg settlement has income from crop production less by 68%, equal to 0.51 SDG than their colleagues living in village residence, this could be justified by the fact that, fareeg residence didn't dependent on farming as a main occupation, rather they were basically animal herders and therefore the contribution of crop production in their total

income was less than that of village dwellers. The p-value was 0.061 and not significant at 0.05 level of significance, therefore we failed to reject the null hypothesis.

5. Damra residence

Residence (village) ($D_2 = 0$) $Lny_{2006} = (-5.98) + 1.1\ LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.72LnX_2 + \alpha_5 D_5 + 2.92LnX_3 + 0.75LnX_4 + 0.49LnX_5 + u_i$
Residence (Damra) ($D_2 = 1$) $Lny_{2006} = (-5.98 - 0.75) + 1.1\ LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.72LnX_2 + \alpha_5 D_5 + 2.92LnX_3 + 0.75LnX_4 + 0.49LnX_5 + u_i$

SUR results showed that, people living in Damra settlement has income from crop production less by 75% than people living in village. The justification was the same as for fareeg settlement. The contribution of fareeg to income derived from crop production was 0.001195 SDG. The p-value was 0.021 and significant at 5% level of significance rejecting the null hypothesis.

It is worth mentioning that, although Damra dwellers were semi-permanent settler, their income from crop production was still low compared to villagers or even with fareeg dwellers. This may be attributed to the fact that, elders were staying in Damras while active age groups were following the nomadic habit and also recruitment of youth in military forces reduces their contribution in the agricultural activities.

6. Age

$Lny_{2006} = -5.98 + 1.1\ LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 - 0.72LnX_2 + \alpha_5 D_5 + 2.92LnX_3 + 0.75LnX_4 + 0.49LnX_5 + u_i$

Age of the respondent has positive impact on income generated from crop production, however, if age of the household head increased by 1%, the income generated from crop production will increase by 1.1%, equal to 3.0 SDG. It may be a matter of experience that differs and causes this change in income, as the respondents get older, their skills, experiences and knowledge may increase, and consequently causing their income from crop production to rise. This emphasized by Beyene, et al. (2010) who stated that, as age

increases, one can acquire more knowledge and experience becoming effective in exploiting these experiences.

However, the predictor variable of age was significant because the p-values was 0.004 and statistically significant rejecting the null hypothesis.

7. Family size

$$Lny_{2006} = -5.98 + 1.1\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 - 0.72 LnX_2 + \alpha_5 D_5 + 2.92 LnX_3 + 0.75 LnX_4 + 0.49 LnX_5 + u_i$$

Family size showed a negative sign, if family size increased by one percent the income incurred from crop production decreases by 0.72%, (0.49 SDG), this may be attributed to the fact that, household members were in most cases farm labour, since accessibility to farms during conflict period was restricted. Family size was significant because the p-value was 0.030 and was statistically significant rejecting the null hypothesis.

8. Total area cultivated

$$Lny_{2006} = -5.98 + 1.1\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 - 0.72 LnX_2 + \alpha_5 D_5 + 2.92 LnX_3 + 0.75 LnX_4 + 0.49 LnX_5 + u_i$$

If the total area cultivated increased by 1%, income from crop production will increase by 2.92%, the sign of the elasticity was positive following the a priori. The p-values was 0.000. The total area cultivated have an influence on income produced from crop production. Similar results were obtained by Abdel Aziz, et. Al., (2010), in Dar Elsalam and Umkdada Districts, North Darfur State where they found that, cropped area by millet and groundnuts caused the output to increase, this may eventually lead to increase household income.

9. Production of millet

$$Lny_{2006} = -5.98 + 1.1\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 - 0.72 LnX_2 + \alpha_5 D_5 + 2.92 LnX_3 + 0.75 LnX_4 + 0.49 LnX_5 + u_i$$

If the production of millet increased by 1%, income from crop production will increase by 0.75%, the sign of the elasticity was positive, following the a priori. The p-values was 0.000 and statistically significant at 0.05 level of significance rejecting the null hypothesis.

10. Total household expenditure

$Lny_{2006} = -5.98 + 1.1\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 - 0.72LnX_2 + \alpha_5 D_5 + 2.92LnX_3 + 0.75LnX_4 + 0.49LnX_5 + u_i$

Household expenditure has an effect on income from crop production. When the household expenditure increased by one percent, the income from crop production will increase by 0.49%. The p-value was 0.081 and only significant at 10% level of significance and not significant at 5% level of significance accepting the alternative hypothesis.

4.3.3.3 Peace period

Ten variables out of 18 were found having an impact on income derived from crop production which were age, town, IDP camp, Fareeg, Damra, married, family size, security situation, total area cultivated and production of millet.

1. Age

$Lny_{2012} = -5.98 + 1.1\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 - 0.72LnX_2 + \alpha_5 D_5 + 2.92LnX_3 + 0.75LnX_4 + 0.49LnX_5 + u_i$

SUR regression results discovered a positive relationship between age and income produced from crop production, if age of the respondent increased by one percent, income generated from crop production will increase by 1.1%, the p-value was 0.046 and significant at 5% level of significance rejecting the null hypothesis.

This may be justified by the fact that skills and knowledge may increase with an increase in age, and consequently causing income from crop production to increase. The results agreed with Matsane and Oyekale, (2014) who

argued that, usually farmers are likely to increase agricultural production and productivity due to the knowledge and their income from crop production was supposed to increase. On the contrary. Ghirmai (2016) found that age of the head of household negatively influences income generated from crop production. Generally, in the study area youth were absent in agricultural activities (Abaker and Hassan, 2015).

2. Town residence

Residence (village) $(D_2 = 0)$ $Lny_{2012} = (-7.53) + 1.07\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.81 LnX_2 + \alpha_5 D_5 + 2.83 LnX_3 + 0.74 LnX_4 + 0.35 LnX_5 + u_i$
Residence (town) $(D_2 = 1)$ $Lny_{2012} = (-7.53 - 0.73) + 1.07\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.81 LnX_2 + \alpha_5 D_5 + 2.83 LnX_3 + 0.74 LnX_4 + 0.35 LnX_5 + u_i$

Town residents have income from crop production less by 73% than people living in village. The p-value was 0.043 and significant at 5% level of significance rejecting the null hypothesis.

3. IDPs camp residence

Residence (village) $(D_2 = 0)$ $Lny_{2012} = (-7.53) + 1.07\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.81 LnX_2 + \alpha_5 D_5 + 2.83 LnX_3 + 0.74 LnX_4 + 0.35 LnX_5 + u_i$
Residence (IDPs camp) $(D_2 = 1)$ $Lny_{2012} = (-7.53 - 0.56) + 1.07\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.81 LnX_2 + \alpha_5 D_5 + 2.83 LnX_3 + 0.74 LnX_4 + 0.35 LnX_5 + u_i$

The results revealed that people living in IDP camps have income from crop production less by 56%, than those living in villages.

The p-value was 0.080 and was not significant at 0.05 level of significance, thus not rejecting the null hypothesis.

4. Fareeg residence

Residence (village) $(D_2 = 0)$ $Lny_{2012} = (-7.53) + 1.07\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.81 LnX_2 + \alpha_5 D_5 + 2.83 LnX_3 + 0.74 LnX_4 + 0.35 LnX_5 + u_i$
Residence (fareeg) $(D_2 = 1)$ $Lny_{2012} = (-7.53 - 1.30) + 1.07\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.81 LnX_2 + \alpha_5 D_5 + 2.83 LnX_3 + 0.74 LnX_4 + 0.35 LnX_5 + u_i$

Fareeg residence has a significant negative effect on income earned from crop production. The results showed that people living in fareeg settlement

have income from crop production less by 130% than village residence. The p-value was 0.003 and significant at 0.05 significant level, it was significant at 5% significant level rejecting the null hypothesis.

5. Damra residence:

Residence (village) $(D_2 = 0)$ $Lny_{2012} = (-7.53) + 1.07\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.81 LnX_2 + \alpha_5 D_5 + 2.83 LnX_3 + 0.74 LnX_4 + 0.35 LnX_5 + u_i$
Residence (Damra) $(D_2 = 1)$ $Lny_{2012} = (-7.53 - 1.15) + 1.07\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.81 LnX_2 + \alpha_5 D_5 + 2.83 LnX_3 + 0.74 LnX_4 + 0.35 LnX_5 + u_i$

The results revealed that people living in Damra settlement has income from crop production less by 115% than people living in village residence. The p-value was 0.001 and was significant at 0.05 level of significance rejecting the null hypothesis.

6. Marital status (Married)

Marital status (single) $(D_3 = 0)$ $Lny_{2012} = (-7.53) + 1.07\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.81 LnX_2 + \alpha_5 D_5 + 2.83 LnX_3 + 0.74 LnX_4 + 0.35 LnX_5 + u_i$
Marital status (married) $(D_3 = 1)$ $Lny_{2012} = (-7.53 + 2.62) + 1.07\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.81 LnX_2 + \alpha_5 D_5 + 2.83 LnX_3 + 0.74 LnX_4 + 0.35 LnX_5 + u_i$

The results showed that a married respondents have income from crop production greater by 262% than the single respondents. The p-value was 0.000 and statistically significant at 0.05 level of significance rejecting the null hypothesis

7. Security situation

Security situation (bad) $(D_5 = 0)$ $Lny_{2012} = (-7.53) + 1.07\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 - 0.81 LnX_2 + 2.83 LnX_3 + 0.74 LnX_4 + 0.35 LnX_5 + u_i$
Security situation (good) $(D_5 = 1)$ $Lny_{2012} = (-7.53 + 0.69) + 1.07\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 - 0.81 LnX_2 + 2.83 LnX_3 + 0.74 LnX_4 + 0.35 LnX_5 + u_i$

The results showed that a good security situation has a significant positive effect on income from crop production. Respondents during good security situation has income from crop production higher by 69% than they have during conflict. The p-value was 0.009 and significant at 0.05 level of

significance rejecting the null hypothesis. The explanation of the increase of income might be attributed to many factors such as access to land, reduction of risks and transaction fees

8. Family size

$Lny_{2012} = (-7.53) + 1.07\ LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 - 0.81 LnX_2 + \alpha_5 D_5 + 2.83 LnX_3 + 0.74 LnX_4 + 0.35 LnX_5 + u_i$

The household family size showed a negative sign, indicating a negative effect on income produced from crop production. A one percent increase in household family size causes reduction in the total household income from crop production by 0.81%. The p-value was 0.0310 and significant at 0.05 level of significance rejecting the null hypothesis.

9. Total area cultivated

$Lny_{2012} = (-7.53) + 1.07\ LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 - 0.81 LnX_2 + \alpha_5 D_5 + 2.83 LnX_3 + 0.74 LnX_4 + 0.35 LnX_5 + u_i$

The results revealed that the total area cultivated has statistically positive influence on household income incurred from crop production. If the total area cultivated by household increased by 1%, income from crop production will rise by 2.8%.

The p-values was 0.000 and significant at 0.05 level of significance rejecting the null hypothesis.

10. Production of millet

$Lny_{2012} = (-7.53) + 1.07\ LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 - 0.81 LnX_2 + \alpha_5 D_5 + 2.83 LnX_3 + 0.74 LnX_4 + 0.35 LnX_5 + u_i$

Production of millet has a positive effect on income earned from crop production. The results Showed that if the production of millet increased by 1% income from crop production will increase by 0.74%. The p-values was 0.000 and significant at 0.05 level of significance rejecting the null hypothesis.

4.3.4 Household Income from livestock:

SUR model results revealed that, chi squared values of the three periods were 196.30, 1139.65 and 853.65 respectively, reflecting the goodness of fit of the three models at the p value 0.0000 and were significant at 0.05 level of significance. The R^2 values in the three periods were 0.50, 0.85 and 0.81 showing that 50%, 85% and 81% of the variation in household income from livestock was explained by the independent variables included in the model.

4.3.4.1 Pre conflict period:

Seven variable have significant effect on income derived from livestock which were fareeg, Damra, married, Khalwa, secondary, university and total area cultivated.

1. Fareeg residence

Residence (village) $(D_2 = 0)$ $Lny_{2000} = (2.23) - 0.18\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.33LnX_2 + \alpha_5 D_5 - 0.66LnX_3 + 0.33LnX_4 - 0.03LnX_5 + u_i$

Residence (fareeg) $(D_2 = 1)$ $Lny_{2000} = (2.23 + 3.53) - 0.18\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.33LnX_2 + \alpha_5 D_5 - 0.66LnX_3 + 0.33LnX_4 - 0.03LnX_5 + u_i$

The results showed that fareeg variable has statistically positive influence on income gained from livestock production. Fareeg settlers have income from animal production greater by 353% than village residence, this was because fareeg residences were fundamentally depend on livestock. The p-value was 0.000 and significant at 0.05 level of significance rejecting the null hypothesis

2. Damra residence

Residence (village) $(D_2 = 0)$ $Lny_{2000} = (2.23) - 0.18\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.33LnX_2 + \alpha_5 D_5 - 0.66LnX_3 + 0.33LnX_4 - 0.03LnX_5 + u_i$

Residence (Damra) $(D_2 = 1)$ $Lny_{2000} = (2.23 + 4.94) - 0.18\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.33LnX_2 + \alpha_5 D_5 - 0.66LnX_3 + 0.33LnX_4 - 0.03LnX_5 + u_i$

The results revealed that Damra Residence has a positive impact on income incurred from livestock production. Damra dwellers have income from

animal production greater by 494% than village residents, this was because livestock production was the main occupation that generate income for Damra dwellers. The p-value was 0.003 and significant at 0.05 level of significance rejecting the null hypothesis. (table 4.3.4).

Table 4.3.4: SUR results summary: Household income from livestock

Variables	Pre conflict 2000	Conflict 2006	Peace 2012
Gender	0.3292742	-0.2656862	0.015177
Age	-0.1786087	0.2043564	-0.0141851
Town	-0.2257296	-0.3336943	-0.0959655
IDPs camp	(dropped)	-0.3285784	-0.1847393
Fareeg	3.528478***	6.52512***	7.224778***
Damra	4.942724***	6.475935***	6.981502***
Married	1.862655***	-0.412209	-0.4331301
Divorced	2.157339	0.1155544	0.6689097
Widow	0.631908	-0.5437201	-0.378981
Khalwa	0.9914813**	0.2800492	0.2765952
Basic	-0.1285916	-0.1177824	-0.5149559
Secondary	-1.597119***	0.471214	-0.2322066
University	-2.476223**	0.0039377	-0.2084773
HH family size	0.3303907	1.011371**	0.2279714
Security	-1.01991	0.382329	0.2868178
Total area cultivated	-0.6649352*	-0.3455264*	-0.0906193
Production of millet	0.3294397	0.2715092**	0.0123478
Household expenditure	-0.0536555	-0.070092	-0.1088035
Constant	2.23421	-1.093543	1.490056
R2	0.50	0.85	0.81
Chi square	196.30***	1139.65***	853.65***
N	202	202	202
***** Significant at 10%	****** Significant at 5%	******* Significant at 1%	

Source: Field survey, 2015

3. Marital status (married)

Marital status (single) $(D_3 = 0)$ $Lny_{2000} = (2.23) - 0.18\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_4 D_4 + 0.33 LnX_2 + \alpha_5 D_5 - 0.66 LnX_3 + 0.33 LnX_4 - 0.03 LnX_5 + \mathrm{u}_i$

Marital status (married) $(D_3 = 1)$ $Lny_{2000} = (2.23 + 1.86) - 0.18\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_4 D_4 + 0.33 LnX_2 + \alpha_5 D_5 - 0.66 LnX_3 + 0.33 LnX_4 - 0.03 LnX_5 + \mathrm{u}_i$

Marital status variable (married) affects income from livestock positively. Married respondents have income generated from livestock greater than unmarried respondents by 186%. this may be because married couples might be more responsible, rational and enthusiastic in their life style, they may be more anxious of their future livelihoods security and well-being. The p-value was 0.002 and significant at 0.05 level of significance rejecting the null hypothesis.

1. Khalwa education

Education level (illiterate) $(D_4 = 0)$ $Lny_{2000} = (2.23) - 0.18\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.33 LnX_2 + \alpha_5 D_5 - 0.66 LnX_3 + 0.33 LnX_4 - 0.03 LnX_5 + u_i$
Education level (Khalwa) $(D_4 = 1)$ $Lny_{2000} = (2.23 + 0.99) - 0.18\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.33 LnX_2 + \alpha_5 D_5 - 0.66 LnX_3 + 0.33 LnX_4 - 0.03 LnX_5 + u_i$

Khalwa education has a positive sign indicating that Khalwa education has a positive effect on income derived from livestock and greater by 99% than illiterate. The p-value was 0.029 and significant at 0.05 level of significance rejecting the null hypothesis.

2. Secondary education

Education level (illiterate) $(D_4 = 0)$ $Lny_{2000} = (2.23) - 0.18\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.33 LnX_2 + \alpha_5 D_5 - 0.66 LnX_3 + 0.33 LnX_4 - 0.03 LnX_5 + u_i$
Education level (secondary) $(D_4 = 1)$ $Lny_{2000} = (2.23 - 1.60) - 0.18\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.33 LnX_2 + \alpha_5 D_5 - 0.66 LnX_3 + 0.33 LnX_4 - 0.03 LnX_5 + u_i$

secondary education coefficient has a negative sign indicating that formal education has a negative effect on income derived from livestock, secondary education has income produced from livestock less by 160% than the illiterate, this indicates that the members' of this group who practice livestock rearing lack formal education. The p-value was 0.007 and significant at 0.05 level of significance rejecting the null hypothesis.

3. University education

Education level (illiterate) $(D_4 = 0)$ $Lny_{2000} = (2.23) - 0.18\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.33 LnX_2 + \alpha_5 D_5 - 0.66 LnX_3 + 0.33 LnX_4 - 0.03 LnX_5 + u_i$

Education level (university) ($D_4 = 1$) $Lny_{2000} = (2.23\ - 2.48) - 0.18\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.33LnX_2 + \alpha_5 D_5 - 0.66LnX_3 + 0.33LnX_4 - \ 0.03LnX_5 + \mathrm{u}_i$

University education coefficient has a negative sign indicating that there is a negative relationship between University education and income derived from livestock. Therefore, university education has income produced from livestock less by 248% than illiterate, this indicates that, having university education decreases respondent's opportunities to engage in animal production activity and hence to derive income from it. The p-value was 0.045 and significant at 0.05 level of significance rejecting the null hypothesis.

4. Total area cultivated

$Lny_{2000} = (2.23) - 0.18\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.33LnX_2 + \alpha_5 D_5 - 0.66LnX_3 + 0.33LnX_4 - \ 0.03LnX_5 + \mathrm{u}_i$

If the total area cultivated increased by 1%, the household total income generated from livestock production decreases by 0.66% indicating that agriculture is not a primary occupation for animal herder, mainly for nomads they just take crop production as secondary or additional occupation, this may be because crop production and livestock production may compete for the same factors of production. The p-value was 0.089 and not significant at 0.05 level of significance accepting the null hypothesis.

4.3.4.2 Conflict period:

Five variables have significant effect on income from livestock, which were Fareeg, Damra, family size, total area cultivated and production of millet.

1. Fareeg residence

Residence (village) ($D_2 = 0$) $Lny_{2006} = (-1.1) + 0.20\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 1.01LnX_2 + \alpha_5 D_5 - 0.35LnX_3 + 0.27LnX_4 - \ 0.07LnX_5 + \mathrm{u}_i$

Residence (fareeg) ($D_2 = 1$) $Lny_{2006} = (-1.1 + 6.53) - 0.20\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 1.01LnX_2 + \alpha_5 D_5 - 0.35LnX_3 + 0.27LnX_4 - \ 0.07LnX_5 + \mathrm{u}_i$

Fareeg residence showed a positive effect on income generated from livestock production. The results tell that fareeg settlement has income from animal production greater by 653% than village residence. The p-value was 0.000 and significant at 0.05 level of significance rejecting the null hypothesis.

2. Damra residence

Residence (village) ($D_2 = 0$) $Lny_{2006} = (-1.1) - 0.20\, LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 1.01 LnX_2 + \alpha_5 D_5 - 0.35 LnX_3 + 0.27 LnX_4 - 0.07 LnX_5 + u_i$
Residence (Damra) ($D_2 = 1$) $Lny_{2006} = (-1.1 + 6.48) - 0.20\, LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 1.01 LnX_2 + \alpha_5 D_5 - 0.35 LnX_3 + 0.27 LnX_4 - 0.07 LnX_5 + u_i$

Damra residence showed a positive impact on income generated from livestock production, people living in Damra settlement have income from animal production greater by 548% than village residence. The p-value was 0.000 and significant at 0.05 level of significance rejecting the null hypothesis

3. Family size

$Lny_{2006} = (-1.1) - 0.20\, LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 1.01 LnX_2 + \alpha_5 D_5 - 0.35 LnX_3 + 0.27 LnX_4 - 0.07 LnX_5 + u_i$

Household family size has a positive sign telling that, a 1% increase in household family size will cause the income incurred from livestock to increase by 1.01%. This might be because animal herders made use of family members to take care of animals as labors. The p-value was 0.020 and significant at 0.05 level of significance rejecting the null hypothesis.

4. Total area cultivated

$Lny_{2006} = (-1.1) - 0.20\, LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 1.01 LnX_2 + \alpha_5 D_5 - 0.35 LnX_3 + 0.27 LnX_4 - 0.07 LnX_5 + u_i$

The results revealed that total area cultivated has negative influence on income derived from livestock production. If the total area cultivated increased by 1%, the household total income generated from livestock

production will decrease by 0.35%. this may be justified by that, agriculture was not a primary occupation for animal herder and crop production and livestock production may compete for the same factors of production. This may cause inefficient management of animals, leading to reduction of income from animal production. The p-value was 0.061 and not significant at 0.05 level of significance accepting the null hypothesis.

5. Production of millet

$Lny_{2006} = (-1.1) - 0.20\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 1.01 LnX_2 + \alpha_5 D_5 - 0.35 LnX_3 + 0.27 LnX_4 - 0.07 LnX_5 + u_i$

Production of millet has a positive impact on income incurred from livestock. The results revealed that a 1% increase in production of millet will cause income from livestock to increase by 0.27%. This might be because animal herders feed animals by plant debris or even by millet produced and therefore increase income. The p-value was 0.027 and significant at 0.05 level of significance rejecting the null hypothesis.

4.3.4.3 Peace period

In this period only two variable found to have an effect on income from livestock, which were Fareeg and Damra residence

1. Fareeg residence

Residence (village) $(D_2 = 0)$ $Lny_{2012} = (1.5) - 0.01\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.23 LnX_2 + \alpha_5 D_5 - 0.09 LnX_3 + 0.01 LnX_4 - 0.11 LnX_5 + u_i$

Residence (fareeg) $(D_2 = 1)$ $Lny_{2012} = (1.5 + 7.22) - 0.01\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.23 LnX_2 + \alpha_5 D_5 - 0.09 LnX_3 + 0.01 LnX_4 - 0.11 LnX_5 + u_i$

The Fareeg residence has a positive impact on income incurred from livestock, they have income from animal production greater by 1366.48 SDG than village residence. The p-value was 0.000, it is less than 0.05 and significant at 0.05 level of significance rejecting the null hypothesis.

2. Damra residence

Residence (village) $(D_2 = 0)$ $Lny_{2012} = (1.5) + 0.02\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.23 LnX_2 + \alpha_5 D_5 - 0.09 LnX_3 + 0.01 LnX_4 - 0.11 LnX_5 + u_i$

Residence (Damra) $(D_2 = 1)$ $Lny_{2012} = (1.5 + 6.98) + 0.02\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.23LnX_2 + \alpha_5 D_5 - 0.09LnX_3 + 0.01LnX_4 - 0.11LnX_5 + u_i$

Damra residence has a significant positive effect on income from animal production. Damra dwellers have income from animal production greater by 1074.91 SDG than village residence. The p-value was 0.000 and significant at 0.05 level of significance rejecting the null hypothesis.

4.3.5 Household Income from employment:

The results depicted the household income derived from employment, in the first period, Chi square value was 312.60 and was significant at p-value 0.0000. The R^2 value was 0.62 telling that 62% of the variation in income from employment was explained by the variables included in the model. Both values express measures of the goodness of fit of the model.

For the second period, the value of chi square was 1641.84 and significant at 0.05 level of significance and the p-value was 0.000. The R^2 was 0.90, reflecting about 90% of the variation on income from employment was made by the independent variables included in the model.

In peace period, the value of chi square was 2011 and the p-value 0.000 and significant at 0.05 level of significance reflecting the overall model fitness. R square for the same period was 0.91 showing that 91% of the variation in the income from employment was due to the independent variables used in the SUR regression model

4.3.5.1 Pre conflict period:

In 2000. seven variables were significant which were Town, Fareeg, Married, Khalwa, Secondary, University and Security, some of them appeared having positive signs whereas others got negative sign. (table 4.3.5).

Table 4.3.5: SUR results Summary: Income from employment

Variables	Pre conflict 2000	Conflict 2006	Peace 2012
Gender	0.4195243	0.1514878	0.3294523
Age	-0.4253973	-0.7075128	-0.2819569
Town	1.363144***	1.432451***	0.7490008**
IDPs camp	(dropped)	1.231455**	0.4772536
Fareeg	-0.5794698*	-0.3168566	-0.0324043
Damra	-1.573788	-0.2157902	0.0052592
Married	-0.9160629**	-0.3408245	-0.2160918
Divorced	-1.738297	-1.458505**	-0.0590921
Widow	0.7376371	-1.28579**	-0.4207728
Khalwa	-1.122818***	-0.3711217	-0.4220156
Basic	-0.5269725	0.0206956	-0.0696326
Secondary	4.840621***	7.084305***	7.906653***
University	3.346746***	7.336886***	8.356805***
HH family size	0.3101185	0.4443176	0.0803667
Security	3.959294**	1.164912***	0.1060811
Total area cultivated	0.3310878	0.0271278	0.0980183
Production of millet	-0.2411457	-0.1111683	-.2333787**
Household expenditure	0.0722547	0.2120186	-0.0754194
Constant	-1.911884	-0.4177718	2.109645
R2	0.62	0.90	0.91
Chi square	312.60***	1641.84***	2011***
N	202	202	202
* Significant at 10%	** Significant at 5%	*** Significant at 1%	

Source: Field survey, 2015

1. Town residence

Residence (village) $(D_2 = 0)$ $Lny_{2000} = (-1.91) - 0.43\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.31 LnX_2 + \alpha_5 D_5 - 0.33 LnX_3 - 0.24 LnX_4 - 0.07 LnX_5 + \mathrm{u}_i$
Residence (town) $(D_2 = 1)$ $Lny_{2000} = (-1.91 + 1.36) - 0.43\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.31 LnX_2 + \alpha_5 D_5 - 0.33 LnX_3 - 0.24 LnX_4 - 0.07 LnX_5 + \mathrm{u}_i$

Town dwellers have income derived from employment greater by 136% than their colleagues in village. The p-value was 0.000 and significant at 0.05 rejecting the null hypothesis. The results were as expected with positive sign. Usually employees were concentrated in towns.

2. Fareeg residence:

Residence (village) $(D_2 = 0)$ $Lny_{2000} = (-1.91) - 0.43\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.31 LnX_2 + \alpha_5 D_5 - 0.33 LnX_3 - 0.24 LnX_4 - 0.07 LnX_5 + u_i$

Residence (fareeg) $(D_2 = 1)$ $Lny_{2000} = (-1.91 - 0.58) - 0.43\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.31 LnX_2 + \alpha_5 D_5 - 0.33 LnX_3 - 0.24 LnX_4 - 0.07 LnX_5 + u_i$

Fareeg dwellers have income from employment less by SDG 0.56 than village residence. The p-value was 0.073and not significant at 0.05 level of significance accepting the null hypothesis.

3. Marital status (Married)

Marital status (single) $(D_3 = 0)$ $Lny_{2000} = (-1.91) - 0.43\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_4 D_4 + 0.31 LnX_2 + \alpha_5 D_5 - 0.33 LnX_3 - 0.24 LnX_4 - 0.07 LnX_5 + u_i$

Marital status (married) $(D_3 = 1)$ $Lny_{2000} = (-1.91 - 0.92) - 0.43\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_4 D_4 + 0.31 LnX_2 + \alpha_5 D_5 - 0.33 LnX_3 - 0.24 LnX_4 - 0.07 LnX_5 + u_i$

Married variable has a negative effect on income generated from employment, it has income from employment lower by 92% than single respondent. The p-value was 0.037 and significant at 0.05 level of significance rejecting the null hypothesis. The results were unexpected and contradicting because the a priori suggests that, married respondents have tendency to maximize their income if compared by unmarried respondents. There might be hidden underlying factors behind this.

4. Khalwa education

Education level (illiterate) $(D_4 = 0)$ $Lny_{2000} = (-1.91) - 0.43\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.31 LnX_2 + \alpha_5 D_5 - 0.33 LnX_3 - 0.24 LnX_4 - 0.07 LnX_5 + u_i$

Education level (Khalwa) $(D_4 = 1)$ $Lny_{2000} = (-1.91 - 1.12) - 0.43\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.31 LnX_2 + \alpha_5 D_5 - 0.33 LnX_3 - 0.24 LnX_4 - 0.07 LnX_5 + u_i$

Education level Khalwa showed a negative effect on income derived from employment. Khalwa variable has income from employment less by 112% than illiterate. The p-value was 0.001 and significant at 5% significant level rejecting the null hypothesis.

5. Secondary education

Education level (illiterate) $(D_4 = 0)$ $Lny_{2000} = (-1.91) - 0.43\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.31 LnX_2 + \alpha_5 D_5 - 0.33 LnX_3 - 0.24 LnX_4 - 0.07 LnX_5 + u_i$

Education level (secondary) $(D_4 = 1)$ $Lny_{2000} = (-1.91 + 4.84) - 0.43\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.31 LnX_2 + \alpha_5 D_5 - 0.33 LnX_3 - 0.24 LnX_4 - 0.07 LnX_5 + \mathrm{u}_i$

Secondary education showed a positive sign causing the household income from employment increase on average by 293% (18.73 SDG), Secondary education has income from employment greater than illiterate by 484% (126.47 SDG) the coefficient was significant at 0.05 level of significance and the p-value was 0.000 rejecting the null hypothesis.

6. University education

Education level (illiterate) $(D_4 = 0)$ $Lny_{2000} = (-1.91) - 0.43\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.31 LnX_2 + \alpha_5 D_5 - 0.33 LnX_3 - 0.24 LnX_4 - 0.07 LnX_5 + \mathrm{u}_i$

Education level (university) $(D_4 = 1)$ $Lny_{2000} = (-1.91 + 3.35) - 0.43\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.31 LnX_2 + \alpha_5 D_5 - 0.33 LnX_3 - 0.24 LnX_4 - 0.07 LnX_5 + \mathrm{u}_i$

University education has a positive sign indicating a positive impact on the household income from employment. University education increases the household income from employment by 144%. University education has income from employment greater than illiterate by 335%. The coefficient was significant at 5% level of significance and the p-value was 0.000 rejecting the null hypothesis.

The results agree sofian et al (2016) who conducted a research in South Darfur State. They conclude that, there is a significant and positive relationship between higher-education levels, mainly the university level and income. In regard with low education level, higher-education qualifications mainly University level, leads to higher income.

7. Security situation

Security situation (bad) $(D_5 = 0)$ $Lny_{2000} = (-1.91) - 0.43\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + 0.31 LnX_2 - 0.33 LnX_3 - 0.24 LnX_4 - 0.07 LnX_5 + \mathrm{u}_i$

Security situation (good) $(D_5 = 1)$ $Lny_{2000} = (-1.91 + 3.96) - 0.43\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + 0.31 LnX_2 - 0.33 LnX_3 - 0.24 LnX_4 - 0.07 LnX_5 + \mathrm{u}_i$

Good security situation has a positive impact on income derived from employment and increases by 205%. Good security situation has income

greater by 396% than when the security situation was bad. The p-value was 0.033 and significant at 5% level of significance rejecting the null hypothesis.

4.3.5.2 Conflict period

In this period, seven variable influenced income from employment, which were town, IDPs, Divorced, and Widow, Secondary education, University education and security situation.

1. Town residence

Residence (village) $(D_2 = 0)$ $Lny_{2006} = (-0.42) - 0.71\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.44 LnX_2 + \alpha_5 D_5 - 0.03 LnX_3 - 0.11 LnX_4 - 0.21 LnX_5 + u_i$
Residence (town) $(D_2 = 1)$ $Lny_{2006} = (-0.42 + 1.43) - 0.71\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.44 LnX_2 + \alpha_5 D_5 - 0.03 LnX_3 - 0.11 LnX_4 - 0.21 LnX_5 + u_i$

During conflict, town residence showed a positive impact on income derived from employment, town dwellers have income derived from employment greater by 101%, than their colleagues in village. The p-value was 0.000 and was significant at 0.05 level of significance rejecting the null hypothesis.

2. IDPs camp residence

Residence (village) $(D_2 = 0)$ $Lny_{2006} = (-0.42) - 0.71\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.44 LnX_2 + \alpha_5 D_5 - 0.03 LnX_3 - 0.11 LnX_4 - 0.21 LnX_5 + u_i$
Residence (IDPs camp) $(D_2 = 0)$ $Lny_{2006} = (-0.42 + 1.23) - 0.71\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.44 LnX_2 + \alpha_5 D_5 - 0.03 LnX_3 - 0.11 LnX_4 - 0.21 LnX_5 + u_i$

During conflicts, IDP camp residents have a positive influence on income derived from employment. IDP camp dwellers have income derived from employment greater by 123% if compared to villagers. The p-value was 0.002 and 0.05 significant at 0.05 level of significance rejecting the null hypothesis.

3. Marital status (divorced)

Marital status (single) $(D_3 = 0)$ $Lny_{2006} = (-0.42) - 0.71\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_4 D_4 + 0.44 LnX_2 + \alpha_5 D_5 - 0.03 LnX_3 - 0.11 LnX_4 - 0.21 LnX_5 + u_i$
Marital status (divorced) $(D_3 = 1)$ $Lny_{2006} = (-0.42 - 1.46) - 0.71\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_4 D_4 + 0.44 LnX_2 + \alpha_5 D_5 - 0.03 LnX_3 - 0.11 LnX_4 - 0.21 LnX_5 + u_i$

Marital status (divorced) has a negative impact on income from employment, it was less by 0.23 SDG than single. The p-value was 0.034 and significant at 5% level of significance rejecting the null hypothesis. This may be because during conflict, divorced respondents may suffer conflict consequences and may not easily compensate losses, they may even have their jobs lost or shift to other jobs, therefore, this may cause reduction of the income derived from employment.

4. Marital status (widow)

Marital status (single) $(D_3 = 0)$ $Lny_{2006} = (-0.42) - 0.71\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_4 D_4 + 0.44 LnX_2 + \alpha_5 D_5 - 0.03 LnX_3 - 0.11 LnX_4 - 0.21 LnX_5 + \mathrm{u}_i$
Marital status (widow) $(D_3 = 1)$ $Lny_{2006} = (-0.42 - 1.29) - 0.71\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_4 D_4 + 0.44 LnX_2 + \alpha_5 D_5 - 0.03 LnX_3 - 0.11 LnX_4 - 0.21 LnX_5 + \mathrm{u}_i$

Marital status (widow) has a negative effect on income from employment. Widow has income less by 0.28 SDG than single. The p-value was 0.022 and significant at 5% level of significance rejecting the null hypothesis.

5. Secondary education

Education level (illiterate) $(D_4 = 0)$ $Lny_{2006} = (-0.42) - 0.71\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + + \alpha_3 D_3 + 0.44 LnX_2 + \alpha_5 D_5 - 0.03 LnX_3 - 0.11 LnX_4 - 0.21 LnX_5 + \mathrm{u}_i$
Education level (secondary) $(D_4 = 1)$ $Lny_{2006} = (-0.42 + 7.08) - 0.71\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.44 LnX_2 + \alpha_5 D_5 - 0.03 LnX_3 - 0.11 LnX_4 - 0.21 LnX_5 + \mathrm{u}_i$

The secondary education showed a positive relationship with income derived from employment. If the respondents have secondary education, their income from employment will be greater by 708% compared with illiterate respondents which was equivalent to 1187.96 SDG. The p-value was 0.000 and was significant at 0.05 level of significance rejecting the null hypothesis.

6. University education

Education level (illiterate) $(D_4 = 0)$ $Lny_{2006} = (-0.42) - 0.71\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.44 LnX_2 + \alpha_5 D_5 - 0.03 LnX_3 - 0.11 LnX_4 - 0.21 LnX_5 + \mathrm{u}_i$
Education level (university) $(D_4 = 1)$ $Lny_{2006} = (-0.42 + 7.34) - 0.71\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.44 LnX_2 + \alpha_5 D_5 - 0.03 LnX_3 - 0.11 LnX_4 - 0.21 LnX_5 + \mathrm{u}_i$

The university education influences positively on income derived from employment, if the household has university certificate, the income from employment increase by 692% which equals 1012.32 SDG. University education has income from employment greater by 734% (1540.70 SDG) than illiterate respondents. The p-value was 0.000 and significant at 0.05 level of significance rejecting the null hypothesis.

7. Security situation

Security situation (bad) ($D_5 = 0$) $Lny_{2006} = (-0.42) - 0.71\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + 0.44LnX_2 - 0.03LnX_3 - 0.11LnX_4 - 0.21LnX_5 + u_i$

Security situation (good) ($D_5 = 1$) $Lny_{2006} = (-0.42 + 1.16) - 0.71\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + 0.44LnX_2 - 0.03LnX_3 - 0.11LnX_4 - 0.21LnX_5 + u_i$

The results revealed that during good security situation, income from employment was greater by 116% than when insecurity situation prevail.

The p-value was 0.000 and statistically significant at 0.05, therefore, the level of significance rejecting the null hypothesis.

4.3.5.3 Peace period

In this period, four variables have an impact on the income produced from employment, they were Town, secondary and university education and production of millet.

1. Town residence

Residence (village) ($D_2 = 0$) $Lny_{2012} = (2.11) - 0.28\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.08LnX_2 + 0.10LnX_3 + \alpha_5 D_5 - 0.23LnX_4 - 0.08LnX_5 + u_i$

Residence (town) ($D_2 = 1$) $Lny_{2012} = (2.11 + 0.75) - 0.28\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.08LnX_2 + 0.1LnX_3 + \alpha_5 D_5 - 0.23LnX_4 - 0.08LnX_5 + u_i$

Town residents have an income from employment on average 286%, (17.46 SDG), they have income from employment more than villagers have by 75%. The p-value was 0.028 and was significant at 5% level of significance rejecting the null hypothesis.

2. Secondary education

Education level (illiterate) ($D_4 = 0$) $Lny_{2012} = (2.11) - 0.28\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.08LnX_2 + 0.10LnX_3 + \alpha_5 D_5 - 0.23LnX_4 - 0.08LnX_5 + u_i$

Education level (secondary) ($D_4 = 1$) $Lny_{2012} = (2.11 + 7.91) - 0.28\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.08LnX_2 + 0.10LnX_3 + \alpha_5 D_5 - 0.23LnX_4 - 0.08LnX_5 + u_i$

Secondary education variable showed a positive impact on income derived from employment, it was greater by 791% (2724.38 SDG) if compared by illiterate. The p-value was 0.000 and significant at 5% level of significance rejecting the null hypothesis.

3. University education

Education level (illiterate) ($D_4 = 0$) $Lny_{2012} = (2.11) - 0.28\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.08LnX_2 + 0.10LnX_3 + \alpha_5 D_5 - 0.23LnX_4 - 0.08LnX_5 + u_i$
Education level (university) ($D_4 = 1$) $Lny_{2012} = (2.11 + 8.36) - 0.28\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.08LnX_2 + 0.10LnX_3 + \alpha_5 D_5 - 0.23LnX_4 - 0.08LnX_5 + u_i$

University variable showed a positive effect on income from employment. Respondents with university education has income from employment more than 836% (4272.67 SDG) if compared by illiterate.

The p-value was 0.000 and was significant at 5% level of significance rejecting the null hypothesis. The results agree sofian et al (2016) who conducted a research in South Darfur State, they conclude that, there was a significant and positive relationship between higher-education levels, mainly the university level and income. In regard with low education level, higher-education qualifications "University level" leads to higher income.

4. Production of millet

$Lny_{2012} = (2.11) - 0.28\,LnX_1 + \alpha_1 D_1 + + \alpha_3 D_3 + \alpha_4 D_4 + 0.08LnX_2 + 0.10LnX_3 + \alpha_5 D_5 - 0.23LnX_4 - 0.08LnX_5 + u_i$

The results revealed that production of millet has a negative impact on income from employment. If production of millet increased by 1%, the household income from employment will reduce by 0.23% (1.26 SDG) this may be because crop production activity and employment may compete in the factors of production and caused the decline of income from

employment. The p-value was 0.013 and was significant at 5% level of significance rejecting the null hypothesis.

4.3.6 Household Income from labour:

The results showed that, in the first period (2000), the value of chi square was 50.69 indicating the goodness of fit of the model the p-value was 0.000 and was significant at 0.05 level of significance. The value of R^2 was 0.16 telling that 16% of the variation in household income from labour was explained by the independent variables included in the model.

In conflict period, chi square was 29.32 and was significant at $\alpha = 0.05$, with p-value of 0.04. The supporting R square was 0.12 indicating the variation caused by independent variable only by 12%, it was poor indicating that there may be more factors needed not included in the model, which having an influence on income produced from labour. During peace, Chi square of the model was 41.61, it was significant at 0.05 level of significance and the p-value of 0.001. The R square was 0.16, interpreting only 16 % of variation in income from labour activity was due to the dependent variables included in the model.

In general, the R squared was relatively low for the three periods. However, according to Goldberger stated by Gujarati (2009), although the R squared has a very modest role in regression analysis, being a measure of the goodness of fit of a sample, hence a high R squared is not evidence in favor of the model and a low R square is not evidence against it (table 4.3.6).

4.3.6.1 Pre conflict period

Despite the significance of the Chi squared and the value, the R^2 was comparatively low, even though five regressors show significant effect, they are: age fareeg, secondary, security and household expenditure.

Table 4.3.6: SUR results summary: Income from labour

Variables	Pre conflict 2000	Conflict 2006	Peace 2012
Gender	0.0006615	-0.3146343	-0.1782972
Age	-1.30666**	-0.0101295	-0.7341871
Town	-0.3788095	-1.13348*	-0.451768
IDPs camp	(dropped)	-0.5287267	-0.6510463
Fareeg	-0.7442868**	-1.58672**	-1.790041***
Damra	-1.274407	-1.496467**	-1.72935***
Married	-0.5710401	0.6390083	0.1706066
Divorced	0.9673289	0.5365241	-0.0134109
Widow	0.0019792	0.4465952	0.7266987
Khalwa	0.1832333	0.7126272*	0.6407717
Basic	-0.1619353	0.6934819*	0.680757*
Secondary	-0.9249221**	-0.3789272	-1.03432*
University	-0.8530468	-0.9199684	-1.684257***
HH family size	0.6533035	-0.1929263	0.1789031
Security	-6.489354***	-0.0218009	-0.2581209
Total area cultivated	-0.2306676	-0.1148892	-0.3080281
Production of millet	0.023639	-0.0348835	0.0619258
Household expenditure	1.031873**	0.0076394	0.4973515
Constant	3.758576	1.592442	-0.1308647
R^2	0.1638	0.1243	0.1576
Chi square	50.69***	29.32**	41.61**
N	202	202	202
* Significant at 10%	** Significant at 5%	*** Significant at 1%	

Source: Field survey, 2015

1. Age

$$Lny_{2012} = (3.76) - 1.31\,LnX_1 + \alpha_1 D_1 + +\alpha_3 D_3 + \alpha_4 D_4 + 0.65 LnX_2 - 0.23 LnX_3 + \alpha_5 D_5 + 0.02 LnX_4 + 1.03 LnX_5 + u_i$$

Regression results in table (4.3.6) showed a negative relationship between the age the household income generated from labour indicating that as the age of the respondent increases by one percent, the income derived from working as labour lowers by 1.31%. it was statistically significant at 5% level of significance and the p-value was 0.034 rejecting the null hypothesis. The results were not as expected. It was supposed that as age of the labour increases, their experiences and skills increases too, and accordingly the

income derived from serving as labour goes up. To justify this situation, labors may be casual labors working in a daily paid bases, there may be underlying factors having influence on this source of income not included in the model.

2. Fareeg residence

Residence (village) $(D_2 = 0)$ $Lny_{2000} = (3.76) - 1.31\, LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.65 LnX_2 - 0.23 LnX_3 + \alpha_5 D_5 + 0.02 LnX_4 + 1.03 LnX_5 + \mathrm{u}_i$

Residence (fareeg) $(D_2 = 1)$ $Lny_{2000} = (3.76 - 0.74) - 1.31\, LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.65 LnX_2 - 0.23 LnX_3 + \alpha_5 D_5 + 0.02 LnX_4 + 1.03 LnX_5 + \mathrm{u}_i$

The results revealed that, income from labour gained by fareeg residence was less by 74% than village residence, the coefficient showed that it was statistically significant at 5% level of significance. The p-value was 0.023, rejecting the null hypothesis.

3. Secondary education

Education level (illiterate) $(D_3 = 0)$ $Lny_{2000} = (3.76) - 1.31\, LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_4 D_4 + 0.65 LnX_2 - 0.23 LnX_3 + \alpha_5 D_5 + 0.02 LnX_4 + 1.03 LnX_5 + \mathrm{u}_i$

Education level (secondary) $(D_3 = 1)$ $Lny_{2000} = (3.76 - 0.92) - 1.31\, LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_4 D_4 + 0.65 LnX_2 - 0.23 LnX_3 + \alpha_5 D_5 + 0.02 LnX_4 + 1.03 LnX_5 + \mathrm{u}_i$

The results showed a negative effect of secondary education on income from serving as labour, people having secondary school certificate have income from labour services less by 92% than illiterate. The coefficient was significant at 0.05 level of significance and the p-value of 0.023 rejecting the null hypothesis. This implies that secondary school certificate holders serve as employees rather than labors.

4. Security situation

Security situation (bad) $(D_5 = 0)$ $Lny_{2000} = (3.76) - 1.31\, LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + 0.66 LnX_2 - 0.23 LnX_3 + 0.02 LnX_4 + 1.03 LnX_5 + \mathrm{u}_i$

Security situation (good) $(D_5 = 1)$ $Lny_{2000} = (3.76 - 6.49) - 1.31\, LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + 0.66 LnX_2 - 0.23 LnX_3 + 0.02 LnX_4 + 1.03 LnX_5 + \mathrm{u}_i$

The results revealed that respondents during good security situation has income from labour less by 0.001 SDG than they have when insecurity

situation prevail, results are very surprising and contradicting. It is assumed that during good security situation, the income from labour go up. This might be explained by the fact that labour activities were characterized with low salaries. The p-value was 0.000 and significant at 0.05 level of significance rejecting the null hypothesis.

5. Household expenditure

$Lny_{2000} = (3.76) - 1.31\, LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + 0.66 LnX_2 - 0.23 LnX_3 + 0.02 LnX_4 + \alpha_5 D_5 + 1.03 LnX_5 + \mathrm{u}_i$

The results revealed that expenditure has a positive impact on income from labour, as household expenditure increases by 1% the income derived from labour increases by 1.03%, results are in line with the a priori, because more household expenditure means that, more income was needed. The p-value was 0.010 and significant at 5% level of significance rejecting the null hypothesis.

4.3.6.2 Conflict period

Five variables showed a significant impact on income gained from labour, they were: Town, Fareeg, Damra, Khalwa and Basic.

1. Town residence

Residence (village) $(D_2 = 0)$ $Lny_{2006} = (1.59) - 0.01\, LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.19 LnX_2 - 0.11 LnX_3 - 0.03 LnX_4 + \alpha_5 D_5 + 0.008 LnX_5 + \mathrm{u}_i$

Residence (town) $(D_2 = 1)$ $Lny_{2006} = (1.59 - 1.13) - 0.01\, LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.19 LnX_2 - 0.11 LnX_3 - 0.03 LnX_4 + \alpha_5 D_5 + 0.008 LnX_5 + \mathrm{u}_i$

Town residence has a negative effect on income from labour. The coefficient showed that it was statistically significant only at 10% level of significance. The p-value was 0.058 and not significant at 5% level of significance accepting the null hypothesis.

2. Fareeg residence

Residence (village) $(D_2 = 0)$ $Lny_{2006} = (1.59) - 0.01\, LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.19 LnX_2 - 0.11 LnX_3 - 0.03 LnX_4 + \alpha_5 D_5 + 0.008 LnX_5 + \mathrm{u}_i$

Residence (fareeg) $(D_2 = 1)$ $Lny_{2006} = (1.59 - 1.58) - 0.01\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.19LnX_2 - 0.11LnX_3 - 0.03LnX_4 + \alpha_5 D_5 + 0.008LnX_5 + \mathrm{u}_i$

Fareeg residence has negative effect on income from labour and have income from labour lower by 158% than village residence. The p-value was 0.017 and significant at 0.05 level of significance rejecting the null hypothesis.

3. Damra residence

Residence (village) $(D_2 = 0)$ $Lny_{2006} = (1.59) - 0.01\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.19LnX_2 - 0.11LnX_3 - 0.03LnX_4 + \alpha_5 D_5 + 0.008LnX_5 + \mathrm{u}_i$
Residence (Damra) $(D_2 = 1)$ $Lny_{2006} = (1.59 - 1.5) - 0.01\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.19LnX_2 - 0.11LnX_3 - 0.03LnX_4 + \alpha_5 D_5 + 0.008LnX_5 + \mathrm{u}_i$

Damra variable has a negative effect on income from labour. Damra residence has income from labour lower by 150% than village residence, the coefficient was statistically significant at 5% level of significance and the p-value was 0.018 rejecting the null hypothesis.

4. Khalwa education

Education level (illiterate) $(D_2 = 0)$ $Lny_{2006} = (1.59) - 0.01\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.19LnX_2 - 0.11LnX_3 - 0.03LnX_4 + \alpha_5 D_5 + 0.008LnX_5 + \mathrm{u}_i$
Residence level (Khalwa) $(D_2 = 1)$ $Lny_{2006} = (1.59 + 0.71) - 0.01\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.19LnX_2 - 0.11LnX_3 - 0.03LnX_4 + \alpha_5 D_5 + 0.008LnX_5 + \mathrm{u}_i$

Education dummy, Khalwa show positive sign, according to the p-value of 0.081, it is not significant at 0.05, we cannot reject the null hypothesis.

5. Basic education

Education level (illiterate) $(D_2 = 0)$ $Lny_{2006} = (1.59) - 0.01\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.19LnX_2 - 0.11LnX_3 - 0.03LnX_4 + \alpha_5 D_5 + 0.008LnX_5 + \mathrm{u}_i$
Education level (basic) $(D_2 = 1)$ $Lny_{2006} = (1.59 + 0.7) - 0.01\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 0.19LnX_2 - 0.11LnX_3 - 0.03LnX_4 + \alpha_5 D_5 + 0.008LnX_5 + \mathrm{u}_i$

Education level (basic) showed positive sign. The p-value was 0.084 and was not significant at 0.05 level of significance accepting the null hypothesis.

4.3.6.3 Peace period

Two residence variables (Fareeg, Damra) and three education variables (Basic Secondary and University) have an influence on income from.

1. Fareeg residence

Residence (village) $(D_2 = 0)$ $Lny_{2012} = (-0.13) - 0.73\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.18LnX_2 - 0.31LnX_3 + 0.06LnX_4 + \alpha_5 D_5 + 0.50LnX_5 + \mathrm{u}_i$
Residence (fareeg) $(D_2 = 1)$ $Lny_{2012} = (-0.13 - 1.79) - 0.73LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.18LnX_2 - 0.31LnX_3 + 0.06LnX_4 + \alpha_5 D_5 + 0.50LnX_5 + \mathrm{u}_i$

fareeg residence showed a negative relationship with income from labour activities. fareeg has income from labour less by 179% than the village residence. The p-value was 0.004 and was statistically significant at 0.05 level of significance rejecting the null hypothesis.

2. Damra residence

Residence (village) $(D_2 = 0)$ $Lny_{2012} = (-0.13) - 0.73\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.18LnX_2 - 0.31LnX_3 + 0.06LnX_4 + \alpha_5 D_5 + 0.50LnX_5 + \mathrm{u}_i$
Residence (Damra) $(D_2 = 1)$ $Lny_{2012} = (-0.13 - 1.72) - 0.73LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.18LnX_2 - 0.31LnX_3 + 0.06LnX_4 + \alpha_5 D_5 + 0.50LnX_5 + \mathrm{u}_i$

Damra residence has a negative influence on income generated from labour activity. It was found that, Damra residence causes income from labour decrease by 172% than villagers. The p-value was 0.002 and was significant at 5% level of significance rejecting the null hypothesis.

3. Basic education

Education level (illiterate) $(D_4 = 0)$ $Lny_{2012} = (-0.13) - 0.73\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.18LnX_2 - 0.31LnX_3 + 0.06LnX_4 + \alpha_5 D_5 + 0.50LnX_5 + \mathrm{u}_i$
Education level (basic) $(D_4 = 1)$ $Lny_{2012} = (-0.13 + 0.68) - 0.73LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.18LnX_2 - 0.31LnX_3 + 0.06LnX_4 + \alpha_5 D_5 + 0.50LnX_5 + \mathrm{u}_i$

Basic education variable has a positive sign, showing a positive relationship between income derived from labour and basic education. If the respondents have basic education, their income from labour was greater by 68% than illiterate respondents. The p-value was 0.090 and was not significant at 0.05 level of significance accepting the null hypothesis.

4. Secondary education

Education level (illiterate) $(D_4 = 0)$ $Lny_{2012} = (-0.13) - 0.73\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.18LnX_2 - 0.31LnX_3 + 0.06LnX_4 + \alpha_5 D_5 + 0.50LnX_5 + \mathrm{u}_i$
Education level (secondary) $(D_4 = 1)$ $Lny_{2012} = (-0.131 - 1.03\,) - 0.73LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.18LnX_2 - 0.31LnX_3 + 0.06LnX_4 + \alpha_5 D_5 + 0.50LnX_5 + \mathrm{u}_i$

Secondary education has a negative effect on income from labour. If the respondents have secondary education, their income generated from labour was less by 103% than illiterate respondents. The p-value was 0.061 and not significant at 0.05 level of significance accepting the null hypothesis.

5. University education

Education level (illiterate) $(D_4 = 0)$ $Lny_{2012} = (-0.13) - 0.73\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + +0.18LnX_2 - 0.31LnX_3 + 0.06LnX_4 + \alpha_5 D_5 + 0.50LnX_5 + \mathrm{u}_i$
Education level (university) $(D_4 = 1)$ $Lny_{2012} = (-0.13 - 1.68\,) - 0.73LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.18LnX_2 - 0.31LnX_3 + 0.06LnX_4 + \alpha_5 D_5 + 0.50LnX_5 + \mathrm{u}_i$

University education has a negative sign. University graduates has income from labour activities less by 168% than illiterates. The p-value was 0.004 and significant at 0.05 level of significance rejecting the null hypothesis.

4.3.7 Household income from trade

The goodness of fit for SUR regression model illustrates income generated from trade in the three periods, it was displayed based on chi square and the R square of each period. The value of chi square was 46.68 with p-value of 0.0001 and R square 0.19 for the first period and significant at 0.05 level of significance. Chi square value for the second period was 31.46 and the p-value of 0.0254 and R square was 0.14 while chi square value for the third period was 30.79 and the p-value of 0.0304 and R square 0.13. Chi square in the last two periods was significant at rejecting the null hypothesis.

4.3.7.1 Pre conflict:

1. Fareeg residence

Residence (village) $(D_2 = 0)$ $Lny_{2000} = (-20.77) + 0.34\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 1.02LnX_2 + 0.19LnX_3 - 0.24LnX_4 + \alpha_5 D_5 + 2.83LnX_5 + \mathrm{u}_i$

Residence (fareeg) $(D_2 = 1)$ $Lny_{2000} = (-20.77 - 1.13) + 0.34\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 1.02LnX_2 + 0.19LnX_3 - 0.24LnX_4 + \alpha_5 D_5 + 2.83LnX_5 + \mathrm{u}_i$

Fareeg residence showed a negative relationship with income from trade, it has income less by 113% than village residence. The p-value was 0.007 and significant at 0.05 level of significance rejecting the null hypothesis. This implies that, fareeg residence do not practice trade as villagers do because of the nomadic way of life that they follow. It does not support trade activity (table 4.3.7).

Table 4.3.7: SUR results summary: Household Income from trade

Variables	Pre conflict 2000	Conflict 2006	Peace 2012
Gender	0.110368	0.4879656	0.1422817
Age	0.3368368	-0.3169732	0.3277827
Town	-0.5369537	0.9572644	0.9476917
IDPs camp	(dropped)	0.5079319	0.6328913
Fareeg	-1.130068***	-0.5830436	-1.522518**
Damra	-0.8452722	-0.4598075	-1.017141
Married	0.8106826	-0.0826607	1.298451
Divorced	3.010137*	-0.2044301	0.9713016
Widow	0.5837675	0.316422	1.760985
Khalwa	-0.0056533	-0.1728187	0.4538035
Basic	-0.8015699*	0.6073331	0.8148815*
Secondary	-1.05967*	-1.008291*	-0.5757836
University	0.6571951	-0.9726586	-0.5087339
HH family size	-1.019036	0.4953359	0.4588583
Security	0.5203427	0.0100502	0.1748622
Total area cultivated	0.1944229	0.2182897	0.1005304
Production of millet	-0.2427249	-0.1503462	0.0927662
Household expenditure	2.833548***	1.435305***	0.7502231
Constant	-20.7768***	-12.14933**	-10.72548
R^2	0.19	0.14	0.13
Chi square	46.68***	31.46**	30.79**
N	202	202	202
* Significant at 10%	** Significant at 5%	*** Significant at 1%	

Source: Field survey, 2015

2. Marital status (divorced)

Marital status (single) $(D_2 = 0)$ $Lny_{2000} = -20.77 + 0.34\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 1.02LnX_2 + 0.19LnX_3 - 0.24LnX_4 + \alpha_5 D_5 + 2.83LnX_5 + \mathrm{u}_i$
Marital status (divorced) $(D_2 = 1)$ $Lny_{2000} = (-20.77 + 3.01) + 0.34\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 1.02LnX_2 + 0.19LnX_3 - 0.24LnX_4 + \alpha_5 D_5 + 2.83LnX_5 + \mathrm{u}_i$

The results revealed that divorced respondents have income from trade greater by 301% than do have single respondents. The p-value was 0.068 and significant at 0.05 level of significance rejecting the null hypothesis.

3. Basic education

Education level (illiterate) $(D_4 = 0)$ $Lny_{2000} = -20.77 + 0.34\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 1.02LnX_2 + 0.19LnX_3 - 0.24LnX_4 + \alpha_5 D_5 + 2.83LnX_5 + \mathrm{u}_i$
Education level (Basic) $(D_4 = 1)$ $Lny_{2000} = (-20.77 - 0.8) + 0.34\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 - 1.02LnX_2 + 0.19LnX_3 - 0.24LnX_4 + \alpha_5 D_5 + 2.83LnX_5 + \mathrm{u}_i$

Basic education showed that it has negative sign indicating a negative relationship between income derived from trade and basic education, If the respondent has basic education, the income from trade was less by 80% than illiterate respondents have. The p-value was 0.080 and not significant at 0.05 level of significance accepting the null hypothesis.

4. Secondary education

Education level (illiterate) $(D_4 = 0)$ $Lny_{2000} = -20.77 + 0.34\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 1.02LnX_2 + 0.19LnX_3 - 0.24LnX_4 + \alpha_5 D_5 + 2.83LnX_5 + \mathrm{u}_i$
Education level (Secondary) $(D_4 = 1)$ $Lny_{2000} = (-20.77 - 1.06) + 0.34\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 1.02LnX_2 + 0.19LnX_3 - 0.24LnX_4 + \alpha_5 D_5 + 2.83LnX_5 + \mathrm{u}_i$

Secondary education has a negative effect on income generated from trade, telling that if the respondent has secondary education, the income from trade was less by 106% than illiterate respondents have. The p-value was 0.061 and not significant at 0.05 level of significance accepting the null hypothesis.

5. Household expenditure

$Lny_{2000} = -20.77 + 0.34\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 1.02LnX_2 + 0.19LnX_3 - 0.24LnX_4 + \alpha_5 D_5 + 2.83LnX_5 + \mathrm{u}_i$

The results revealed that if household expenditure increased by 1%, the income generated from trade will increase by 2.83%. The elasticity has the right positive sign that agree with the a priori. The p-value was 0.000 and significant at 5% level of significance rejecting the default hypothesis.

4.3.7.2 Conflict period

1. Secondary education

Education level (illiterate) $(D_2 = 0)$ $Lny_{2006} = (-12.15) - 0.32\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.5LnX_2 + 0.22LnX_3 - 0.15LnX_4 + \alpha_5 D_5 + 1.44LnX_5 + \mathrm{u}_i$

Education level (Secondary) $(D_4 = 1)$ $Lny_{2006} = (-12.15 - 1.01) - 0.32\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.5LnX_2 + 0.22LnX_3 - 0.15LnX_4 + \alpha_5 D_5 + 1.44LnX_5 + \mathrm{u}_i$

Secondary education has a negative effect on household income from trade, it tells that, having a secondary education will reduce the income generated from trade by about 101% than illiterate. The p-value was 0.058 and significant only at 10% level of significance accepting the null hypothesis.

2. Household expenditure

$Lny_{2006} = (-12.15) - 0.32\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 0.5LnX_2 + 0.22LnX_3 - 0.15LnX_4 + \alpha_5 D_5 + 1.44LnX_5 + \mathrm{u}_i$

household expenditure has a positive effect on income gained from trade. A one percent increase in household expenditure will increase the household income generated from trade by 1.44%, the coefficient is statistically significant at normal levels of significant and the p-value was 0.001 and elasticity differs from zero and we reject the null hypothesis.

4.3.7.3 Peace period

1. Fareeg residence

Residence (village) $(D_2 = 0)$ $Lny_{2012} = (-10.72) + 0.32\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.46LnX_2 + 1.01LnX_3 - 0.09LnX_4 + \alpha_5 D_5 + 0.75LnX_5 + \mathrm{u}_i$

Residence (fareeg) $(D_2 = 0)$ $Lny_{2012} = (-10.72 - 1.32) + 0.32\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.46LnX_2 + 1.01LnX_3 - 0.09LnX_4 + \alpha_5 D_5 + 0.75LnX_5 + \mathrm{u}_i$

Fareeg residence showed a negative relationship with income from trade, it has income less by 132% than village residence. The p-value was 0.032 and was significant at 0.05 level of significance rejecting the null hypothesis.

2. Basic education

Education level (illiterate) $(D_2 = 0)$ $Lny_{2012} = (-10.72) + 0.32\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.46LnX_2 + 1.01LnX_3 - 0.09LnX_4 + \alpha_5 D_5 + 0.75LnX_5 + \mathrm{u}_i$

Education level (basic) $(D_2 = 1)$ $Lny_{2012} = (-10.72 + 81) + 0.32\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.46LnX_2 + 1.01LnX_3 - 0.09LnX_4 + \alpha_5 D_5 + 0.75LnX_5 + \mathrm{u}_i$

Basic education has a positive effect on income generated from trade showing a positive relation with income derived from trade. The results were telling that having a basic education will increase the income from trade by 81% than illiterate. The p-value was 0.079 and was not significance at 0.05 level of significance accepting the null hypothesis.

4.3.8 Household income from aids and relief assistance

Before the conflict, the aid assistant provided to the community was very limited, it was confined to assistance given by Zakat Chamber.

In the first period, Chi squared was 33.5643 and the p-value of 0.0096, and the R squared equal to 0.13, it captures about 13% of variation on income from aid assistance caused by independent variable included in the model.

In the second period, Chi square for the model was 167.39 and the p-value of 0.0000 and the R squared equal to 0.46 interpreting 46% of variation caused by independent variables on household income from aid and relief.

For the third period, Chi squared for the model was 163.43 and the p-value of 0.0000, The R square equal to 0.45, interpreting about 45% of the variation caused by the independent variable on household income from aid and relief

4.3.8.1 Pre conflict period

Before the conflict, two variables have an effect on income derived from assistance, which were secondary education and family size (table 4.3.8).

Table 4.3.8: SUR results summary: Income from aid and relief

Variables	**Pre conflict 2000**	**Conflict 2006**	**Peace 2012**
Gender	0.0925425	-0.5454307	-0.6345064
Age	-0.1507076	0.5869541	1.227335
Town	0.0684635	-0.551158	-0.8791087
IDPs camp	(dropped)	0.9774522*	0.8702683*
Fareeg	-0.0180955	-3.678587***	-4.458137***
Damra	0.0574598	-4.190961***	-4.529011***
Married	-0.080305	-0.0573368	0.4262583
Divorced	-0.1276727	0.6348853	1.074224
Widow	-0.1969809	0.3279129	0.6768354
Khalwa	-0.0335253	-0.0768144	0.1548703
Basic	0.0382303	-0.0486978	0.4675151
Secondary	0.1914541*	-0.5387399	-0.0007654
University	-0.0451825	-0.5848628	-0.019392
HH family size	0.5701481***	0.177294	0.0731455
Security	0.0166241	-0.2087629	-0.0354624
Total area cultivated	0.0554987	0.070732	0.0153539
Production of millet	0.0124127	-0.079245	-0.0938709
Household expenditure	0.0239904	.6315082	-0.1059679
Constant	-0.7623717	-1.918266	2.257364
R2	0.13	0.46	0.45
Chi square	33.56**	167.39***	163.43***
N	202	202	202
***** Significant at 10%	****** Significant at 5%	******* Significant at 1%	

Source: Field survey, 2015

1. Secondary education

Education level (illiterate) ($D_2 = 0$) $Lny_{2000} = (-0.76) - 0.32\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.57LnX_2 + 0.06LnX_3 - 0.01LnX_4 + \alpha_5 D_5 + 0.02LnX_5 + \mathrm{u}_i$

Education level (secondary) ($D_2 = 1$) $Lny_{2000} = (-0.76 + 0.19) - 0.32\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.57LnX_2 + 0.06LnX_3 - 0.01LnX_4 + \alpha_5 D_5 + 0.02LnX_5 + \mathrm{u}_i$

Income incurred from aid and humanitarian assistance was greater if one has secondary education by 19% than illiterate. The coefficient was significant only at 10% level of significance, this is because the corresponding The p-value was 0.062 and was not significant at 0.05 level of significance accepting the null hypothesis.

2. Family size

$Lny_{2000} = (-0.76) - 0.32\, LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.57 LnX_2 + 0.06 LnX_3 - 0.01 LnX_4 + \alpha_5 D_5 + 0.02 LnX_5 + \mathrm{u}_i$

If family size increased by 1% household income from aid would increase on average by 0.19%. The p-value was 0.000 and significant at 0.05 level of significance rejecting the null hypothesis

4.3.8.2 Conflict period

Three explanatory variables were found to have an effect on income generated from aid and humanitarian assistance which were: IDPs, fareeg, and Damra variables.

3. IDPs residence

Residence (village) $(D_2 = 0)$ $Lny_{2006} = (-1.92) + 0.59\, LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.18 LnX_2 + 0.07 LnX_3 - 0.08 LnX_4 + \alpha_5 D_5 + 0.63 LnX_5 + \mathrm{u}_i$

Residence (IDPs camp) $(D_2 = 1)$ $Lny_{2006} = (-1.92 + 0.98) + 0.59\, LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.18 LnX_2 + 0.07 LnX_3 - 0.08 LnX_4 + \alpha_5 D_5 + 0.63 LnX_5 + \mathrm{u}_i$

During Central Darfur conflict, humanitarian aids became the main livelihood strategy for the IDPs, it generates income for displaced. The results revealed that IDPs who were living in camps have income from humanitarian aids and relief greater by 98% than villagers. The p-value was 0.094 and not significant at 0.05 level of significance failing to reject the null hypothesis. Results provide an indication that although income from relief and aids was important income source for IDPs; there were other sources of income available to them, for instance, remittances from relatives and casual labour, they diversify their income generating activities.

4. Fareeg residence

Residence (village) $(D_2 = 0)$ $Lny_{2006} = (-1.92) + 0.59\, LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.18 LnX_2 + 0.07 LnX_3 - 0.08 LnX_4 + \alpha_5 D_5 + 0.63 LnX_5 + \mathrm{u}_i$

Residence (fareeg) $(D_2 = 1)$ $Lny_{2006} = (-1.92 - 3.68) + 0.59\, LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.18 LnX_2 + 0.07 LnX_3 - 0.08 LnX_4 + \alpha_5 D_5 + 0.63 LnX_5 + \mathrm{u}_i$

Fareeg residence showed a negative relationship with income from aid and relief, it has income less by 368% than in village residence. The p-value was 0.000 and significant at 0.05 level of significance rejecting the null hypothesis.

5. Damra residence

Residence (village) $(D_2 = 0)$ $Lny_{2006} = (-1.92) + 0.59\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.18LnX_2 + 0.07LnX_3 - 0.08LnX_4 + \alpha_5 D_5 + 0.63LnX_5 + \mathrm{u}_i$
Residence (Damra) $(D_2 = 1)$ $Lny_{2006} = (-1.92 - 4.19) + 0.59\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.18LnX_2 + 0.07LnX_3 - 0.08LnX_4 + \alpha_5 D_5 + 0.63LnX_5 + \mathrm{u}_i$

People living in Damra settlement have income from relief and aid assistance less by 419% than villagers. The p-value was 0.000 and significant at 5% level of significance rejecting the null hypothesis.

4.3.8.3 Peace period

IDPs Fareeg and Damra dummy variables are showing impact on Income gained from aid and humanitarian assistance in this period.

1. IDPs residence

Residence (village) $(D_2 = 0)$ $Lny_{2012} = (2.26) + 1.23\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.07LnX_2 + 0.02LnX_3 - 0.09LnX_4 + \alpha_5 D_5 - 0.11LnX_5 + \mathrm{u}_i$
Residence (IDPs camp) $(D_2 = 1)$ $Lny_{2012} = (2.26 + 0.87) + 1.23\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.07LnX_2 + 0.02LnX_3 - 0.09LnX_4 + \alpha_5 D_5 - 0.11LnX_5 + \mathrm{u}_i$

IDPs have income from humanitarian aid and relief greater by 87%% than villagers have. The p-value was 0.065 and not significant at 0.05 level of significance so we fail to reject the null hypothesis.

2. Fareeg residence

Residence (village) $(D_2 = 0)$ $Lny_{2012} = (2.26 + 0.87) + 1.23\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.07LnX_2 + 0.02LnX_3 - 0.09LnX_4 + \alpha_5 D_5 - 0.11LnX_5 + \mathrm{u}_i$
Residence (fareeg) $(D_2 = 1)$ $Lny_{2012} = (2.26 - 4.46) + 1.23\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.07LnX_2 + 0.02LnX_3 - 0.09LnX_4 + \alpha_5 D_5 - 0.11LnX_5 + \mathrm{u}_i$

Fareeg residence showed a negative relationship with income from aid and relief, it has income less by 446% % than village residence. The p-value was

0.000 and significant at 0.05 level of significance rejecting the null hypothesis.

3. Damra residence

Residence (village) ($D_2 = 0$) $Lny_{2012} = (2.26) + 1.23\, LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.07 LnX_2 + 0.02 LnX_3 - 0.09 LnX_4 + \alpha_5 D_5 - 0.11 LnX_5 + u_i$

Residence (Damra) ($D_2 = 1$) $Lny_{2012} = (2.26 - 4.53) + 1.23\, LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 + 0.07 LnX_2 + 0.02 LnX_3 - 0.09 LnX_4 + \alpha_5 D_5 - 0.11 LnX_5 + u_i$

Damra residence showed negative effect on income gained from humanitarian assistance. People living in Damra settlement have income from relief and aid assistance less by 453% than villagers. The p-value was 0.000 and statically significant at 5% level of significance rejecting the null hypothesis.

4.3.9 Household Income from secondary activities:

The results revealed that chi square was 49.42 with and the p-value 0.0001 for the first period, for the second period the chi square was 69.17 and the p-value 0.0000, while in the third period chi square was 86.73 and the p-value of 0.0000, were significant at 0.05 level of significance rejecting the null hypothesis.

The R square was 0.19, 0.23 and 0.29, interpreting the variation in household income incurred from secondary activities caused by the independent variables included in the model for the three period by 19%, 23% and 29% respectively.

4.3.9.1 Pre conflict period

In the first period, two variable show significance, Khalwa and University variables, they have an impact on income generated from secondary activities.

1. Khalwa education

Education level (illiterate) ($D_4 = 0$) $Lny_{2000} = (0.78) - 0.92\, LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 - 0.74 LnX_2 - 0.25 LnX_3 - 0.18 LnX_4 + \alpha_5 D_5 + 0.64 LnX_5 + u_i$

Education level (Khalwa) $(D_4 = 1)$ $Lny_{2000} = (0.78 + 2.63) - 0.92\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 - 0.74LnX_2 - 0.25LnX_3 - 0.18LnX_4 + \alpha_5 D_5 + 0.64LnX_5 + \mathrm{u}_i$

Khalwa education has a positive sign suggesting that those who have Khalwa education, have income generated from secondary activities greater by 263% than for illiterate. The p-value was 0.000 and was significant at 0.05 level of significance rejecting the null hypothesis.

Table 4.3.9: SUR results summary: Income from secondary activities:

Variables	Pre conflict 2000	Conflict 2006	Peace 2012
Gender	0.1401472	.1181293	0.1064111
Age	-0.9225496	-.5039218	-0.0646927
Town	-0.8482816	.1680342	-1.622233*
IDPs camp	(dropped)	1.826409*	-0.1887259
Fareeg	0.7152925	2.90215***	1.998732*
Damra	1.530281	3.322013***	3.074813***
Married	-0.1581859	.2420591	-0.4413679
Divorced	-1.008619	-1.399703	-1.759338
Widow	0.5963357	.8073988	-0.8647929
Khalwa	2.632613***	1.818461***	0.6995777
Basic	0.3024601	-.1774892	-1.140834
Secondary	-0.1182772	-1.311691	-2.405515**
University	2.569927*	-1.917654*	-2.775465***
HH family size	-0.7377701	-1.816333*	-1.165724
Security	0.640028	-.5076016	-0.5619786
Total area cultivated	-0.2537034	.1550489	0.0013381
Production of millet	0.1837205	-.0803601	-0.1027861
Household expenditure	0.6411112	2.465609***	3.964691***
Constant	0.7849185	-14.4589*	-30.34743**
R2	0.1865	0.2272	0.2857
Chi square	49.42	69.17	86.73
N	202	202	202
***** Significant at 10%	****** Significant at 5%	******* Significant at 1%	

Source: Field survey, 2015

2. University education

Education level (illiterate) $(D_4 = 0)$ $Lny_{2000} = (0.78) - 0.92\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 - 0.74LnX_2 - 0.25LnX_3 - 0.18LnX_4 + \alpha_5 D_5 + 0.64LnX_5 + \mathrm{u}_i$

Education level (University) $(D_4 = 1)$ $Lny_{2000} = (0.78 + 2.63) - 0.92\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 - 0.74LnX_2 - 0.25LnX_3 - 0.18LnX_4 + \alpha_5 D_5 + 0.64LnX_5 + \mathrm{u}_i$

University education coefficient has a positive sign indicating that it has positive effect on income generated from secondary activities, it has income produced from secondary activities greater by 263% than their illiterate. This implies that, availability of resources and assets, as well as enjoying good security situation before the conflict, helps people to diversify their income sources by engaging in different occupations that incur additional income to the household. Educated respondents make use of knowledge they have to generate additional income from secondary income generating activities. The p-value was 0.071and not significant at 5% level of significance accepting the null hypothesis.

4.3.9.2 Conflict period

In this period, seven variables have an effect on income generated from secondary activities which were IDPs camp, fareeg, Damra, Khalwa, university, family size, and household total expenditure.

1. IDPs camp residence

Residence (village) $(D_2 = 0)$ $Lny_{2006} = (-14.46) - 0.5\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 1.81 LnX_2 + 0.16 LnX_3 - 0.08 LnX_4 + \alpha_5 D_5 + 2.47 LnX_5 + \mathrm{u}_i$

Residence (IDPs camp) $(D_2 = 1)$ $Lny_{2006} = (-14.46 + 1.83) - 0.5\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 1.81 LnX_2 + 0.16 LnX_3 - 0.08 LnX_4 + \alpha_5 D_5 + 2.47 LnX_5 + \mathrm{u}_i$

The results revealed that IDPs camp dwellers have income from secondary activities greater by 183% than villagers have, the coefficient was significant only at 10% level of significance. The p-value was 0.060 and not significant at 5% level of significance accepting the null hypothesis.

2. Fareeg residence

Residence (village) $(D_2 = 0)$ $Lny_{2006} = (-14.46) - 0.5\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 1.81 LnX_2 + 0.16 LnX_3 - 0.08 LnX_4 + \alpha_5 D_5 + 2.47 LnX_5 + \mathrm{u}_i$

Residence (fareeg) $(D_2 = 1)$ $Lny_{2006} = (-14.46 + 2.9) - 0.5\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 1.81 LnX_2 + 0.16 LnX_3 - 0.08 LnX_4 + \alpha_5 D_5 + 2.47 LnX_5 + \mathrm{u}_i$

Fareeg residents have income from secondary activities higher by 290% than their village residence. The p-value was 0.008 and was statistically significant at 0.05 level of significance rejecting the null hypothesis.

3. Damra residence

Residence (village) $(D_2 = 0)$ $Lny_{2006} = (-14.46) - 0.5\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 1.81 LnX_2 + 0.16 LnX_3 - 0.08 LnX_4 + \alpha_5 D_5 + 2.47 LnX_5 + u_i$
Residence (Damra) $(D_2 = 1)$ $Lny_{2006} = (-14.46 + 3.32) - 0.5\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 1.81 LnX_2 + 0.16 LnX_3 - 0.08 LnX_4 + \alpha_5 D_5 + 2.47 LnX_5 + u_i$

Damra residence showed a positive effect on income incurred from secondary activities. Damra dwellers have income from secondary activities more by 332% than villagers. The p-value was 0.001 and was significant at 5% level of significance, we reject the null hypothesis.

4. Khalwa education

Education level (illiterate) $(D_4 = 0)$ $Lny_{2006} = (-14.46) - 0.5\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 - 1.81 LnX_2 + 0.16 LnX_3 - 0.08 LnX_4 + \alpha_5 D_5 + 2.47 LnX_5 + u_i$
Education level (Khalwa) $(D_4 = 1)$ $Lny_{2006} = (-14.46 + 1.82) - 0.5\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 - 1.81 LnX_2 + 0.16 LnX_3 - 0.08 LnX_4 + \alpha_5 D_5 + 2.47 LnX_5 + u_i$

The results showed that Khalwa education has income from secondary activities 182% more than illiterate. The p-value was 0.007 and significant at 5% level of significance rejecting the null hypothesis.

5. University education

Education level (illiterate) $(D_4 = 0)$ $Lny_{2006} = (-14.46) - 0.5\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 - 1.81 LnX_2 + 0.16 LnX_3 - 0.08 LnX_4 + \alpha_5 D_5 + 2.47 LnX_5 + u_i$
Education level (university) $(D_4 = 1)$ $Lny_{2006} = (-14.46 - 1.92) - 0.5\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 - 1.81 LnX_2 + 0.16 LnX_3 - 0.08 LnX_4 + \alpha_5 D_5 + 2.47 LnX_5 + u_i$

The p-value was 0.074 and significant at 0.05 level of significance accepting the null hypothesis.

6. Family size

$Lny_{2006} = (-14.46) - 0.5\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 - 1.81 LnX_2 + 0.16 LnX_3 - 0.08 LnX_4 + \alpha_5 D_5 + 2.47 LnX_5 + u_i$

SUR results suggested that as family size increases by one percent the income from secondary activities reduces by about 1.81%, indicating a negative relationship between family size and income from secondary activities, this may be because, the main contributors of this category were the household heads. The p-value of the coefficient was 0.062 and was than the not significant at 5% level of significance accepting the null hypothesis.

7. Household expenditure

$Lny_{2006} = (-14.46 - 1.92) - 0.5\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 - 1.81 LnX_2 + 0.16 LnX_3 - 0.08 LnX_4 + \alpha_5 D_5 + 2.47 LnX_5 + \mathrm{u}_i$

Household expenditure has a positive effect on secondary activities. The results showed that, a one percent increase in household expenditure causes income from secondary activities to increase by 2.47%. The elasticity has got the right positive sign. The p-value was 0.001 telling that the elasticity was statistically significant rejecting the null hypothesis.

4.3.9.3 Peace period:

In this period, six variables have an impact on income generated from undertaking secondary activities, town, fareeg, Damra, secondary, university, and household total expenditure.

1. Town residence

Residence (village) $(D_2 = 0)$ $Lny_{2012} = (-30.35) - 0.06\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 1.17 LnX_2 + 0.001 LnX_3 - 0.1 LnX_4 + \alpha_5 D_5 + 3.96 LnX_5 + \mathrm{u}_i$

Residence (town) $(D_2 = 1)$ $Lny_{2012} = (-30.35 - 0.16) - 0.06\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 1.17 LnX_2 + 0.001 LnX_3 - 0.1 LnX_4 + \alpha_5 D_5 + 3.96 LnX_5 + \mathrm{u}_i$

Town residence has an effect on income derived from secondary activities, the results showed that town dwellers have income from secondary activities less by 16% than villagers have. The p-value was 0.075 and not significant at 0.05 level of significance accepting the null hypothesis.

2. Fareeg residence

Residence (village) $(D_2 = 0)$ $Lny_{2012} = (-30.35) - 0.06\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 1.17 LnX_2 + 0.001 LnX_3 - 0.1 LnX_4 + \alpha_5 D_5 + 3.96 LnX_5 + \mathrm{u}_i$

Residence (fareeg) $(D_2 = 1)$ $Lny_{2012} = (-30.35 + 2) - 0.06\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 1.17LnX_2 + 0.001LnX_3 - 0.1LnX_4 + \alpha_5 D_5 + 3.96LnX_5 + u_i$

People from fareeg, have income from secondary activities greater by 200% than village residence has, however, the coefficient is also significant only at 10% level of significance. The p-value was 0.064 and not significant at 0.05 level of significance failing to reject the null hypothesis.

3. Damra residence

Residence (village) $(D_2 = 0)$ $Lny_{2012} = (-30.35) - 0.06\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 1.17LnX_2 + 0.001LnX_3 - 0.1LnX_4 + \alpha_5 D_5 + 3.96LnX_5 + u_i$
Residence (Damra) $(D_2 = 1)$ $Lny_{2012} = (-30.35 + 3.07) - 0.06\,LnX_1 + \alpha_1 D_1 + \alpha_3 D_3 + \alpha_4 D_4 - 1.17LnX_2 + 0.001LnX_3 - 0.1LnX_4 + \alpha_5 D_5 + 3.96LnX_5 + u_i$

The results revealed that Damra settlement has income from secondary activities greater by 307% than people from villages. The p-value was 0.001 and significant at 5% level of significance rejecting the null hypothesis.

4. Secondary education

Education level (illiterate) $(D_4 = 0)$ $Lny_{2012} = (-30.35) - 0.06\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 1.17LnX_2 + 0.001LnX_3 - 0.1LnX_4 + \alpha_5 D_5 + 3.96LnX_5 + u_i$
Education level (secondary) $(D_4 = 1)$ $Lny_{2012} = (-30.35 - 2.4) - 0.06\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 - 1.17LnX_2 + 0.001LnX_3 - 0.1LnX_4 + \alpha_5 D_5 + 3.96LnX_5 + u_i$

Secondary education showed a negative effect on income gained from secondary activities, people having secondary school certificate have income from secondary activities less by about 240%, than illiterate. The p-value was 0.012 and was significant at 0.05 level of significance rejecting the null hypothesis.

5. University education

Education level (illiterate) $(D_4 = 0)$ $Lny_{2012} = (-30.35) - 0.06\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 - 1.17LnX_2 + 0.001LnX_3 - 0.1LnX_4 + \alpha_5 D_5 + 3.96LnX_5 + u_i$
Education level (university) $(D_4 = 1)$ $Lny_{2012} = (-30.35 - 2.78) - 0.06\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 - 1.17LnX_2 + 0.001LnX_3 - 0.1LnX_4 + \alpha_5 D_5 + 3.96LnX_5 + u_i$

University graduates have income from secondary activities less by 278% if compared with illiterate respondents. The p-value was 0.000 and significant

at 0.05 level of significance rejecting the null hypothesis. The results revealed that diversification of income was not much practiced among educated respondents, they depend on the main economic activity.

6. Household expenditure

$Lny_{2012} = (-30.35) - 0.06\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 - 1.17 LnX_2 + 0.001 LnX_3 - 0.1 LnX_4 + \alpha_5 D_5 + 3.96 LnX_5 + \mathrm{u}_i$

Household expenditure has positive effect on income generated from secondary activities, if the household expenditure increased by one percent, income from secondary activities increases by 3.96%. The p-value was 0.000 and significant at 5% level of significance rejecting the null hypothesis.

4.3.10 Income from household members' share

Table 4.3.9 shows SUR results, Chi square value for the three periods was 49.80 (p = 0.0000< 0.05), 30.20 (p = 0.0355< 0.05) and 21.07 (p = 0.2760 > 0.05) respectively p-value was statistically significant at 0.05 level of significance for 2000 and 2006, while for 2012 was not significant.

R square value for the three periods was 0.20, 0.14 and 0.08 respectively, interpreting 20%, 14% and 8% of the variation in income from household member share caused by the independent variables included in the model.

The overall fitness of the SUR model suggested by the Chi-Squared and R squared values might indicate that there were other variables not interred in the model, mainly for the third period.

4.3.10.1 Pre conflict period

Before the conflict, five variables have an effect on income generated from household members share which were: Khalwa, University, family size, Security and household expenditure.

1. Khalwa education

Education level (illiterate) $(D_4 = 0)$ $Lny_{2000} = (-13.30) - 0.06\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 1.82 LnX_2 + 0.08 LnX_3 - 0.25 LnX_4 + \alpha_5 D_5 + 1.52 LnX_5 + \mathrm{u}_i$

Education level (Khalwa) ($D_4 = 1$) $Lny_{2000} = (-13.30 - 1.57) - 0.06\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 1.82 LnX_2 + 0.08 LnX_3 - 0.25 LnX_4 + \alpha_5 D_5 + 1.52 LnX_5 + u_i$

The results in table 4.3.10 revealed that Khalwa education has negative effect on income generated from household members share. People having Khalwa education have income generated from household members share 152% less than uneducated people. The p-value was 0.002 and significant was at 0.05 level of significance rejecting the null hypothesis.

Table 4.3.10: SUR results summary: Income from HHMs' share:

Variables	Pre conflict 2000	Conflict 2006	Peace 2012
Gender	-0.5865636	-1.683874***	-2.091636***
Age	-0.064976	1.463305	1.548203
Town	0.173311	-0.9297321	-0.2543134
IDPs camp	(dropped)	-1.249182	-0.1176323
Fareeg	-0.3677875	0.0834545	1.529271
Damra	2.06558	-0.9324201	0.3326812
Married	-0.3278144	1.796985	-4.647489
Divorced	-0.0923114	2.846559	-3.513008
Widow	0.192728	1.582792	-4.753711
Khalwa	-1.566285***	-0.7295514	0.1033711
Basic	-0.0092878	-0.8977783	-0.142319
Secondary	-0.6140959	-0.1846467	0.1188986
University	-5.063084***	-0.513899	-0.7499597
HH family size	1.81511**	0.1854279	1.212415
Security	5.557627**	0.6411594	-0.3689777
Total area cultivated	0.078443	-0.3890014	0.137075
Production of millet	-0.2525901	0.2324011	-0.1716828
Household expenditure	1.515669**	1.739148*	1.32039
Constant	-13.30453**	-16.60829*	-10.25001
R2	0.20	0.14	0.08
Chi square	49.80***	30.20**	21.07
N	202	202	202
***** Significant at 10% ****** Significant at 5% ******* Significant at 1%			

Source: Field survey, 2015

2. University education

Education level (illiterate) ($D_4 = 0$) $Lny_{2000} = (-13.30) - 0.06\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 1.82 LnX_2 + 0.08 LnX_3 - 0.25 LnX_4 + \alpha_5 D_5 + 1.52 LnX_5 + u_i$

Education level (university) $(D_4 = 1)$ $Lny_{2000} = (-13.30 - 5.06) - 0.06\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + 1.82LnX_2 + 0.08LnX_3 - 0.25LnX_4 + \alpha_5 D_5 + 1.52LnX_5 + \mathrm{u}_i$

University education has a negative influence on income generated from household members share. The results indicated that people having University education have income generated from household members share less by 506% than uneducated people, this tells us that educated respondents bear the family's financial responsibility, they do not depend on household members share as source of income, unlike uneducated people. The p-values was 0.000 and was significant at 0.05 level of significance rejecting the null hypothesis.

3. Family size

$Lny_{2000} = (-13.30) - 0.06\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + 1.82LnX_2 + 0.08LnX_3 - 0.25LnX_4 + \alpha_5 D_5 + 1.52LnX_5 + \mathrm{u}_i$

Family size has significantly positive impact on income generated from household members share, hence, if the household family size was increased by 1% the income produced from household members share increases by 1.82%. The elasticity has the right positive sign which agrees with the a priori, suggesting that before the conflict, in the study area, household members contribute significantly to total household income. The p-value was 0.035 and significant at 0.05 level of significance rejecting the null hypothesis.

4. Security situation

Security situation (bad) $(D_5 = 0)$ $Lny_{2000} = (-13.30) - 0.06\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + 1.82LnX_2 + 0.08LnX_3 - 0.25LnX_4 + 1.52LnX_5 + \mathrm{u}_i$

Security situation (good) $(D_5 = 1)$ $Lny_{2000} = (-13.30 + 5.56) - 0.06\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + 1.82LnX_2 + 0.08LnX_3 - 0.25LnX_4 + 1.52LnX_5 + \mathrm{u}_i$

Security situation has statistically positive influence on income generated from household members share. Respondents during good security situation has income from household members share higher by 556% than they have

when insecurity situation prevail. The p-value was 0.043 and was significant at 0.05 level of significance rejecting the null hypothesis.

5. Household expenditure

$Lny_{2000} = (-13.30) - 0.06\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + 1.82 LnX_2 + 0.08 LnX_3 - 0.25 LnX_4 + \alpha_5 D_5 + 1.52 LnX_5 + \mathrm{u}_i$

Household expenditure has statistically positive influence on income derived from household members share. If the household expenditure increased by 1%, the income from household members share will increase by 1.52%. The p-value was 0.028 and was significant at 0.05 level significant at 0.05 level of significance rejecting the null hypothesis.

4.3.10.2 Conflict period

In this period only two independent variables have significant impact on income from household share, they were gender and household expenditure.

1. Gender

Gender (female) $(D_1 = 0)$ $Lny_{2006} = (-16.61) + 1.46\,LnX_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + 0.19 LnX_2 + 0.08 LnX_3 - 0.39 LnX_4 + \alpha_5 D_5 + 1.52 LnX_5 + \mathrm{u}_i$

Gender (male) $(D_1 = 1)$ $Lny_{2006} = (-16.61 - 1.68) + 1.46\,LnX_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + 0.19 LnX_2 + 0.08 LnX_3 - 0.39 LnX_4 + \alpha_5 D_5 + 1.52 LnX_5 + \mathrm{u}_i$

SUR results revealed that if the respondent was male his income from household members share was lower by 168% than female. The justification for this point was that, during the conflicts male respondent were targets for conflict parties and their role in generating income was undermined. The p-value was 0.007 was significant at 0.05 level of significance rejecting the null hypothesis.

2. Household expenditure

$Lny_{2006} = (-16.61) - 1.46\,LnX_1 + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + + 0.19 LnX_2 + \alpha_5 D_5 - 0.39 LnX_3 + 0.23 LnX_4 + 1.74 LnX_5 + \mathrm{u}_i$

Household expenditure showed a positive effect on income generated from family members share. If household expenditure increased by 1%, the income derived from family members share goes up by 1.74%. The p-value

was 0.061 and significant at 0.05 level of significant rejecting the null hypothesis.

4.3.10.3 Peace period

3. Gender

Gender (female) ($D_1 = 0$) $Lny_{2012} = (-10.25) + 1.55\, LnX_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + 1.21 LnX_2 + \alpha_5 D_5 + 0.14 LnX_3 - 0.17 LnX_4 + 1.32 LnX_5 + u_i$

Gender (male) ($D_1 = 1$) $Lny_{2012} = (-10.25 - 2.09) - 1.55\, LnX_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 D_4 + 1.21 LnX_2 + \alpha_5 D_5 - 0.14 LnX_3 - 0.17 LnX_4 + 1.32 LnX_5 + u_i$

In 2012, only gender income from family members share, it has negative impact. Male respondents have household income generated have an effect on from family members share less 209% compared with female respondent. The p-value was 0.002 and was significant at 0.05 level of significance rejecting the null hypothesis.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.1 Summary

Central Darfur State (CDS) was created in January, 2012. It is located to the west of Sudan's Darfur region. It borders Chad to the west and Central African Republic to the southwest. Within Darfur, CDS borders South Darfur State to the south and east, North Darfur State to the north and West Darfur State to the northwest. The State covers an area of 44,748 km^2. Before the conflict, the most important economic activities practiced by the majority of the population to derive income and make livelihoods were traditional agriculture and livestock rearing, diversified or supplemented by other economic activities like, employment and labour activities.

In 2003, the recent Darfur conflict erupted, consequently many people were killed, there was widespread theft, vandalism, looting and destruction of assets and property, people displaced from their original lands, security became problematic for the population in the state. Because they were seriously affected, people were not able to undertake previous income generating activities and livelihood strategies. Humanitarian assistance and relief became the most available strategy. Consequently, new IGAs and livelihoods strategies emerged or intensified than before, such as selling of food and nonfood aid and humanitarian assistance provided by different NGOs, construction, brick making, water vending, tea making, charcoal collection, firewood collection, grass collection, migration and working with military forces.

The main objective of this study was to evaluate the impact of conflict on livelihoods of affected people of IDPs, nomads and residents in Central Darfur State during 2000-2015, to identify the livelihood strategies adopted by IDPs nomads and residents. Assess the demographic changes and their implications, compare their income and delineate the critical factors affecting income. To achieve this goal, a multi-stage sampling technique was applied to draw the sample size from the targeted population. Accordingly, 202 respondents were selected. A structured questionnaire was the main tool to collect the data about the socio-economic characteristics of the respondents, their livelihood strategies and income generating activities and the influence of the conflict on the population. Secondary data were collected from relevant sources.

The data collected for three time periods, the first period (2000) represents the situation before the conflict. The second period (2006) represents the severe situation after the conflict were erupted, whereas the last period (2012) represents the situation after Darfur Peace Agreement (DPA) signed in Doha in 2011, after which security conditions became relatively conducive for undertaking economic activities.

Socioeconomic characteristics were examined using descriptive analysis including percentage, averages, which were then compared to reveal the impact of the current conflict on these variables and on the income generated as well as other livelihood strategies in the study area. Another analytical model used in the analysis was the Seemingly Unrelated Regression model, to delineate the relationships between household livelihood strategies and income generating activities; the dependent variable and different independent popularly called SUR model, using Stata10 as main software, in addition to SPSS and excel spreadsheet.

5.2 Main Results and Findings:

The main objective of the study was to evaluate the impact of conflict on livelihoods of affected people of IDPs, nomads and residents in Central Darfur State during 2000-2015. However, Seemingly Unrelated Regression results and descriptive analysis results revealed the following findings:

To identify and compare the household livelihood strategies adopted by IDPs nomads and residents that diversify sources of income in CDS. before the conflict, the majority of the respondents depend mainly on crop production as the main livelihood strategy and income generating activity. About 85.6% of the respondents practiced crop production, the majority of them (51%) were sedentary farmers and 23% were nomads while 11% were residents. In the same period, raising livestock was the second activity practiced by people to generate income and support their livelihoods and 51.5% practiced it, most of them were nomads. Moreover, respondents practiced different livelihood strategies and income generating activities rather than crop production and livestock, as a matter of income diversification, such as employment and labour which more practiced in towns and IDP camp, trade, income that come from household members share and income from secondary jobs practiced by 40%, 21% of them were sedentary farmers before displacement, 15% were nomads, 4% residents.

After the conflict only 44% of the respondents were able to practice crop production while 56% do not cultivate, the majority of the sedentary farmers who used to cultivate became IDPs and left their lands. IDPs became dependent on aid, relief and humanitarian assistance. In this period crop production was no longer the main income generating activity for IDPs, therefore, 64% of the respondents depend on humanitarian assistance, 43% of them were IDPs. In contrast nomads tends to practice crop production and their percentage increased to 26%, IDPs decreased to 5%, and residents 13%.

Animal production was still practiced in this period, but concentrated among nomads 26% out of 28% with only 2% practiced by IDPs, and residents. In this period 25.7% practice employment, the majority were from town residents and IDPs camps. New livelihood strategies emerged or practiced more than before for instance tea making mainly for women, charcoal and firewood collection, brick making, construction, petty trade, working with NGOs and working with Popular Defense Forces (PDF); Border Guards Forces (BGF) and recently the Rapid Support Forces (RSF). Most of these livelihood strategies were not practiced before the conflict.

In the third period, crop production resumed its importance and practiced by 75.2%, about 26.2% were IDPs who were able to move to the outskirts of the IDPs camps to practice their usual livelihood strategies mainly crop production, while nomads were 26.2% and residents 22.8%. Still 64% of the respondents receive humanitarian assistance as second livelihood activity practiced in this period, 40% were IDPs, but the quantities of rations provided were reduced, 20% were residents while only 4% were nomads. livestock raising activity practiced by people to generate income and support their livelihoods and 27% practice it, the majority were nomads 25%. Diversification of livelihood strategies and income generating activities also widespread among respondents like in the previous period.

To assess the household residence and demographic changes and implications on livelihood strategies of IDPs nomads and residents. before the conflict, the results revealed that 15.3% of the respondents lived in town, 56.4% lived in village, 27.2% lived in fareeg and 1% lived in Damra while with no one living in IDP camps. After the conflict, the previous demographic set up was completely changed. Percentage of population living in town increased to 19.3% as a result of population influx from surrounding country sides escaping conflict, on the other hand village and

Fareeg dwellers decreased for the same reason and therefore their percentage became 8.4% and 11.9%, respectively. Furthermore, in this period, the conflict caused mass displacement of population from their original places to large IDP camps usually around big towns and in this period their percentage jumped from zero before the conflict to 45% (91 people. The implications of this demographic movement was adverse as people abandoned their original villages. However, people lost previous assets such as human, physical, natural, social, and political assets and other sources of income generation and became idle without jobs, depending mainly on humanitarian aid provided by NGOs.

In this period, nomads tend to establish new Damra settlements where they were able to construct schools for their children, and enjoy other basic services and became more agro pastoralist than before. However, as villagers residence shifted to IDP camps and towns, nomads residences were too changed the pasioralists way of life. Within the third period (2012), people started to return voluntarily, this was indicated by decreasing number (84) and percentage (41.6%) of IDPs, but this period was essentially characterized by increase and development in numbers and percentages of Damra settlements (19.3%), which reveals the nomads' new perspectives and policies towards their future residence and related issues, the main characteristic of this perspective was nomadic sedentarization.

To compare income of livelihood groups of different time periods and their contribution to the household total income throughout the three periods, it is found that, before the conflict in 2000, the highest contribution to the household total income was made by household members share which reached 31% of the total household annual income.

Income from Agriculture (crop production) ranked as a second livelihoods and income source before the conflict (21%), indicating the importance of agriculture in the family income. Income from livestock came third in importance with 13%. However, both crop production and livestock together constitute 34%. Despite the importance of agriculture as a backbone of CDS economy, income incurred from crop production and livestock per year was particularly low in comparison with other sources of income.

Average income from trade was 13%, it equals livestock share, and secondary income source 9%, employment 8%, labour 5% while contribution of aids, relief and humanitarian food assistance was negligible. After the conflict; in 2006, people were not able to undertake the daily income activities they used to for many reasons, insecurity being the most important of them. Sedentary farmers; the most crop producers became IDPs and lost the main assets of producing income; land and livestock.

During this period, people's movement was either restricted or limited. In these circumstances, crop production and livestock share to annual household income of the respondents sharply declined and jointly became 18% (10% and 8%, respectively). The decrease reached 47% compared to their share before the conflict. Alternatives for livelihoods and income were described as rare, dangerous or risky, thus humanitarian food assistance was one alternative which accounted for 15%. Other alternatives were, dependence on secondary occupations, share of household members which accounted for 21% and 18%, respectively, while employment shared by15%, trade by 8% and labour by 6%. Eventually, trade was affected adversely by the conflict.

In 2012, income from agriculture was able to attain its usual position in central Darfur economy, its contribution boomed to 22%. Income derived

from secondary occupations ranked second (scoring 20%) indicating the scarcity or unavailability of main jobs by which people used to incur money and pursuit their livelihoods. Employment was the third main occupation in this period 18%, income from household members share 13%. This period witnessed a reduction of humanitarian assistance and relief contribution, it has retreated to 9% as a result of rations cut-of made by providing organizations. Trade 8%, labour 5%. This period was also characterized by a sharp decline of livestock income sources contribution; this may be due to inability of sedentary farmers who used to rear livestock. Or because pastoralists who were main animal keepers now resort to easier and comfortable jobs such as joining military, gold mining, cars trading from West Africa and Libya, etc. and therefore causing decrease of livestock share to family annual income.

During the three periods under study, household expenditure was kept very close to their total income, and on average, about 87%, (2000), 82% (2006) and 82% (2012) of total income was consumed in different aspects such as cereals, meat, sugar, health, education, milk, vegetables, cooking oil, onion.

To delineate the critical factors affecting the income of different groups, in pre conflict period, results revealed that about 99.5% of interviewed believed that they enjoy enough security situation that allowed them to undertake economic activities, while 0.5% could not practice economic activities due to insecurity. Seemingly Unrelated Regression results suggested that, good security situation affected household income for all livelihood groups positively. Household total expenditure was another determinant of income, the household total expenditure was statistically significant at 5% significant level telling that, if the household expenditure increased by 1% the household total income will increase by 1.32%.

After the conflict, the situation was entirely different, about 43.6% could practice income generating activities, while the majority (56.4%) couldn't. In this period, protection or security fees charged was the affecting the income of respondents primarily for IDPs. They pay security fees in order to keep their lives and be capable of undertaking different economic activates peacefully. SUR results showed that the coefficient of household expenditure was significant under the 5% significant level. Therefore, if the household total expenditure increased by one percent, the total household income increases by 1.12%.

Respondents during conflict period have total household income less by 57% than they have when good security situation prevail. The results suggest that insecurity has a negative impact on total household income. The coefficient was statistically significant at 0.05 level of significance. The most affected people by this situation were IDPs who used to practice crop production before the conflict and they have lost income producing assets.

In 2012 and later years, the security became to some extent conducive for the different livelihood groups to undertake economic activities, where about 78.2% could practice different economic activities against 21.8% couldn't enjoy stability but still paying protection fees that affect household total income negatively for IDPs. University education was important factor affecting total household income positively for residents and IDPs. The coefficient was significant under 5% level of significance. Production of millet was also significant under 5% level of significance, because a 1% increase in production of millet caused the total income to increase by 0.04% and so affected the household income positively.

Household expenditure affected income in this period, a one percent increase in household expenditure leads total household income to increase by 1.01%.

The results of SUR models revealed that the chi square as a measure of the goodness of fit of the overall significance of the regression model (nine regression equation), was significant at 0.05 level of significance except for income from household members' share in the third period which was insignificant. The value of R^2 was ranging from very high (0.93) to very low (less than 10%). A maximum of 11 variables showed a statistically significant impact on dependent variables (income from crop production), while in case of income from household members' share only gender was significant and therefore in this case.

5.3 Conclusions

This study is an attempt to evaluate the impact of conflict on livelihoods of affected people of IDPs, nomads and residents in Central Darfur State during 2000-2015 in three periods (2000, 2006 and 2012). According to the results obtained, the study concluded that, before the conflict, the majority of the respondents depend mainly on crop production as the main livelihood strategy and income generating activity. the majority of them were sedentary farmers followed by raising livestock the majority practicing it were nomads. Respondents practice different livelihood strategies and income generating activities rather than crop production and livestock, as a matter of income diversification, such as employment, labour, trade, income that come from household members share and income from secondary jobs.

After the conflict the majority of the sedentary farmers became IDPs and relied on aid, relief and humanitarian assistance. In contrast nomads practiced crop production and animal production. New livelihood strategies emerged such as tea making mainly, charcoal and firewood collection, brick making, construction, petty trade, working with NGOs and working with military. Most of these livelihood strategies were not practiced before the

conflict. In the third period, crop production resumed its importance followed by humanitarian assistance and livestock raising. Diversification of livelihood strategies and income generating activities also widespread among respondents like in the previous period.

To examine the household residence and demographic changes and implications on livelihood strategies of IDPs nomads and residents, before the conflict, the majority of respondents lived in villages, with the rest living in towns, and fareegs. After the conflict, demographic changes occurred. The majority were living in IDP camps, towns, fareegs and damras. In this period, most of people lost producing assets and became reliant on humanitarian aid. Within the third period, people started to return voluntarily, numbers of Damra settlements increased and nomads tend to sedentarization.

To compare income of livelihood groups of different time periods and their contribution to the household total income throughout the three periods, it is found that, before the conflict the highest contribution to the household total income was made by household members share followed by income from crop production, income from livestock, then income from trade, employment, labour, while contribution of aids, relief and humanitarian food assistance was negligible. After the conflict, crop production and livestock share to annual household income declined due to insecurity therefore people started to receive humanitarian food assistance and depend on secondary occupations, share of household members, employment, trade and labour. In 2012, income from agriculture was able to attain its usual position and its contribution increased, followed by income derived from secondary occupations, employment, household members share, trade and labour. The contribution of livestock and relief in household income reduced sharply.

During the three periods under study, household expenditure was kept very close to their total income, and was consumed in different aspects such as cereals, meat, sugar, health, education, milk, vegetables, cooking oil, onion.

To delineate the critical factors affecting the income of different groups, in pre conflict period, good security situation affected household income for all livelihood groups positively. Household total expenditure was another determinant of income, Seemingly Unrelated Regression results suggested that, the household total expenditure was statistically significant and increase the household total income. After the conflict, insecurity and paying of protection affected the income of IDPs. Household expenditure also affected the household total income positively. Assets loss for IDPs affected their income. In 2012 and later years, security affected household income positively, also university education was important factor affecting total household income positively for residents and IDPs. Production of millet was also significant as household income determinant.

5.4 Recommendations

Based on the results revealed by this study, the following recommendations could strongly be raised:

1. Crop production and livestock rearing activities were the major income generating activities in the study area but their share to total household income was relatively low, policies should be directed to modernize, support and improve them.
2. IDPs abandoned their original villages, they were more affected by the conflict, their infrastructures damaged, they lost previous assets and other sources of income generation, therefore polices needed to rehabilitate infrastructure, and provide IDPs with producing assets.

3. Demographic movement suggest that pastoralists and agro pastoralists tend to abdicate their nomadic way of life, they started sedentarization (establish new Damra settlements) where families settling in one place while the herds continue to practice seasonal mobility. It is essential to provide them with basic services.
4. Security was the major constraint for people to undertake their income generating activities freely, it is strongly recommended that the government should address this issue in a way that promote more peace through formulating coexistence committees, power share etc.

REFERENCES

Abaker, A., (2006). Food Crops Diversity and Food Security in West Darfur State, Sudan: **"**A Case Study of Cereal Crops in Zalingei locality, M.Sc. Thesis. University of Khartoum, Faculty of Agriculture, Department of Agricultural Economics.

Abaker, A., (2016). Promoting Peace over Natural Resources in West and Central Darfur States, Sudan, Baseline Assessment Report, commissioned by Darfur Development and Reconstruction Agency (DDRA) and supported by UNEP (unpublished).

Abaker A. and Hassan, T., (2015). Socio-Economic Factors Influencing Small Scale Farmers Livelihoods and Food Security in Central Darfur State, Sudan, International Journal of Current Rresearch in Life Sciences, Vol. 4, No. 11, pp. 464-468, 2015.

Abdel Aziz, H. H., Abdalla, A. A. and Abdullatif, M. A. (2010). Economic Analysis of Factors Affecting Crop Production in North Darfur State a Study of Umkdada District, Journal of Applied Sciences Research, 6(3): 224-228, INSInet Publication.

Abdel Aziz, H. H., Abdalla, A. A. and Abdullatif, M. A. (2010). Economic Analysis of Factors Affecting Crop Production in Dar Elsalam District North Darfur State, Journal of the Saudi Society of Agricultural Sciences, Biannual referred journal, Published by Saudi Society of Agricultural Sciences.Vo1. 9. Retrieved 7/ 8 /2017.

Abdul-Jalil, M., (2008). Nomad-sedentary relations and the question of land rights in Darfur: From complementarity to conflict.in: Richard Rottenburg (Hg.): Nomadic-sedentary relations and failing state institutions in Darfur and Kordofan (Sudan). Halle 2008 (Orientwissenschaftliche Hefte 26; Mitteilungen des SFB „Differenz und Integration "12 (1–24).

Action Contre la Faim International (ACF) (2010). Food Security and Livelihood Assessments a Practical Guide for Field Workers Technical Department of Food Security and Livelihoods ACF International, Joseph Ferruzzi Associates, Inc. Uganda.

Alternative Energy Promotion Centre (AEPC), (2014). Strategy and Guidelines for Promotion of Income Generation Activities (IGAs), Business Development for Renewable Energy and Productive Energy Use Component Strategy, National Rural and Renewable Energy Programme.

Alamgir, M. and Arora, P. (1991). Providing Food Security for All, Intermediate Technology Publications, Southampton Road, London.

Alinovi L., Marco D., Erdgin Mane and Donato R., (2010). Livelihoods Strategies and Household Resilience to Food Insecurity: An Empirical Analysis to Kenya, Paper prepared for the Conference on "Promoting Resilience through Social Protection in Sub-Saharan Africa", organized by the European Report of Development in Dakar, Senegal,

Alix-Garcia, Anne B. and David S., (2012). The Landscape of Conflict: IDPs, aid, and land use change in Darfur, the Journal of Economic Geography.

Amnesty international (AI), (2014). the impact of inter-communal violence on civilians in central Darfur, Amnesty International Ltd, Peter Benenson House, Easton Street, London WC1X 0DW, United Kingdom.

Arashi, M. (2011). Preliminary test and Stein estimations in simultaneous linear equations, Linear Algebra and its Applications, Faculty of Mathematics, Shahrood University of Technology, P.O. Box 316-3619995161, Shahrood, Iran, Elsevier Inc
doi: 10.1016/j.laa.2011.07.036.

Arias A.M., Ibáñez, M. and Andrés Z., (2013). Agricultural Production amidst Conflict: The Effects of Shocks, Uncertainty and Governance of Non-State Armed Actors.

Badreldin M. and Adam A., (2016). Household Food Security of Internally Displaced Persons (IDPs): An Applied Study on Abushock IDPs Camp, North Darfur State – Sudan, Asian Journal of Social Science Studies; Vol. 1, No. 2; 2016.

Barrett, C. and Thomas R., (2000). Asset, Activity, and Income Diversification A among African Agriculturalists: Some Practical Issues.

Barrett, C., Thomas R. and Patrick W., (2001) Nonfarm Income Diversification and Household Livelihood Strategies in Rural Africa: Concepts, Dynamics, and Policy Implications. Department of Applied Economics and Management, Cornell University, Ithaca.

Basavaraj, N. (2008). A Study on Impact of Income Generating Activities on Sustainable Rural Livelihoods of Kawad Project Beneficiaries, M.Sc. Thesis Department of Agricultural Extension Education, College of Agriculture, University of Agricultural Sciences, Dharwad - 580 005.

Baverio K., Omer H. ELDirani and Young, H (2013). Standing Wealth, Sudan's Livelihoods Challenges', Woodrow Wilson Center Risk and Resilience, Washington.

Bjarne V., Erik H. and Aase R., (2011). Conflict Resolution working with conflicts, Danish Centre for Conflict Resolution Dronning Olgas Vej 30, 2000 Frederiksberg, Denmark.

Bromwich, B. (2014). Relationships and Resources Environmental governance for peacebuilding and resilient livelihoods in Sudan, Nairobi, Kenya.

Brooks, C., (2013). Introductory Econometrics for Finance, Panel Data, Chapter 11, PowerPoint.

Brosché, J. (2015). Department of Peace and Conflict Research, Conflict Analysis Tools and Peace building Project, Knowledge Production and Dissemination.

Cadavez, V. and Henningsen, A. (2011 / 2012) The use of seemingly unrelated regression (SUR) to predict the carcass composition of lambs. Meat Science 92, 2012, p. 548–553
DOI: 10.1016/j.meatsci.2012.05.0257.

Cambridge advanced Learner's Dictionary (CALD3), (2008). Third Edition.

Carletto G., Katia C., Benjamin D., Marika K., Kostas S., Paul W., Alberto Z., (2007). Rural income generating activities in developing countries: re-assessing the evidence, (*e*JADE), Agricultural Development

Economics Division (ESA) FAO Vol. 4, No. 1, available online at www.fao.org/es/esa/eJADE

Catherine L., and Daniel M., (2003). Livelihoods, Chronic Conflict and Humanitarian Response: A Synthesis of Current Practice, A Review of Current Approaches, Natural Resource perspectives, The Overseas Development Institute, 111 Westminster Bridge Road, London SE1 7JD, UK.

Central Darfur Humanitarian Aid Commission (HAC) (2014). Annual reports for Humanitarian situation (in Arabic).

Central Darfur State Information Center, (2015). State administrative information (in Arabic).

Chambers, R. and Conway, G., (1992). Sustainable rural livelihoods: Practical concepts for the 21st century. IDS Discussion Paper 296. Institute of Development Studies, University of Sussex, Brighton.

Chikina O. (2007). Income Generation Activities manual: returning "profit" to IGAs: published and produced the USAID, prepared by CHF International and DAI, first edition, Darfur, Sudan.

Danish Refugee Council (DRC), (2008). Income Generation through Grant & Microfinance Programmes: Programme Handbook, sector overview.

Danish Refugee Council (DRC), (2008). Internal Displacement Profiling Toolbox

Darfur Wikipedia, the free encyclopedia, Central Darfur State Retrieved 8 April 2017.

Darfur Wikipedia, the free encyclopedia, Retrieved 4 August 2017.

Davis B., Winters P., Carletto G., Covarrubias K., Quinones E, Zezza A., Stamoulis K., Azzarri C and Digiuseppe S., (2010). A Cross-Country Comparison of Rural Income Generating Activities. World Development Vol. 38(1): pp. 48–63.

Davis B., Winters P., Carletto G., Covarrubias K., Quinones E, Zezza A., Stamoulis K., and Digiuseppe S., (2007). Rural Income Generating Activities: A Cross Country Comparison: Paper for presentation at the 106th EAAE Seminar on "Pro-poor development in low income

countries: Food, agriculture, trade, and environment" Montpellier, France.

Darfur Community Peace and Stability Fund (DCPSF), (2015). Darfur Community Peace and Stability Fund, Annual Report Development's 2009 Rural Poverty Report, developed under contract with IFAD. http://www.ifad.org/rural/rpr2008/background.htm

Desougi M., Nasreldin A., Abdalla A., (2016). Effects of soil physical and chemical properties on the, distribution of trees in some ecological zones of Zalingei-Darfur; Sudan, International Journal of Engineering Research & Science (IJOER) ISSN: [2395-6992] [Vol-2, Issue-2, February- 2016.

De Waal, Alex (1984 -1985). Famine Mortality: A Case Study of Darfur, Sudan Population Investigation Committee, Population Studies, Published by: Population Investigation Committee Vol. 43, No. 1 (Mar. 1989), pp. 5-24, http://www.jstor.org/page/info/about/policies/terms.jsp.

Department for International Development (DFID), (1999). Sustainable Livelihoods Guidance Sheets, Framework, Vulnerability Context, 2.2.

Department for International Development (DFID), (1999). Sustainable livelihoods guidance sheets, Framework**,** Livelihood Strategies, 2.5DOI: 10.3968/j.sms.1923845220130602.1853

Dosa, A. B, (2015), the conflict and agricultural production in Darfur in Darfur Darfur's Political Economy, A quest for development, Edited by Hamid Eltigani Ali, Europa country perspective.

Egyir I. S., (2007). Allanblackia: Standard Setting and Sustainable Supply Chain Management, Price Setting and Marginal Cost Study, Department of Agricultural Economics and Agribusiness, College of Agriculture and Consumer Sciences, University of Ghana, Legon for International Union for Conservation of Nature (IUCN), Final draft report.

El-Dukheri, I., Damous, H. & Khojali, A. M. (2004). Rationale for a Possible Market Support Program in Darfur, Sudan: A Brief Look at Markets and Food Security: Commissioned by USAID and implemented by CARE.

Ellis, F., (1998). 'Survey Article: Household Strategies and Rural Livelihood Diversification', Journal of Development Studies, Vol.35.

Ellis, F., (2000). Rural Livelihoods and Diversity in Developing Countries. Oxford: Oxford University Press.

FAO and ILO, (2009). The Livelihood Assessment Tool-kit, Analyzing and responding to the impact of disasters on the livelihoods of people, [First Edition] Published by FAO, Rome and ILO, Geneva.

FAO, (2007). Introduction to Livelihoods, Food Security Information for Action, Livelihoods Assessment and Analysis, Lesson 1, Learner Notes, a course funded by the European Union and developed by the Food and Agriculture Organization of the United Nations.

FAO, UNOPS & ILO, (2016). Recovery of Livelihoods of Vulnerable Farming and Pastoral Communities in Darfur, Joint Programme/Project Document of the UN Fund for Recovery Reconstruction and Development in Darfur, Khartoum.

Fitzpatrick, M. and Young, H. with Shadia Abdelrahim Daoud, Awadalla Mohamed Saeed, Sarra Rasheid Ahmed Beheiry and Niveen Salah Eldin Elmagboul, (2016). Taadoud, Transition to Development Project, Risk and Returns: Household, Priorities for Resilient Livelihoods in Darfur, Feinstein International Center, Tufts University, 114 Curtis Street, Somerville, MA 02144, USA.

Fitzpatrick, M., and Young, H (2015). "The road to recovery: A scoping study for the Taadoud Transition to Development Project." Somerville, MA: Feinstein International Center, Tufts University.

Flint, J. (2010). The Other War: Inter-Arab Conflict in Darfur, Small Arms Survey HSBA Working Paper 22, Graduate Institute of International and Development Studies, Geneva 2010.

Friis, Valentin Gandasegui, Esben Bendixen Emelda Miyanda Hachoofwe Afton Halloran, (2011). Beyond resistance: The current and potential livelihood strategies of Kampung Kujang Sain, Sarawak Malaysia. University of Copenhagen faculty of Life Science, Sciences and Humanities.

Gidi L. S., (2013). Rural households' livelihoods strategies and opportunities with regard to farming: a case of Intsika Yethu Local Municipality, M.Sc. Thesis. Department of Agricultural Economics and Extension, Faculty of Science and Agriculture, University of Fort Hare.

Goffey (2012). DFID Sudan, Darfur Community Peace and Stability Fund Impact Assessment, Final Report.

Gujarati, D. N. and Dawn C. Porter (2009). Basic Econometrics, Fifth Edition, McGraw-Hill Companies, Inc., 1221 Avenue of the Americas, New York, NY, 10020.

HAC, MOAF, WFP and FAO. (2009). 2008 Darfur Food Security and Livelihood Assessment, Final Report.

Hassan, T. A, (1987). Economics of millet production under subsistence farming in Darfur region, a case study of central district 83council of the southern Darfur, M.Sc. Thesis, University of Khartoum.

Havard H., Havard M. Nygard, Havard S., Scott G., and Ranveig D. Flaten, (2011), The Conflict Trap, Annual Meeting of the American Political Science Association in Seattle, WA.

Hyungsik R. M. and Benoit P. (2006). Seemingly Unrelated Regressions.

Ibáñez, A. M. and Moya, A. (2009). Do conflicts create poverty traps? Asset losses and recovery for displaced households in Colombia. MICROCON, Research Working Paper 10, Brighton: MICROCON.

IFRS Foundation, (2012). Classification of assets, Joint World Bank and IFRS Foundation 'train the trainers' workshop hosted by the ECCB, 30 April to 4 May 2012, PowerPoint, IFRS Foundation, 30 Cannon Street, London, EC4M 6X H, UK, www.ifrs.org

Ilker E., Sulaiman A. M., Rukayya S. A. (2016). Comparison of Convenience Sampling and Purposive Sampling. American Journal of Theoretical and Applied Statistics. Vol. 5, No. 1, 2016.
doi: 10.11648/j.ajtas.20160501.11

International Crisis Group (ICG) (2015). The Chaos in Darfur, Crisis Group Africa Briefing N°110, Nairobi/Brussels.

International Crisis Group (ICG), (2010). Rigged Elections in Darfur and the Consequences of a Probable NCP Victory in Sudan, Policy Briefing, Crisis Group Africa Briefing, Nairobi/Brussels.

Integrated Regional Information Networks (IRIN), (2013). The humanitarian situation in Darfur. Retrieved 5 October 2017.

Jaspars, S. and Maxwell, D. (2009). Food security and livelihoods programming in conflict: a review commissioned and published by Humanitarian Practice Network (HPN) at Overseas Development Institute (ODI), 111 Westminster Bridge Road London, SE1 7JD, United Kingdom

Jaspars, S. and O'Callaghan, S. (2008). Challenging choices: Protection and livelihoods in Darfur: A review of the Danish Refugee Council's programme in West Darfur: HPG Working Paper, Prepared in cooperation with the Danish Refugee Council (DRC): Humanitarian Policy Group, Overseas Development Institute 111 Westminster Bridge Road, London, SE1 7JD, United Kingdom. Jean Folger, What is an asset? Investopedia, http://www.investopedia.com/contributors/393/

Jaspars, S., Mohamed H. Zakaria, Youssif E. and Fuddle, A., (2010). Coping and change in protracted conflict: The role of community groups and local institutions in addressing food insecurity and threats to livelihoods. A case study of North Darfur, HPG Working Paper.

Jeremy L. and Alan N. with Chiara Altare, Debarati Guha-Sapir, Jaideep Gupte, Patricia Justino, Pandora Kodrou and Catherine Longley (2012). Programming for secure livelihoods amid uncertainty: trends and directions in livelihoods, nutrition and food security in Darfur, FAO/WFP/UNICEF.

JMRDP, (2015). Metrological station, compiled from different reports from Monitoring and Evaluation administration (in Arabic)

Junior R. Davis, (2003). The Rural Non-Farm Economy, livelihoods and their diversification: Issues and options, NRI Report No: 2753, ReportI.

Kagwanja, P. and Patrick M., P. (2007). Protection of civilians in African peace missions. The case of the African Union Mission in Sudan, Darfur, ISS Paper 139.

Khames, Interview with one of the Jebel Marra prominent leaders, a member of Central Darfur Legislation Council - August, 2017.

Kingdon, G. G., (2002). Education of women and socio-economic development published in Reason and Revelation: Studies in the Babi and Baha'i Religions, volume 13, Los Angeles: Kalimat Press.

Klugman J. and Asbjorn W., (2007). Dimensions of Challenge for Development in Darfur, in Darfur, Dimensions of Challenge for Development Background Volume.

Longley, C. and Maxwell, D., (2003). Livelihoods, Chronic Conflict and Humanitarian Response: A Synthesis of Current Practice, Working Paper 182, Overseas Development Institute, 111 Westminster Bridge Road, London, SE3 7JD, UK

Mabugu. M. Chitiga, Charles N/, Selma K, ShirinMotala, Nthabiseng Tsoanamatsie, LebogangMashile, Thami Ngwenya and Bongani Magongo, (2013), Civil Society Participation in Income Generating Activities in South Africa. A Research Report Produced by the HSRC in Partnership with the NDA 195 Jan Smuts & 7th Avenue, Parktown North Johannesburg 2193.

Mahmood, H. Z., M. Qasim, M. Khan and M. I. U. Husnain, (2014). Re-examining the Inverse Relationship between Farm Size and Productivity in Pakistan, the Journal of Animal & Plant Sciences. Vol. 24 (5).

Manger, L. (2006). Resource Conflict as a Factor in the Darfur Crisis in Sudan, Department of Social Anthropology, University of Bergen Colloque international “Les frontières de la question foncière, Montpellier.

Malual, J. D., (2008)."Sustainable livelihoods analysis of post-conflict rural development in southern Sudan" Retrospective Theses and Dissertations. Paper 15475.

Matthias G., (2010). Seemingly unrelated Regression (SUR), Baltagi, Ch.6.

Merghani E., Suad I. Elobid and Mabroka Y. Fadul (2016). Impact of Conflicts on Role of Rural Women's Household in Food Security (West Darfur Returnee's Area, Sudan), Quest Journals, Journal of Research in Humanities and Social Science, Volume 4 ~ Issue 11 (2016) pp: 89-93. www.questjournals.org

Ministry of Agricultural and Animal Resources (MoAAR), (2013). Central Darfur State. Zalingei, Sudan (in Arabic).

Ministry of Agriculture, Natural Resources and Irrigation (MoANRI) (2016). Annual report. Central Darfur State, Zalingei. Sudan (in Arabic).

Ministry of the cabinet affairs (MoCA), (2012). http://www.sudan.gov.sd. Retrieved: 28 February 2012 (in Arabic).

Moon, R. and Perron, B., (2006) Seemingly Unrelated Regressions

Morse S. and McNamara, N. (2013). The Theory behind the Sustainable Livelihood Approach, Chapter 2, Springer Science + Business Media Dordrecht 2013 DOI: 10.1007/978-94-007-6268-8_2.

Morton, J., (2008). Managing Political and Economic Claims to Land in Darfur.

Morton, J., (1985, Re-issued 2005): A Darfur Compendium A Review of the Geographical Historical and Economic Background to Development in the Region James Morton, HTSPE Limited, Hamel Hempstead, UK.

Morton, J., (1993). Agricultural Development in Darfur Region, Sudan, with special reference to innovation, technical change and open access resources, Ph.D. Thesis, London University.

Mukasa, K. & Abura, S. (2013). Pilot project: Introduction of alternative income generating activities for livelihood diversification for fishing dependent communities on the islands of the three riparian states of Lake Victoria. Report/Rapport: SFFAO/2013/23. November/ Novembre 2013. FAO-SmartFish Programme of the Indian Ocean Commission, Ebene, Mauritius.

Mundt A., (2011). Addressing the Legacy of Conflict in Darfur (Shifting Land Tenure Patterns and Humanitarian Action). Middle East Institute. Foundation Recherche Strategique.

Nem N. L., Teruaki N., and Shigeyoshi T. (2013). An Analysis of Factors Influencing Household Income: A Case Study of PACT Microfinance in Kyaukpadaung Township of Myanmar, American Journal of Human Ecology Vol. 2, No. 2, 2013, 94-102.
DOI: 10.11634/216796221302320.

Niklas L. and Mikael S., (2005). Conflict, Conflict Prevention and Conflict Management and beyond: a conceptual exploration, Concept Paper, Central Asia-Caucasus Institute & Silk Road Studies Program, A Joint Transatlantic Research and Policy Center, Johns Hopkins University-SAIS, 1619 Massachusetts Ave. NW, Washington, D.C. 20036.

Olamide, E. I., and Adepoju, A. A. (2013). Estimating Seemingly Unrelated Regressions with First Order Autoregressive Disturbances. Studies in Mathematical Sciences. Vol. 6, No. 2, 2013, pp. [40{57].

Olanrewaju S.O & Ipinyomi R.A. (2014). Autocorrelation effects of seemingly unrelated regression (SUR) model on some estimators, The International Journal of Engineering and Science (IJES). Volume 3, Issue 5, Pages 27-40.

Olsson, O (2010). After Janjaweed? Socioeconomic Impacts of the Conflict in Darfur, Department of Economics, School of Business, Economics and Law at University of Gothenburg, Göteborg, Sweden, Working Papers in Economics.

Osman, A. M. K., Young, H., Robert F. Houser and Jennifer Coats, (2013). "Agricultural Change, Land, and Violence in Protracted Political Crisis: An examination of Darfur," Oxfam America Research Backgrounder series.

Parietti M., (2015). Blue Collar vs. White Collar: Different Social Classes? Investopedia, retrieved 23 may 2017 at: http://www.investopedia.com/articles/wealthmanagement/120215/bluecollar-vs-white-collar-different-social-classes.asp#ixzz4ht60nXyX

Pedace, R. (2013). Econometrics for Dummies - John Wiley & Sons, Inc.111 River St. Hoboken, NJ 07030-5774.

Penitsch, R. and Scherbaum, V., (2006). Independent Evaluation of the Act/Caritas Darfur Emergency Response Operation, Caritas Internationalis Beneficiary Survey Report, Friedrich Ebert Str. 34

Pakistan Institute of Legislative Development and Transparency (PILDAT), (2009). Conflict Management and Negotiation Strategies, Background Paper, Pakistan Institute of Legislative Development and Transparency, No. 7, Avenue, F-8/1, Islamabad, Pakistan. www.pildat.org.

ProAct Network, (2010), Environmental and Livelihoods Vulnerability Mapping (ELVM) in North and South Darfur, Sudan, Final Report.

Radio Dabanga home page, September 21 - 2014 FATA BORNO. Displaced in North Darfur's Kutum to pay 'protection fees', retrieved August 11, 2017.

Radio Dabanga home page, September 23 - 2014 Nyertete Locality (West Jebal Marra locality) Rape attempt, beating, 'protection fees' imposed in Central Darfur, retrieved August 11, 2017.

Radwanski S. A. and Wickens, G. E. (1967). The Ecology of Acacia albida on Mantle Soils in Zalingei, Jebel Marra, Sudan, Journal of Applied Ecology, Vol. 4, No. 2 (Nov., 1967), pp. 569-579, British Ecological Society. http://www.jstor.org/stable/2401358

Salih B., Ibrahim, S. and. Mursi, N (2002). Jebel Marra Rural Development Project, A Draft Profile for Project Rehabilitation, Republic of Sudan, Ministry of Agriculture & Forestry, Khartoum.

Saparamadu C. (2010). External review of the completed livelihood projects in Jaffna district

Satti, Y. H., (2014). The Impact of Violent Conflict in Darfur on Women and Children and the Possible Interventions to handle its Consequences, workshop paper on the impact of conflict on women and children in Sudan, Omdurman Islamic University, Faculty of Economics and Political Science, Center for Conflict Analysis and Peace Studies in collaboration with Ministry of Social Development, Khartoum State, Sudan.

Satti, Y. H., (2009). Pastoralism, land rights and migration routes in Darfur: The case of West Darfur State, in Marcel Leroy (ed.), Environment and Conflict in Africa: Reflections on Darfur, pp. 259-270, United Nations University for Peace, Africa Programme, Addis Ababa.

Satti, Y. H., (2015). Interplay of Ethnic and Gender Factors in Deepening Poverty in Conflict Areas in West Darfur State, Ph.D. Thesis, Sudan University of Science and Technology, Faculty of Graduate Studies and Scientific Research.

Schwarze S. (2004). Determinants of Income Generating Activities of Rural Households: A Quantitative Study in the Vicinity of the Lore-Lindu National Park in Central Sulawesi/Indonesia: Institute of Rural Development, Georg-August-University of Göttingen, Waldweg 26, 37073 Göttingen.

Sènakpon E., Silvère D., Jacob A. and Rosaine N. (2013). Econometric modeling of farm household land allocation in the municipality of Banikoara in Northern Benin, Land Use Policy, ScienceDirect, Volume 34, September 2013, Pages 72-79. https://doi.org/10.1016/j.landusepol.2013.02.004

Serrat, O. (2010). The sustainable livelihoods approach. Washington, DC: Asian Development Bank.

Sheheli S., (2012). Improving Livelihood of Rural Women through Income Generating Activities in Bangladesh, Ph.D. Thesis, Division of Agricultural Economics, Humboldt University Berlin.

Siyoum A. D., Dorothea Hilhorst, and Gerrit-Jan van Uffelen, (2012). Food aid and dependency syndrome in Ethiopia: Local perceptions, The Journal of Humanitarian Assistance, Field experience and current research on humanitarian action and policy.

Smith, M. B. and Jaspars, S. (2006). Conflict, Camps and Coercion: The Continuing Livelihoods crisis in Darfur: final report to WFP Sudan, Khartoum, Sudan.

Smith. M. B. and Fadul. A. A. (2008). Adaptation and Devastation: The Impact of the Conflict on Trade and Markets in Darfur: Findings of a

Scoping Study: Medford, MA: Feinstein International Center, Tufts University. Medford, MA.

Sofian A. A., Saad, Amin I. Adam and Afra H. Abdelateef, (2016). The relationship between household income and educational level. (South Darfur rural Areas-Sudan) statistical study, International Journal of Advanced Statistics and probability, 4 (1) (2016) 27-30, doi: 10.14419/ijasp. v4il.5655, Research paper.

Sreekumaran, C.V. (2009). A Sociological Study of Rural Livelihoods in Raja Singa Mangalam Block, Ramanathapuram District, Tamil Nadu, Department of Sociology, School of Social Sciences and International Studies, Ph.D. Thesis, Pondicherry University, Puducherry – 605 014.

Strawiński, P. (2011). Educational Aspirations, University of Warsaw, Faculty of Economics Sciences, Working Paper.

SudaNews, (2005). Darfur Conflict: Its History, Nature and Development, Embassy of the Republic of the Sudan Washington, DC. www.SudanEmbassy.org

SUMER, K. (2012). Testing the Validity of Economic Growth Theories with Seemingly Unrelated Regression Models: application to turkey in 1980-2010, Applied Econometrics and International Development Vol. 12-1 (2012)

Sunethra T., (2001). "Rural Livelihood Strategies and the Five Capitals: A Comparative Study in the Selected Villages of Sri Lanka.

Tanuwidjaja, E. (2006). Multi Factor SUR in Event Study Analysis: Evidence from M&A in Singapore's Financial Industry, Singapore Centre for Applied and Policy Economics Department of Economics SCAPE, National University of Singapore Working Paper Series Paper No. 2006/07 – 3 April
http://nt2.fas.nus.edu.sg/ecs/pub/wp-scape/0607.pdf

Teabin. M.A (2014). Assessment of Agricultural Production Role on Poverty Alleviation in Wad Banda Locality, North Kordofan State Sudan, Ph.D. Thesis, Sudan University of Science and Technology. College of Graduate Studies.

Tearfund, (2007). Darfur: Relief in a Vulnerable Environment. www.Tearfund.org/darfurenvironment

TGH, IMC, IOM, HAC and WES (2016). Joint Assessment Mission Report, Garaya village, Umdokhon locality, Central Darfur.

Thennakoon S., (2001). "Rural Livelihood Strategies and the Five Capitals: A Comparative Study in the Selected Villages of Sri Lanka.

Thomson Reuters Foundation (TRF) (2014). Darfur conflict. Retrieved 17/2/2018

Tubiana, J., (2007). Darfur a conflict for land in war in Darfur and the search for peace, edited by Alex de Waal, Justice Africa, Global Equity Initiative, Harvard University.

Tubiana, J., Victor T. and Abdul-Jalil, M. (2012). Traditional Authorities' Peacemaking Role in Darfur, Peaceworks, United States Institute of Peace 2301 Constitution Ave., NW Washington, DC 20037.

UN, (2010). Darfur, Beyond Emergency Relief, longer-term trends and priorities for UN agency in Darfur, Office of the UN Resident and Humanitarian Coordinator, Ebeid Khatim Street, Khartoum, Sudan.

UN (2009). Policy for Post-Conflict Employment Creation, Income Generation and Reintegration: Geneva.

UNAMID, (2012). Darfur Administrative Map, Republic of Sudan MID1GEN001M12007U32x40SudanDarfur_05.

UNDP, (2007). Enhancing livelihood Opportunities and Building Social Capital for New Livelihoods Strategies in Darfur.

UNDP, (2011). West Darfur State Situation Analysis.

UNFPA, (nd). Population Dynamics of Sudan.

UN Office for the Coordination of Humanitarian Affairs (OCHA), (2012). SUDAN Central Darfur State - Administrative Map, http://unocha.org/.

Valdés A., William F., Gustavo Anríquez, Carlo A.i, Katia C., Benjamin Davis, Stefania DiGiuseppe, Tim Essam, Tom Hertz, Ana Paula de la O, Esteban Quiñones, Kostas Stamoulis, Paul Winters, Alberto Zezza (2009). A Profile of the Rural Poor, Background Paper for Chapter 2 of the International Fund for Agricultural.

War in Darfur, From Wikipedia, the free encyclopedia. Retrieved 8/8/2017

Wesley P. H., (2008). Anthropogenic Activities and Resource Shortages: The Case of Darfur.

WFP and FAO, (2012). Darfur Joint Assessment Mission, Situation Analysis, Agriculture, Livestock and Rural Livelihoods in the Greater Darfur Region, prepared by: Thematic Working Group of Agriculture, Livestock and Rural Livelihoods of World Food Programme (WFP) and Food and Agriculture Organization (FAO) Submitted to: DJAM Coordination Unit, Khartoum, Sudan.

Wolfersberger, J., Delacote P. and Garcia, S (2015). An empirical analysis of forest transition and land-use change in developing countries, Laboratoire d'Economie Forestière (LEF), AgroParisTech/INRA

World Food Programme (WFP), (2005). "Emergency food security and nutrition assessment in Darfur, Sudan: provisional report, Rome.

World Food Programme (WFP), (2012-2013). Darfur Comprehensive Food Security Assessment, Sudan.

World Food Programme (WFP), (2006). "Emergency food security and nutrition assessment in Darfur, Sudan: final report, Rome.

Widyaningsih, A., SusilawatiI, M. and Sumarjaya. I W. (2014). Estimasi Model Seemingly Unrelated Regression (SUR) dengan Metode Generalized Least Square (GLS) Jurnal Matematika Vol. 4 No. 2, December 2014. ISSN: 1693-1394

Young H., Abdal Monium O., Ahmed M. A., Michael A., Omer E., (2009). Livelihoods, Power and Choice: The Vulnerability of the Northern Rizaygat, Darfur, Sudan: Feinstein International Center, Tufts University, 200 Boston Ave., Suite 4800 Medford, MA 02155 USA.

Young, H. and Abdal Monim O., (2006). Challenges to Peace and Recovery in Darfur, A Situation Analysis of the Ongoing Conflict and its Continuing Impact on Livelihoods, Friedman School of Nutrition Science and Policy, Feinstein International Center, Tufts University, 200 Boston Ave., Suite 4800 Medford, MA 02155 USA.

Young, H., Osmon, A. M., Aklilu, Y., Dale, R., Badri, B., & Fuddle, A. J. A. (2005). Darfur - Livelihoods under Siege. Retrieved from Medford, MA, USA.

Young, (2006). Livelihoods, migration and remittance flows in times of crisis and conflict: case studies for Darfur, Sudan, Overseas Development Institute, 111 Westminster Bridge Road, London SE1 7JD, UK

Youngs T., (2004). Sudan: conflict in Darfur, International Affairs and Defence Section, House of Commons Library.

Yousif, A. (2009). Identity, Population Change and Gender Issues Relating to the Darfur Conflict, Including the Situation of IDPs and Refugees, in Environment and Conflict in Africa, Reflections on Darfur, University for Peace Africa Programme, Addis Ababa, Ethiopia

Zellner A. (1962). An efficient method of estimating seemingly unrelated regressions and tests for aggregation bias. I. Amer. Statist. Assn. 57:348-68. University of Wisconsin, Madi

APPENDICES

Appendix A

Questionnaire

بسم الله الرحمن الرحيم

جامعة السودان للعلوم و التكنولوجيا

كلية الدراسات العليا

إستبانة لبرنامج الدكتوراة في الإقتصاد الزراعي

التاريخ / / 2015م رقم الإستمارة.....

I.الخصائص الديموغرافية

1. الولاية.....

2.المحلية.....الوحدة الإدارية.....

3. ما هو وضع الأسرة السكني خلال الفترات المختلفة؟

جنس رب الأسرة (أ) ذكر ..... (ب) أنثى.....

الفترة	وضع الأسرة السكني (يذكر اسم المدينة, قرية, فريق, معسكر نزوح, دامرة)					
	مدينة	قرية	فريق	معسكر نزوح	دامرة	أخرى... حدد
2000						
2006						
2012						

4.عُمر رب الأسرة .....

5.الحالة الإجتماعية لرب الأسرة:

الفترة	الحالة الإجتماعية			
	عازب	متزوج	مطلّق	أرمل
2000				
2006				
2012				

6.إذا كنت متزوجاً, كم عدد الزوجات؟

الفترة	عدد زوجات رب الأسرة			
	1	2	3	4
2000				
2006				
2012				

7.ما هو مستوى تعليم رب الاسرة؟

الفترة	مستوى تعليم رب الاسرة					
	أمي	خلوة	أساس	ثانوي	جامعي	أخرى ... حدد
2000						
2006						
2012						

8.كم عدد أعضاء الأسرة خلال الفترات المختلفة؟

عدد اعضاء الاسرة		
2000	2006	2012

9.من الذي يتخذ القرارات اليومية في الأسرة؟

الفترة	متخذ القرار			
	رب الاسرة	ربة الاسرة	الإبن الاكبر	أخرى... حدد

2000				
2006				
2012				

10. على من تقع مسؤولية توفير دخل الأسرة؟

الفترة	المسؤول عن توفير الدخل للأسرة			
	رب الاسرة	ربة الاسرة	الإبن الأكبر	أخرى... حدد
2000				
2006				
2012				

11. النشاط الإقتصادي الأساسي ومصدر كسب العيش (المهنة الرئيسية)

1. هل الوضع الامني يسمح بالقيام بالأنشطة الإقتصادية المختلفة .....نعم / لا
2. إذا كانت الإجابة بنعم, هل تدفع رسوم تأمين (أمن) نظير ممارسة هذه الأنشطة الإقتصادية ؟ .....نعم / لا
3. إذا كانت الإجابة بنعم, كم تدفع من الرسوم؟.....
4. لمن تدفع رسوم التأمين؟ (أ) الحكومة (ب) القادة المحليون...حدد ..... (ج) آخرون ...حدد.....
5. ما هوالنشاط الإقتصادي الأساسي ومصدر كسب العيش لرب الأسرة؟

النشاط الإقتصادي الأساسي و سبل كسب العيش (المهنة)	2000	2006	2012
الزراعة			
الرعي			
التجارة			
الهجرة			
موظف			
عامل			
المساعدات الغذائية			
أخرى ... حدد			

12. المزرعة وملكية الارض:

1. هل تمتلك قطعة أرض؟ ..... نعم / لا
2. نوع التربة:

(أ) طينية (ب) صفراء (ج) رملية (د) بركانية (هـ) غرينية (و) أخرى ... حدد.....

3. المساحة الكلية.....فدان
4. هل تمارس الزراعة .....نعم / لا
5. إذا كانت الإجابة بلا, وضّح الأسباب:

(أ) الأمن (ب) الحيوانات (ج) أخري ... وضح.....

6. اذا كنت لا تمتلك قطعة أرض, كيف تحصل على الارض لممارسة الزراعة؟

(أ) إيجار (ب) هبة من الاقارب (ج) أخرى...وضح.....

7. إن كنت تمارس الزراعة, وضِّح المساحة المزروعة, المحصودة والانتاج لكل محصول في المتوسط

المحاصيل	2000					
	المساحة (فدان)		وحـــــدة	متوسط		القيمة (SDG)
	المزروعة	المحصودة	الإنتاج	الإنتاج	الكمية المستهلكة	
الدخن						
الذرة						
الفول السوداني						
السمسم						
البطيخ						
البامية						
الكركدي						
البطاطس الخريفي						
الطماطم						
أخرى ... حدد						
	2006					
الدخن						
الذرة						
الفول السوداني						
السمسم						
البطيخ						
البامية						

الكركدي						
البطاطس الخريفي						
الطماطم						
أخرى ... حدد						
2012						
الدخن						
الذرة						
الفول السوداني						
السمسم						
البطيخ						
البامية						
الكركدي						
البطاطس الخريفي						
الطماطم						
أخرى ... حدد						

8. هل تمارس الزراعة المروية؟.....نعم / لا

9. إذا كانت الإجابة بنعم, ما هو متوسط المساحة التي تزرعها بالمحاصيل المختلفة والإنتاج والإستهلاك والقيمة

المحصول	2000					
	المساحة فدان	متوسط الانتاج	وحدة الإنتاج	الكمية		متوسط القيمة (SDG)
				المستهلكة	المباعة	
البصل						
البطاطس						
الطماطم						
الفول المصري						
قصب السكر						
البرتقال						
البطيخ						
المانجو						
أخرى ... حدد						
2006						
البصل						
البطاطس						
الطماطم						
الفول المصري						
قصب السكر						
البرتقال						
البطيخ						
المانجو						
أخرى ... حدد						
2012						
البصل						
البطاطس						
الطماطم						
الفول المصري						
قصب السكر						
البرتقال						
البطيخ						
المانجو						
أخرى ... حدد						

10. ما هي المصادر التي تتحصل منها على مدخلات الإنتاج الزراعي؟

مدخلات الإنتاج الزراعي	2000				
	وزارة الزراعة	البنك الزراعي	المنظمات	السوق	أخرى ... حدد
التقاوي					
التراكتور					
المحراث البلدي					
الكدنكة (الطورية)					
المبيدات الحشرية					

مبيدات الحشائش					
الأسمدة					
طلمبات رش					
عربات ترولي صغيرة (درداقة)					
أخرى ... حدد					
	2006				
التقاوي					
التراكتور					
المحراث البلدي					
الكدنكة (الطورية)					
المبيدات الحشرية					
مبيدات الحشائش					
الأسمدة					
طلمبات رش					
عربات ترولي صغيرة (درداقة)					
أخرى ... حدد					
	2012				
التقاوي					
التراكتور					
المحراث البلدي					
الكدنكة (الطورية)					
المبيدات الحشرية					
مبيدات الحشائش					
الأسمدة					
طلمبات رش					
عربات ترولي صغيرة (درداقة)					
أخرى ... حدد					

11. ما هو متوسط كمية المدخلات المستخدمة ومتوسط التكلفة ؟

مدخلات الإنتاج	2000			2006			2012		
	الكمية	الوحدة	التكلفة	الكمية	الوحدة	التكلفة	الكمية	الوحدة	التكلفة
التقاوي									
التراكتور									
المحراث البلدي									
الكدنكة (الطورية)									
المبيدات الحشرية									
مبيدات الحشائش									
الأسمدة									
طلمبات رش									
عربات ترولي (درداقة)									
أخرى ... حدد									

12. هل تمارس البستنة؟..... نعم / لا

13. إذا كانت الإجابة بنعم، ما هي منتجات البساتين الرئيسية التي تنتجها ومتوسط إنتاجية الفدان والقيمة (SDG)

الفاكهة	2000		2006		2012	
	الانتاجية	القيمة	الانتاجية	القيمة	الانتاجية	القيمة
المانجو						
البرتقال						
الجوافة						
الموالح الاخرى						
أخرى ... حدد						

14. ما هو نوع العمالة التي تعتمد عليها في العمليات الزراعية؟

(أ) عمالة الأسرة (ب) العمالة المستأجرة (ج) النفير

15. وضح مساهمة كل من أنواع العمالة المختلفة في العمليات الزراعية وقدّر تكلفة العمليات الزراعية:

العمليات الزراعية	2000						
	عمالة الأسرة	التكلفة المقدّرة	العمالة المستأجرة	التكلفة المقدّرة	النفير	التكلفة المقدّرة	التكلفة الكلية
نظافة الارض							

الحراثة							
البذر							
الحشاشة							
الحصاد							
	2006						
أخري .. حدد							
نظافة الارض							
الحراثة							
البذر							
الحشاشة							
الحصاد							
	2012						
أخري .. حدد							
نظافة الارض							
الحراثة							
البذر							
الحشاشة							
الحصاد							
أخري .. حدد							

II. الماشية:

1. هل تمتلك ماشية؟

2000 .....نعم / لا

2006 .....نعم / لا

2012.....نعم / لا

2. إذا كانت الإجابة بنعم وضح الأنواع والأعداد والقيمة (للوحدة) في الجدول أدناه خلال الفترات المختلفة:

نوع الحيوان	الأعداد			متوسط القيمة للوحدة في الفترة		
	2000	2006	2012	2000	2006	2012
البقر						
الجمل						
الماعز						
الضأن						
الحصان						
الحمار						
الدجاج						
أخرى (حدد).....						

3. إذا لم تكن تملك ماشية الآن, وضّح كيف فقدتها:

نوع الحيوان	2000			2006			2012		
	نفق	بيع إضطراري	نهب	نفق	بيع إضطراري	نهب	نفق	بيع إضطراري	نهب
البقر									
الجمل									
الماعز									
الضأن									
الحصان									
الحمار									
أخرى (حدد).....									

4. ما هي منتجات الحيوان التي تقوم بإنتاجها؟

منتجات الحيوان	2000		2006		2012	
	متوسط		متوسط		متوسط	
	الكمية	القيمة	الكمية	القيمة	الكمية	القيمة
لبن						
زبادي						
جبنة						
سمن						

أخرى (حدد).....						

5. ما هو مصدر مدخلات الانتاج الحيواني؟

المدخلات	المصدر							
	2000							
	وزارة الثروة الحيوانية	وزارة الزراعة	البنك الزراعي	بنك الثروة الحيوانية	المنظمات	السوق	الكمية	التكلفة متوسط
العليقة								
الفاكسينات								
أخرى (حدد)....								
	2006							
العليقة								
الفاكسينات								
أخرى (حدد)...								
	2012							
العليقة								
الفاكسينات								
أخرى (حدد)...								

III.المعونات والمساعدات الإنسانية:

1. هل تتلقي مساعدات وعون من أية جهة؟..... نعم / لا
2. إذا كانت الإجابة بنعم, وضح الجهات التي تقدم لك المساعدة:

(أ) الحكومة (ب) الأقارب (ج) المنظمات (د) أخرى..حدد

3. إذا كنت تتلقى معونات من المنظمات, ما نوعها وحجمها والكميات المستهلكة منها والمباعة والقيمة المالية لها

نوع المعونة	2000				2006				2012			
	الكمية			القيمة	الكمية			القيمة	الكمية			القيمة
	المستلمة	المستهلكة	المباعة		المستلمة	المستهلكة	المباعة		المستلمة	المستهلكة	المباعة	
طلمبة ري												
الذرة /جوال												
الدخن/جوال												
القمح/جوال												
السكر/جوال												
صابون كرتونة												
البقوليات/جوال												
البطاطين/ قطعة												
فرشات بالقطعة												
مشمّعات بالقطعة												
زيت الطعام/رطل												
أخرى ...حدد												

IV. سبل كسب العيش والأنشطة الإضافية المدِّرة للدخل (مهن إضافية)

1.بجانب سبل كسب العيش الأساسية المذكورة أعلاه, هل تمارس أنشطة إقتصادية أخرى إضافية؟..... نعم / لا

2.إذا كانت الإجابة بنعم, وضّح ذلك في الجدول التالي (متوسط الدخل الشهري خلال الفترة):

سبل كسب العيش والأنشطة الإضافية المدِّرة للدخل	2000		2006		2012	
	متوسط الدخل الشهري	الدخل الكلي	الدخل الشهري	الدخل الكلي	الدخل الشهري	الدخل الكلي
بيع الشاي						
فحم						
حطب						
جمع العشب						
عمالة منزلية						

كماين الطوب						
البناء						
بيْع الماءِ						
عمالة زراعية						
التجارة الهامشية						
عتالة						
جمع الحصى						
بيع منتجات الحيوان						
الصمغ العربي						
أخرى (حدد).....						

3. هل هناك من أعضاء الاسرة من يساهم في دخل الاسرة ؟..... نعم / لا

4. إذا كانت الإجابة بنعم, , كم عدد الذين يساهمون في دخل الأسرة, ومتوسط مساهمة كل فرد ؟

مصدر الدخل	2000			2006			2012		
	عدد اعضاء الأسرة	الدخل الشهري	الدخل الكلي	عدد اعضاء الأسرة	الدخل الشهري	الدخل الكلي	عدد اعضاء الأسرة	الدخل الشهري	الدخل الكلي
الزراعة									
الرعي									
الهجرة									
موظف									
عامل									
التجارة									
بيع الشاي									
فحم									
حطب									
جمع العشب									
عمالة منزلية									
كماين الطوب									
البناء									
بيْع الماءِ									
عمالة زراعية									
التجارة الهامشية									
عتالة									
جمع الحصى									
الصناعات اليدوية									
منتجات الحيوان									
الصمغ العربي									
أخرى (حدد).....									

V. أصول وممتلكات الأسرة:

نوع الأصول	2000		2006		2012	
	العدد	القيمة	العدد	القيمة	العدد	القيمة
طاحونة						
طلمبة ري						
كارو						
عربة .. حدد نوعها						
مولد كهرباء						
نادي مشاهدة						
تلفزيون						
راديو						

دكان						
تلفون						
أخرى (حدد).....						

VI. المدّخرات

ما هو نوع المدّخرات التي تقوم بإدخارها وما هي قيمتها المالية خلال الفترات الواردة؟

	2000		2006		2012	
المدّخرات	الكمية	القيمة	الكمية	القيمة	الكمية	القيمة
الماشية						
الارض						
إدخار بالبنك						
آليات زراعية						
مجوهرات						
مخزونات محاصيل						
أخرى (حدد).....						

VII. الإستثمارات:

1. هل لديك إستثمارات؟ .....نعم / لا
2. إذا كانت الإجابة بلا وضّح السبب:

(أ) الأمن (ب) لا املك رأس المال الإبتدائي (ج) أخرى ... حدد

3. إذا كانت الإجابة بنعم ما هو حجم وقيمة الإستثمارات (متوسط الفترة), وضّح ذلك على الجدول أدناه:

	2000	2006	2012
النشاط الإستثماري	حجم و قيمة الإستثمار	حجم و قيمة الإستثمار	حجم و قيمة الإستثمار
الزراعة			
الرعي			
التجارة			
أخرى (حدد).....			

4. هل هناك من يمنحكم مساعدات لتشجيعكم على الإستثمار أم تدفعون ضرائب؟

البند	نعم	لا	القيمة	نعم	لا	نعم	القيمة	لا	القيمة
مساعدات									
ضرائب									

VIII. التمويل:

1. هل هناك جهات تقوم بتمويلك؟..... نعم / لا
2. إذا كانت الإجابة بنعم, ما هي الجهات التي تقوم بتمويلك ومتوسط قيمة التمويل خلال الفترة؟

مصدر التسليف	2000		2006		2012	
	نـــــوع التسليف	قيمة التسليف	نـــــوع التسليف	قيمة التسليف	نـــــوع التسليف	قيمة التسليف
البنك الزراعي						
بنك الثروة الحيوانية						
المنظمات						
الدائنون المحليّون						
الأقارب						
أخرى... حدد						

IX. الهجرة والتحويلات المالية:

1. هل هناك من بين أعضاء الأسرة مهاجرين ؟..... نعم / لا
2. إذا كانت الإجابة بنعم, كم عدد أعضاء الأسرة المهاجرين والى أين؟

	الجهة التي هاجروا اليها						
عـــــــدد المهاجرين	ولايـــــات السودان	جنوب السودان	الشـــــرق الأوسط	أمريكا	أوروبا	أستراليا	أخرى .. حدد

3. منذ متى هاجر أعضاء الأسرة؟

(أ) 2000 (ب) 2006 (ج) 2012

4. كم يبلغ متوسط التحويلات السنوية لأعضاء الأسرة المهاجرين خلال الفترات المختلفة؟

الفترة	المادة المحولة			القيمة
	نقداً	عينة ... حدد	أخرى ... حدد	
2000				
2006				
2012				

X. الإستهلاك والإنفاق:

ماهو متوسط الصرف والإستهلاك على البنود التالية:

بنود الصرف والإستهلاك	الصرف والإستهلاك الشهري			الصرف والإستهلاك الكلي/ سنة		
	2000	2006	2012	2000	2006	2012
الغذاء الرئيسي						
التعليم						
الصحة						
المياه						
مواد الطبخ وزيت الطعام						
الملابس						
المواصلات						
الحطب/ الفحم / الغاز						
السكّر والشاي						
أخرى (حدد).....						
الصرف والإستهلاك الكلي						

Appendix B
Seemingly Unrelated Regression (SUR) Results

1. Household total income

Equation	Obs	Parms	RMSE	"R-sq"	chi2	P
Pre conflict	202	17	.1655798	0.8256	968.28	0.0000
Conflict	202	18	.6063532	0.3069	84.74	0.0000
Peace	202	18	.2065554	0.5854	285.83	0.0000
Pre conflict						
Variables	Coef.	Std. Err	z	P>|z|	[95% Conf.	Interval]
gender2000	.021073	.0276967	0.76	0.447	-.0332116	.0753575
agein2000	-.0447117	.0607762	-0.74	0.462	-.1638309	.0744075
town2000	.0027605	.0367558	0.08	0.940	-.0692796	.0748006
idpscamp2000	(dropped)					
fareeg2000	-.0555915*	.0315211	-1.76	0.078	-.1173717	.0061888
damra2000	.1502302	.1224154	1.23	0.220	-.0896997	.39016
married2000	-.0185462	.0432326	-0.43	0.668	-.1032806	.0661881
divorced2000	-.1499569	.1291698	-1.16	0.246	-.4031251	.1032113
widow2000	-.0765506	.1780492	-0.43	0.667	-.4255206	.2724194
khalwa2000	.0031166	.0332663	0.09	0.925	-.0620841	.0683174
basic2000	-.0288404	.0354482	-0.81	0.416	-.0983176	.0406369
secondry2000	-.0343237	.0435059	-0.79	0.430	-.1195936	.0509463
univers~2000	-.0858015	.0904529	-0.95	0.343	-.263086	.091483
hhfamil~2000	.0483551	.0567606	0.85	0.394	-.0628937	.1596038
securit~2000	.0818846	.1823201	0.45	0.653	-.2754563	.4392256
totalar~2000	-.009409	.0287541	-0.33	0.743	-.065766	.046948
product~2000	.0068668	.0160967	0.43	0.670	-.0246822	.0384158
househo~2000	1.322399***	.0456231	28.99	0.000	1.232979	1.411818
_cons	-2.388446***	.407193	-5.87	0.000	-3.18653	-1.590362
Conflict						
gender2006	-.0506592	.1103335	-0.46	0.646	-.2669089	.1655904
agein2006	-.0361618	.2292493	-0.16	0.875	-.4854821	.4131585
town2006	.0976015	.2088401	0.47	0.640	-.3117176	.5069206
idpscamp2006	-.2830575	.2175326	-1.30	0.193	-.7094136	.1432986
fareeg2006	.0218142	.2287924	0.10	0.924	-.4266106	.470239
damra2006	-.0086232	.205964	-0.04	0.967	-.4123053	.3950589
married2006	-.1126885	.279874	-0.40	0.687	-.6612315	.4358546
divorced2006	-.0613798	.3828687	-0.16	0.873	-.8117887	.6890292
widow2006	-.0095981	.3123009	-0.03	0.975	-.6216966	.6025004
khalwa2006	.0229642	.1375818	0.17	0.867	-.2466911	.2926195
basic2006	.0444307	.1381568	0.32	0.748	-.2263517	.3152131
secondry2006	-.0123962	.1647751	-0.08	0.940	-.3353496	.3105571
univers~2006	-.9347573***	.2376765	-3.93	0.000	-1.400595	-.4689199
hhfamil~2006	-.0164429	.2080149	-0.08	0.937	-.4241446	.3912588
securit~2006	-.565556**	.167606	-3.37	0.001	-.8940576	-.2370544
totalar~2006	.1092131	.0936014	1.17	0.243	-.0742423	.2926684
product~2006	.0787814	.061521	1.28	0.200	-.0417975	.1993603
househo~2006	1.118233***	.1801008	6.21	0.000	.7652423	1.471224
_cons	-.4983538	1.740367	-0.29	0.775	-3.90941	2.912702

Peace						
gender2012	.030453	.0371817	0.82	0.413	-.0424218	.1033279
agein2012	.0822065	.0861393	0.95	0.340	-.0866235	.2510365
town2012	.0288507	.0583418	0.49	0.621	-.0854971	.1431986
idpscamp2012	-.0291971	.0514822	-0.57	0.571	-.1301003	.0717061
fareeg2012	-.0408013	.0704826	-0.58	0.563	-.1789446	.0973419
damra2012	-.0641105	.0575123	-1.11	0.265	-.1768325	.0486116
married2012	.1328001	.2135745	0.62	0.534	-.2857983	.5513985
divorced2012	-.0167757	.2418855	-0.07	0.945	-.4908626	.4573112
widow2012	.2487112	.2232632	1.11	0.265	-.1888767	.686299
khalwa2012	.0097571	.050851	0.19	0.848	-.089909	.1094231
basic2012	.0217546	.0473507	0.46	0.646	-.071051	.1145602
secondry2012	.0966883	.0635582	1.52	0.128	-.0278836	.2212601
univers~2012	.1580897**	.0716584	2.21	0.027	.0176419	.2985376
hhfamil~2012	-.0411868	.0607441	-0.68	0.498	-.160243	.0778694
securit~2012	-.0292073	.0436597	-0.67	0.504	-.1147788	.0563642
totalar~2012	.0169667	.0284865	0.60	0.551	-.0388658	.0727991
product~2012	.044805***	.0170549	2.63	0.009	.0113779	.0782321
hhtotalexp~2	1.009978***	.0721849	13.99	0.000	.8684986	1.151458
_cons	-.4191602	.7959599	-0.53	0.598	-1.979213	1.140893

2. Income from Agriculture (crop production)

Equation	Obs	Parms	RMSE	"R-sq"	chi2	P
Pre conflict	202	17	1.178443	0.7549	678.16	0.0000
Conflict	202	18	.9964256	0.9269	2721.77	0.0000
Peace	202	18	1.293269	0.8823	1598.59	0.0000
Pre conflict						
Variables	Coef	Std. Err	z	P>|z|	[95% Conf	Interval]
gender2000	-.0809956	.1960862	-0.41	0.680	-.4653175	.3033263
agein2000	.0925948	.4287498	0.22	0.829	-.7477393	.9329289
town2000	-.1658476	.2559061	-0.65	0.517	-.6674144	.3357191
idpscamp2000	(dropped)					
fareeg2000	-.5509633**	.2225853	-2.48	0.013	-.9872225	-.1147042
damra2000	-.668714	.8495805	-0.79	0.431	-2.333861	.9964332
married2000	.2239348	.3007786	0.74	0.457	-.3655803	.81345
divorced2000	.0906879	.8949897	0.10	0.919	-1.66346	1.844836
widow2000	-4.900391***	1.233944	-3.97	0.000	-7.318877	-2.481906
khalwa2000	.2420504	.2335279	1.04	0.300	-.2156558	.6997566
basic2000	-.2976879	.2476723	-1.20	0.229	-.7831167	.1877408
secondry2000	-.3976259	.3038659	-1.31	0.191	-.9931921	.1979403
univers~2000	-.69684	.6311273	-1.10	0.270	-1.933827	.5401467
hhfamil~2000	.2213596	.3972342	0.56	0.577	-.5572051	.9999243
securit~2000	-1.337299	1.264409	-1.06	0.290	-3.815494	1.140897
totalar~2000	1.864599***	.2004072	9.30	0.000	1.471809	2.25739
product~2000	.6480351***	.11206	5.78	0.000	.4284016	.8676686
househo~2000	.5062974	.3168916	1.60	0.110	-.1147987	1.127394
_cons	-2.330928	2.836839	-0.82	0.411	-7.89103	3.229173
Conflict						
gender2006	.3677944**	.1780535	2.07	0.039	.018816	.7167728
agein2006	1.071449**	.3713965	2.88	0.004	.3435254	1.799373

town2006	-1.282307***	.3303509	-3.88	0.000	-1.929782	-.6348308
idpscamp2006	-1.285143***	.3418764	-3.76	0.000	-1.955209	-.6150778
fareeg2006	-.6773862*	.3621269	-1.87	0.061	-1.387142	.0323695
damra2006	-.754163**	.3271773	-2.31	0.021	-1.395419	-.1129073
married2006	.2270297	.4384925	0.52	0.605	-.6323999	1.086459
divorced2006	-.4816747	.5978852	-0.81	0.420	-1.653508	.6901587
widow2006	-.1875513	.4890379	-0.38	0.701	-1.146048	.7709454
khalwa2006	.1392502	.2194753	0.63	0.526	-.2909134	.5694139
basic2006	-.0599255	.2197336	-0.27	0.785	-.4905954	.3707444
secondry2006	-.1409407	.2622766	-0.54	0.591	-.6549934	.373112
univers~2006	-.1511109	.3760263	-0.40	0.688	-.888109	.5858872
hhfamil~2006	-.7195211**	.3307563	-2.18	0.030	-1.367792	-.0712506
securit~2006	-.2020061	.2607553	-0.77	0.439	-.7130771	.3090649
totalar~2006	2.920771***	.1466531	19.92	0.000	2.633336	3.208206
product~2006	.7468171***	.0965347	7.74	0.000	.5576125	.9360217
househo~2006	.4905204*	.2814557	1.74	0.081	-.0611227	1.042163
_cons	-5.982034**	2.742943	-2.18	0.029	-11.3581	-.6059635
Peace						
gender2012	-.1342083	.2306517	-0.58	0.561	-.5862773	.3178608
agein2012	1.07064**	.5365545	2.00	0.046	.0190125	2.122267
town2012	-.7312504**	.3613644	-2.02	0.043	-1.439512	-.0229892
idpscamp2012	-.5576556*	.3180804	-1.75	0.080	-1.181082	.0657705
fareeg2012	-1.304848**	.435993	-2.99	0.003	-2.159378	-.450317
damra2012	-1.153583**	.3568805	-3.23	0.001	-1.853056	-.45411
married2012	2.622815**	1.307982	2.01	0.045	.0592179	5.186412
divorced2012	2.258554	1.479676	1.53	0.127	-.6415585	5.158667
widow2012	2.232064	1.367097	1.63	0.103	-.4473959	4.911525
khalwa2012	.350589	.3146465	1.11	0.265	-.2661067	.9672848
basic2012	.3281868	.292754	1.12	0.262	-.2456005	.901974
secondry2012	-.2914303	.3927393	-0.74	0.458	-1.061185	.4783246
univers~2012	-.6351521	.4416924	-1.44	0.150	-1.500853	.2305492
hhfamil~2012	-.8074891**	.3752751	-2.15	0.031	-1.543015	-.0719633
securit~2012	.6926645***	.2665722	2.60	0.009	.1701927	1.215136
totalar~2012	2.825486***	.1745637	16.19	0.000	2.483347	3.167624
product~2012	.7430979***	.1046196	7.10	0.000	.5380471	.9481486
hhtotalexp~2	.3524855	.4414752	0.80	0.425	-.5127899	1.217761
_cons	-7.534405	4.88641	-1.54	0.123	-17.11159	2.042783

3. Income from livestock production

Equation	Obs	Parms	RMSE	"R-sq"	chi2	P
Pre conflict	202	17	2.256308	0.4986	196.30	0.0000
Conflict	202	18	1.392705	0.8472	1139.65	0.0000
Peace	202	18	1.629338	0.8077	853.65	0.0000
Pre conflict						
Variables	Coef.	Std. Err.	z	P>|z|	[95% Conf	Interval]
gender2000	.3292742	.3779714	0.87	0.384	-.4115361	1.070085
agein2000	-.1786087	.829205	-0.22	0.829	-1.803821	1.446603
town2000	-.2257296	.5000672	-0.45	0.652	-1.205843	.754384
idpscamp2000	(dropped)					
fareeg2000	3.528478***	.4297002	8.21	0.000	2.686281	4.370675

damra2000	4.942724***	1.664188	2.97	0.003	1.680976	8.204472
married2000	1.862655***	.5883792	3.17	0.002	.7094529	3.015857
divorced2000	2.157339	1.755744	1.23	0.219	-1.283856	5.598535
widow2000	.631908	2.419619	0.26	0.794	-4.110458	5.374274
khalwa2000	.9914813**	.4538252	2.18	0.029	.1020002	1.880962
basic2000	-.1285916	.4828037	-0.27	0.790	-1.074869	.8176863
secondry2000	-1.597119***	.5919516	-2.70	0.007	-2.757323	-.4369152
univers~2000	-2.476223**	1.233919	-2.01	0.045	-4.894658	-.0577868
hhfamil~2000	.3303907	.7749944	0.43	0.670	-1.18857	1.849352
securit~2000	-1.01991	2.478727	-0.41	0.681	-5.878126	3.838306
totalar~2000	-.6649352*	.3910438	-1.70	0.089	-1.431367	.1014965
product~2000	.3294397	.2187339	1.51	0.132	-.0992709	.7581502
househo~2000	-.0536555	.6211322	-0.09	0.931	-1.271052	1.163741
_cons	2.23421	5.542896	0.40	0.687	-8.629666	13.09809
Conflict						
gender2006	-.2656862	.2388362	-1.11	0.266	-.7337965	.2024241
agein2006	.2043564	.5049157	0.40	0.686	-.7852603	1.193973
town2006	-.3336943	.440325	-0.76	0.449	-1.196715	.5293268
idpscamp2006	-.3285784	.4468277	-0.74	0.462	-1.204345	.5471878
fareeg2006	6.52512***	.4795623	13.61	0.000	5.585195	7.465044
damra2006	6.475935***	.4383123	14.77	0.000	5.616858	7.335011
married2006	-.412209	.5538972	-0.74	0.457	-1.497828	.6734095
divorced2006	.1155544	.7509225	0.15	0.878	-1.356227	1.587335
widow2006	-.5437201	.6164649	-0.88	0.378	-1.751969	.6645289
khalwa2006	.2800492	.2932188	0.96	0.340	-.2946491	.8547475
basic2006	-.1177824	.2933116	-0.40	0.688	-.6926625	.4570977
secondry2006	.471214	.3516575	1.34	0.180	-.218022	1.16045
univers~2006	.0039377	.4881743	0.01	0.994	-.9528663	.9607417
hhfamil~2006	1.011371**	.4351363	2.32	0.020	.1585195	1.864223
securit~2006	.382329	.324369	1.18	0.239	-.2534226	1.01808
totalar~2006	-.3455264*	.184174	-1.88	0.061	-.7065009	.015448
product~2006	.2715092**	.1228997	2.21	0.027	.0306301	.5123883
househo~2006	-.070092	.3536597	-0.20	0.843	-.7632523	.6230682
_cons	-1.093543	3.520435	-0.31	0.756	-7.993469	5.806383
Peace						
gender2012	.015177	.2819595	0.05	0.957	-.5374533	.5678074
agein2012	-.0141851	.6687077	-0.02	0.983	-1.324828	1.296458
town2012	-.0959655	.4454578	-0.22	0.829	-.9690468	.7771157
idpscamp2012	-.1847393	.3868182	-0.48	0.633	-.942889	.5734104
fareeg2012	7.224778***	.5304946	13.62	0.000	6.185028	8.264528
damra2012	6.981502***	.4408428	15.84	0.000	6.117466	7.845539
married2012	-.4331301	1.510064	-0.29	0.774	-3.392801	2.526541
divorced2012	.6689097	1.698359	0.39	0.694	-2.659813	3.997632
widow2012	-.378981	1.576826	-0.24	0.810	-3.469502	2.71154
khalwa2012	.2765952	.382706	0.72	0.470	-.4734948	1.026685
basic2012	-.5149559	.3559341	-1.45	0.148	-1.212574	.1826622
secondry2012	-.2322066	.4762922	-0.49	0.626	-1.165722	.7013089
univers~2012	-.2084773	.5284454	-0.39	0.693	-1.244211	.8272567
hhfamil~2012	.2279714	.4527414	0.50	0.615	-.6593855	1.115328
securit~2012	.2868178	.3028911	0.95	0.344	-.3068378	.8804733

totalar~2012	-.0906193	.2021273	-0.45	0.654	-.4867814	.3055429
product~2012	.0123478	.121959	0.10	0.919	-.2266875	.2513831
hhtotalexp~2	-.1088035	.5062485	-0.21	0.830	-1.101032	.8834253
_cons	1.490056	5.707204	0.26	0.794	-9.695857	12.67597

4. Income from employment

Equation	Obs	Parms	RMSE	"R-sq"	chi2	P
Pre conflict	202	17	1.717197	0.6156	312.60	0.0000
Conflict	202	18	1.258333	0.8915	1641.84	0.0000
Peace	202	18	1.295466	0.9094	2011.00	0.0000
Pre conflict						
Variables	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
gender2000	.4195243	.2841261	1.48	0.140	-.1373527	.9764013
agein2000	-.4253973	.6224259	-0.68	0.494	-1.64533	.7945351
town2000	1.363144***	.3742142	3.64	0.000	.6296974	2.09659
idpscamp2000	(dropped)					
fareeg2000	-.5794698*	.3231977	-1.79	0.073	-1.212926	.053986
damra2000	-1.573788	1.244873	-1.26	0.206	-4.013695	.8661191
married2000	-.9160629**	.4398612	-2.08	0.037	-1.778175	-.0539508
divorced2000	-1.738297	1.312667	-1.32	0.185	-4.311077	.8344823
widow2000	.7376371	1.809693	0.41	0.684	-2.809297	4.284571
khalwa2000	-1.122818***	.3395944	-3.31	0.001	-1.788411	-.4572248
basic2000	-.5269725	.3612539	-1.46	0.145	-1.235017	.1810721
secondry2000	4.840621***	.4436666	10.91	0.000	3.971051	5.710192
univers~2000	3.346746***	.920608	3.64	0.000	1.542387	5.151105
hhfamil~2000	.3101185	.5783817	0.54	0.592	-.8234888	1.443726
securit~2000	3.959294**	1.853153	2.14	0.033	.3271809	7.591408
totalar~2000	.3310878	.2927873	1.13	0.258	-.2427648	.9049403
product~2000	-.2411457	.1638835	-1.47	0.141	-.5623514	.0800601
househo~2000	.0722547	.4637783	0.16	0.876	-.836734	.9812435
_cons	-1.911884	4.146739	-0.46	0.645	-10.03934	6.215575
Conflict						
gender2006	.1514878	.2162474	0.70	0.484	-.2723494	.5753249
agein2006	-.7075128	.4569779	-1.55	0.122	-1.603173	.1881475
town2006	1.432451***	.3999659	3.58	0.000	.6485318	2.216369
idpscamp2006	1.231455**	.4069526	3.03	0.002	.4338429	2.029068
fareeg2006	-.3168566	.4361062	-0.73	0.467	-1.171609	.5378959
damra2006	-.2157902	.3981783	-0.54	0.588	-.9962054	.5646251
married2006	-.3408245	.5051942	-0.67	0.500	-1.330987	.6493381
divorced2006	-1.458505**	.6861917	-2.13	0.034	-2.803416	-.1135942
widow2006	-1.28579**	.5624909	-2.29	0.022	-2.388252	-.1833281
khalwa2006	-.3711217	.2658191	-1.40	0.163	-.8921175	.1498742
basic2006	.0206956	.266067	0.08	0.938	-.5007861	.5421774
secondry2006	7.084305***	.3190355	22.21	0.000	6.459007	7.709603
univers~2006	7.336886***	.4437101	16.54	0.000	6.46723	8.206542
hhfamil~2006	.4443176	.3945599	1.13	0.260	-.3290056	1.217641
securit~2006	1.164912***	.2970272	3.92	0.000	.5827499	1.747075
totalar~2006	.0271278	.1681093	0.16	0.872	-.3023604	.356616
product~2006	-.1111683	.1121589	-0.99	0.322	-.3309957	.108659
househo~2006	.2120186	.3230157	0.66	0.512	-.4210806	.8451178

_cons	-.4177718	3.207181	-0.13	0.896	-6.703732	5.868188
Peace						
gender2012	.3294523	.2187247	1.51	0.132	-.0992402	.7581447
agein2012	-.2819569	.5199382	-0.54	0.588	-1.301017	.7371032
town2012	.7490008**	.3415046	2.19	0.028	.0796641	1.418337
idpscamp2012	.4772536	.2965878	1.61	0.108	-.1040479	1.058555
fareeg2012	-.0324043	.4082275	-0.08	0.937	-.8325154	.7677068
damra2012	.0052592	.339847	0.02	0.988	-.6608287	.6713471
married2012	-.2160918	1.162685	-0.19	0.853	-2.494912	2.062728
divorced2012	-.0590921	1.308553	-0.05	0.964	-2.623809	2.505625
widow2012	-.4207728	1.214197	-0.35	0.729	-2.800555	1.959009
khalwa2012	-.4220156	.294834	-1.43	0.152	-.9998795	.1558484
basic2012	-.0696326	.2739247	-0.25	0.799	-.6065151	.4672499
secondry2012	7.906653***	.3663986	21.58	0.000	7.188525	8.624781
univers~2012	8.356805***	.4067959	20.54	0.000	7.5595	9.154111
hhfamil~2012	.0803667	.3484254	0.23	0.818	-.6025346	.763268
securit~2012	.1060811	.2335494	0.45	0.650	-.3516673	.5638294
totalar~2012	.0980183	.1560115	0.63	0.530	-.2077587	.4037952
product~2012	-.2333787**	.0941072	-2.48	0.013	-.4178254	-.0489321
hhtotalexp~2	-.0754194	.3900333	-0.19	0.847	-.8398707	.689032
_cons	2.109645	4.403355	0.48	0.632	-6.520773	10.74006

5. Income from labour

Equation	Obs	Parms	RMSE	"R-sq"	chi2	P
Pre conflict	202	17	1.874486	0.1638	50.69	0.0000
Conflict	202	18	2.46638	0.1243	29.32	0.0447
Peace	202	18	2.575806	0.1576	41.61	0.0013
Pre conflict						
variables	Coef	Std. Err.	z	P>|z|	[95% Conf.	Interval]
gender2000	.0006615	.287157	0.00	0.998	-.5621559	.5634788
agein2000	-1.30666**	.6174979	-2.12	0.034	-2.516933	-.096386
town2000	-.3788095	.3337426	-1.14	0.256	-1.032933	.275314
idpscamp2000	(dropped)					
fareeg2000	-.7442868**	.3265507	-2.28	0.023	-1.384314	-.1042591
damra2000	-1.274407	1.096348	-1.16	0.245	-3.423211	.8743961
married2000	-.5710401	.3878534	-1.47	0.141	-1.331219	.1891387
divorced2000	.9673289	1.13719	0.85	0.395	-1.261523	3.196181
widow2000	.0019792	1.572391	0.00	0.999	-3.079851	3.083809
khalwa2000	.1832333	.3123293	0.59	0.557	-.4289209	.7953875
basic2000	-.1619353	.3246437	-0.50	0.618	-.7982252	.4743547
secondry2000	-.9249221**	.4055528	-2.28	0.023	-1.719791	-.1300532
univers~2000	-.8530468	.8119359	-1.05	0.293	-2.444412	.7383183
hhfamil~2000	.6533035	.51553	1.27	0.205	-.3571167	1.663724
securit~2000	-6.489354***	1.609338	-4.03	0.000	-9.643599	-3.335109
totalar~2000	-.2306676	.2615877	-0.88	0.378	-.7433701	.2820348
product~2000	.023639	.1463213	0.16	0.872	-.2631454	.3104234
househo~2000	1.031873**	.4025259	2.56	0.010	.2429364	1.820809
_cons	3.758576	3.743616	1.00	0.315	-3.578776	11.09593
Conflict						
gender2006	-.3146343	.3668459	-0.86	0.391	-1.033639	.4043705

agein2006	-.0101295	.8257275	-0.01	0.990	-1.628526	1.608267
town2006	-1.13348*	.5981252	-1.90	0.058	-2.305784	.0388234
idpscamp2006	-.5287267	.5796854	-0.91	0.362	-1.664889	.6074357
fareeg2006	-1.58672**	.6673725	-2.38	0.017	-2.894746	-.2786937
damra2006	-1.496467**	.6318335	-2.37	0.018	-2.734838	-.2580963
married2006	.6390083	.6706392	0.95	0.341	-.6754205	1.953437
divorced2006	.5365241	.9024801	0.59	0.552	-1.232304	2.305353
widow2006	.4465952	.7451642	0.60	0.549	-1.0139	1.90709
khalwa2006	.7126272*	.4078326	1.75	0.081	-.0867101	1.511964
basic2006	.6934819*	.4008781	1.73	0.084	-.0922248	1.479189
secondry2006	-.3789272	.4957637	-0.76	0.445	-1.350606	.5927517
univers~2006	-.9199684	.6450914	-1.43	0.154	-2.184324	.3443876
hhfamil~2006	-.1929263	.5798445	-0.33	0.739	-1.329401	.943548
securit~2006	-.0218009	.3841577	-0.06	0.955	-.7747362	.7311345
totalar~2006	-.1148892	.2221209	-0.52	0.605	-.5502383	.3204598
product~2006	-.0348835	.1516935	-0.23	0.818	-.3321973	.2624303
househo~2006	.0076394	.4246593	0.02	0.986	-.8246774	.8399563
_cons	1.592442	4.703706	0.34	0.735	-7.626652	10.81154
Peace						
gender2012	-.1782972	.3661841	-0.49	0.626	-.8960049	.5394104
agein2012	-.7341871	.960255	-0.76	0.445	-2.616252	1.147878
town2012	-.451768	.5079477	-0.89	0.374	-1.447327	.5437911
idpscamp2012	-.6510463	.4235693	-1.54	0.124	-1.481227	.1791343
fareeg2012	-1.790041***	.6207063	-2.88	0.004	-3.006603	-.573479
damra2012	-1.72935***	.5534372	-3.12	0.002	-2.814067	-.6446327
married2012	.1706066	1.491947	0.11	0.909	-2.753556	3.094769
divorced2012	-.0134109	1.666227	-0.01	0.994	-3.279156	3.252334
widow2012	.7266987	1.556039	0.47	0.640	-2.323083	3.77648
khalwa2012	.6407717	.4394156	1.46	0.145	-.2204672	1.50201
basic2012	.680757*	.4012139	1.70	0.090	-.1056078	1.467122
secondry2012	-1.03432*	.5407888	-1.91	0.056	-2.094246	.0256066
univers~2012	-1.684257***	.5870366	-2.87	0.004	-2.834827	-.5336859
hhfamil~2012	.1789031	.5008404	0.36	0.721	-.8027259	1.160532
securit~2012	-.2581209	.2925207	-0.88	0.378	-.8314509	.3152091
totalar~2012	-.3080281	.2049454	-1.50	0.133	-.7097137	.0936575
product~2012	.0619258	.1253165	0.49	0.621	-.18369	.3075416
hhtotalexp~2	.4973515	.4958767	1.00	0.316	-.474549	1.469252
_cons	-.1308647	6.222916	-0.02	0.983	-12.32756	12.06583

6. Income from trade

Equation	Obs	Parms	RMSE	"R-sq"	chi2	P
Pre conflict	202	17	2.293188	0.1940	46.68	0.0001
Conflict	202	18	2.542859	0.1383	31.46	0.0254
Peace	202	18	2.786076	0.1275	30.79	0.0304
Pre conflict						
variables	Coef	Std. Err	z	P>|z|	[95% Conf.	Interval]
gender2000	.110368	.370488	0.30	0.766	-.6157752	.8365112
agein2000	.3368368	.8084018	0.42	0.677	-1.247602	1.921275
town2000	-.5369537	.4735966	-1.13	0.257	-1.465186	.3912786
idpscamp2000	(dropped)					

fareeg2000	-1.130068***	.4225078	-2.67	0.007	-1.958168	-.3019678
damra2000	-.8452722	1.570405	-0.54	0.590	-3.92321	2.232665
married2000	.8106826	.5545839	1.46	0.144	-.276282	1.897647
divorced2000	3.010137*	1.648383	1.83	0.068	-.220634	6.240908
widow2000	.5837675	2.274011	0.26	0.797	-3.873212	5.040747
khalwa2000	-.0056533	.4318556	-0.01	0.990	-.8520747	.8407681
basic2000	-.8015699*	.4571119	-1.75	0.080	-1.697493	.094353
secondry2000	-1.05967*	.5649177	-1.88	0.061	-2.166888	.0475489
univers~2000	.6571951	1.15959	0.57	0.571	-1.615559	2.929949
hhfamil~2000	-1.019036	.7294786	-1.40	0.162	-2.448788	.4107154
securit~2000	.5203427	2.32754	0.22	0.823	-4.041552	5.082237
totalar~2000	.1944229	.370316	0.53	0.600	-.5313832	.920229
product~2000	-.2427249	.2072872	-1.17	0.242	-.6490004	.1635505
househo~2000	2.833548***	.5822548	4.87	0.000	1.69235	3.974747
_cons	-20.7768***	5.256183	-3.95	0.000	-31.07872	-10.47487
Conflict						
gender2006	.4879656	.3779895	1.29	0.197	-.2528802	1.228811
agein2006	-.3169732	.8569196	-0.37	0.711	-1.996505	1.362558
town2006	.9572644	.647811	1.48	0.139	-.3124219	2.226951
idpscamp2006	.5079319	.6173317	0.82	0.411	-.7020159	1.71788
fareeg2006	-.5830436	.7051977	-0.83	0.408	-1.965206	.7991185
damra2006	-.4598075	.6723184	-0.68	0.494	-1.777527	.8579124
married2006	-.0826607	.6848259	-0.12	0.904	-1.424895	1.259573
divorced2006	-.2044301	.919168	-0.22	0.824	-2.005966	1.597106
widow2006	.316422	.7595791	0.42	0.677	-1.172326	1.80517
khalwa2006	-.1728187	.4326536	-0.40	0.690	-1.020804	.6751667
basic2006	.6073331	.4272634	1.42	0.155	-.2300879	1.444754
secondry2006	-1.008291*	.532632	-1.89	0.058	-2.052231	.0356482
univers~2006	-.9726586	.6759016	-1.44	0.150	-2.297401	.3520842
hhfamil~2006	.4953359	.6088785	0.81	0.416	-.6980441	1.688716
securit~2006	.0100502	.3887022	0.03	0.979	-.7517922	.7718925
totalar~2006	.2182897	.2253753	0.97	0.333	-.2234378	.6600172
product~2006	-.1503462	.1553775	-0.97	0.333	-.4548805	.154188
househo~2006	1.435305***	.4322822	3.32	0.001	.5880475	2.282563
_cons	-12.14933**	4.836749	-2.51	0.012	-21.62918	-2.669472
Peace						
gender2012	.1422817	.4057197	0.35	0.726	-.6529143	.9374777
agein2012	.3277827	1.067058	0.31	0.759	-1.763613	2.419178
town2012	.9476917	.6062237	1.56	0.118	-.2404849	2.135868
idpscamp2012	.6328913	.4980484	1.27	0.204	-.3432656	1.609048
fareeg2012	-1.522518**	.711951	-2.14	0.032	-2.917916	-.1271193
damra2012	-1.017141	.6363899	-1.60	0.110	-2.264442	.2301604
married2012	1.298451	1.664214	0.78	0.435	-1.963349	4.560251
divorced2012	.9713016	1.85071	0.52	0.600	-2.656024	4.598627
widow2012	1.760985	1.734639	1.02	0.310	-1.638845	5.160814
khalwa2012	.4538035	.5049401	0.90	0.369	-.5358609	1.443468
basic2012	.8148815*	.4636437	1.76	0.079	-.0938435	1.723607
secondry2012	-.5757836	.6288428	-0.92	0.360	-1.808293	.6567257
univers~2012	-.5087339	.6753775	-0.75	0.451	-1.83245	.8149817
hhfamil~2012	.4588583	.5741776	0.80	0.424	-.6665092	1.584226

securit~2012	.1748622	.3228231	0.54	0.588	-.4578594	.8075837
totalar~2012	.1005304	.2273123	0.44	0.658	-.3449936	.5460543
product~2012	.0927662	.1396928	0.66	0.507	-.1810267	.3665591
hhtotalexp~2	.7502231	.5506272	1.36	0.173	-.3289865	1.829433
_cons	-10.72548	6.92843	-1.55	0.122	-24.30495	2.853994

7. Income from aid; humanitarian assistance

Equation	Obs	Parms	RMSE	"R-sq"	chi2	P
Pre conflict	202	17	.395606	0.1314	33.56	0.0096
Conflict	202	18	2.724189	0.4621	167.39	0.0000
Peace	202	18	2.865047	0.4532	163.43	0.0000
Pre conflict						
Variables	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
gender2000	.0925425	.0655922	1.41	0.158	-.0360159	.2211008
agein2000	-.1507076	.1440224	-1.05	0.295	-.4329863	.1315711
town2000	.0684635	.0866551	0.79	0.429	-.1013773	.2383043
idpscamp2000	(dropped)					
fareeg2000	-.0180955	.0748028	-0.24	0.809	-.1647063	.1285153
damra2000	.0574598	.2885596	0.20	0.842	-.5081067	.6230262
married2000	-.080305	.1018469	-0.79	0.430	-.2799213	.1193113
divorced2000	-.1276727	.3042242	-0.42	0.675	-.7239412	.4685959
widow2000	-.1969809	.4193126	-0.47	0.639	-1.018819	.6248567
khalwa2000	-.0335253	.0783675	-0.43	0.669	-.1871228	.1200722
basic2000	.0382303	.083467	0.46	0.647	-.125362	.2018226
secondry2000	.1914541*	.102652	1.87	0.062	-.0097401	.3926483
univers~2000	-.0451825	.2130699	-0.21	0.832	-.4627919	.3724269
hhfamil~2000	.5701481***	.1336165	4.27	0.000	.3082647	.8320316
securit~2000	.0166241	.4292737	0.04	0.969	-.8247367	.857985
totalar~2000	.0554987	.0677051	0.82	0.412	-.0772008	.1881982
product~2000	.0124127	.0379027	0.33	0.743	-.0618752	.0867006
househo~2000	.0239904	.1074278	0.22	0.823	-.1865642	.234545
_cons	-.7623717	.9606156	-0.79	0.427	-2.645144	1.1204
Conflict						
gender2006	-.5454307	.3737889	-1.46	0.145	-1.278044	.1871821
agein2006	.5869541	.88241	0.67	0.506	-1.142538	2.316446
town2006	-.551158	.6332938	-0.87	0.384	-1.792391	.6900751
idpscamp2006	.9774522*	.584418	1.67	0.094	-.1679861	2.12289
fareeg2006	-3.678587***	.6859867	-5.36	0.000	-5.023096	-2.334078
damra2006	-4.190961***	.66607	-6.29	0.000	-5.496434	-2.885488
married2006	-.0573368	.6126682	-0.09	0.925	-1.258144	1.143471
divorced2006	.6348853	.8195653	0.77	0.439	-.9714331	2.241204
widow2006	.3279129	.6784238	0.48	0.629	-1.001773	1.657599
khalwa2006	-.0768144	.4163952	-0.18	0.854	-.892934	.7393051
basic2006	-.0486978	.4088497	-0.12	0.905	-.8500286	.7526329
secondry2006	-.5387399	.5244128	-1.03	0.304	-1.56657	.4890902
univers~2006	-.5848628	.6427818	-0.91	0.363	-1.844692	.6749663
hhfamil~2006	.177294	.573677	0.31	0.757	-.9470923	1.30168
securit~2006	-.2087629	.343865	-0.61	0.544	-.8827259	.4652001
totalar~2006	.070732	.2006401	0.35	0.724	-.3225153	.4639793
product~2006	-.079245	.139866	-0.57	0.571	-.3533773	.1948874

household~2006	.6315082	.3851036	1.64	0.101	-.123281	1.386297
_cons	-1.918266	4.619668	-0.42	0.678	-10.97265	7.136117
Peace						
gender2012	-.6345064	.3905924	-1.62	0.104	-1.400053	.1310407
agein2012	1.227335	1.077447	1.14	0.255	-.8844234	3.339093
town2012	-.8791087	.5931178	-1.48	0.138	-2.041598	.2833809
idpscamp2012	.8702683*	.4723992	1.84	0.065	-.0556171	1.796154
fareeg2012	-4.458137***	.6830344	-6.53	0.000	-5.79686	-3.119414
damra2012	-4.529011***	.6272366	-7.22	0.000	-5.758372	-3.299649
married2012	.4262583	1.469369	0.29	0.772	-2.453652	3.306168
divorced2012	1.074224	1.627013	0.66	0.509	-2.114664	4.263111
widow2012	.6768354	1.53061	0.44	0.658	-2.323106	3.676776
khalwa2012	.1548703	.4759342	0.33	0.745	-.7779437	1.087684
basic2012	.4675151	.435299	1.07	0.283	-.3856553	1.320685
secondry2012	-.0007654	.6023297	-0.00	0.999	-1.18131	1.179779
univers~2012	-.019392	.6396346	-0.03	0.976	-1.273053	1.234269
hhfamil~2012	.0731455	.5337826	0.14	0.891	-.9730493	1.11934
securit~2012	-.0354624	.2817137	-0.13	0.900	-.5876112	.5166864
totalar~2012	.0153539	.20092	0.08	0.939	-.378442	.4091499
product~2012	-.0938709	.1242678	-0.76	0.450	-.3374312	.1496895
hhtotalexp~2	-.1059679	.4838744	-0.22	0.827	-1.054344	.8424086
_constant	2.257364	6.443556	0.35	0.726	-10.37177	14.8865

8. Income from secondary jobs (secondary activities)

Equation	Obs	Parms	RMSE	"R-sq"	chi2	P
Pre conflict	202	17	2.814761	0.1865	49.42	0.0001
Conflict	202	18	3.610589	0.2272	69.17	0.0000
Peace	202	18	3.770356	0.2857	86.73	0.0000
Pre conflict						
Variables	Coef	Std. Err.	z	P>|z|	[95% Conf	Interval]
gender2000	.1401472	.4588186	0.31	0.760	-.7591208	1.039415
agein2000	-.9225496	.9967808	-0.93	0.355	-2.876204	1.031105
town2000	-.8482816	.5788284	-1.47	0.143	-1.982764	.2862013
idpscamp2000	(dropped)					
fareeg2000	.7152925	.5199965	1.38	0.169	-.303882	1.734467
damra2000	1.530281	1.91254	0.80	0.424	-2.218229	5.278791
married2000	-.1581859	.6781794	-0.23	0.816	-1.487393	1.171021
divorced2000	-1.008619	2.009205	-0.50	0.616	-4.946587	2.92935
widow2000	.5963357	2.771111	0.22	0.830	-4.834942	6.027613
khalwa2000	2.632613***	.534113	4.93	0.000	1.585771	3.679455
basic2000	.3024601	.5618596	0.54	0.590	-.7987645	1.403685
secondry2000	-.1182772	.6912742	-0.17	0.864	-1.47315	1.236595
univers~2000	2.569927*	1.425791	1.80	0.071	-.224572	5.364426
hhfamil~2000	-.7377701	.9027285	-0.82	0.414	-2.507085	1.031545
securit~2000	.640028	2.839896	0.23	0.822	-4.926066	6.206122
totalar~2000	-.2537034	.4526771	-0.56	0.575	-1.140934	.6335274
product~2000	.1837205	.2529457	0.73	0.468	-.312044	0.679485
household~2000	.6411112	.7124066	0.90	0.368	-.7551801	2.037403
_cons	.7849185	6.432393	0.12	0.903	-11.82234	13.39218
Conflict						

gender2006	.1181293	.5772263	0.20	0.838	-1.013213	1.249472
agein2006	-.5039218	1.260636	-0.40	0.689	-2.974723	1.96688
town2006	.1680342	.9922976	0.17	0.866	-1.776833	2.112902
idpscamp2006	1.826409*	.9711828	1.88	0.060	-.0770742	3.729893
fareeg2006	2.90215***	1.085755	2.67	0.008	.7741099	5.03019
damra2006	3.322013***	1.01603	3.27	0.001	1.33063	5.313396
married2006	.2420591	1.144597	0.21	0.833	-2.00131	2.485428
divorced2006	-1.399703	1.538428	-0.91	0.363	-4.414967	1.615561
widow2006	.8073988	1.271177	0.64	0.525	-1.684062	3.29886
khalwa2006	1.818461***	.6730493	2.70	0.007	.4993086	3.137613
basic2006	-.1774892	.6651012	-0.27	0.790	-1.481064	1.126085
secondry2006	-1.311691	.8112231	-1.62	0.106	-2.901659	.2782768
univers~2006	-1.917654*	1.072344	-1.79	0.074	-4.01941	.1841011
hhfamil~2006	-1.816333*	.9717922	-1.87	0.062	-3.721011	.0883449
securit~2006	-.5076016	.6550731	-0.77	0.438	-1.791521	.776318
totalar~2006	.1550489	.3789361	0.41	0.682	-.5876521	.89775
product~2006	-.0803601	.2571065	-0.31	0.755	-.5842795	.4235594
househo~2006	2.465609***	.7245846	3.40	0.001	1.045449	3.885769
_cons	-14.4589***	7.683761	-1.88	0.060	-29.5188	.6009904
Peace						
gender2012	.1064111	.5984353	0.18	0.859	-1.066501	1.279323
agein2012	-.0646927	1.490819	-0.04	0.965	-2.986645	2.85726
town2012	-1.622233*	.9121853	-1.78	0.075	-3.410083	.1656177
idpscamp2012	-.1887259	.7714325	-0.24	0.807	-1.700706	1.323254
fareeg2012	1.998732*	1.080451	1.85	0.064	-.1189128	4.116376
damra2012	3.074813***	.9313348	3.30	0.001	1.24943	4.900195
married2012	-.4413679	2.78745	-0.16	0.874	-5.90467	5.021934
divorced2012	-1.759338	3.114053	-0.56	0.572	-7.862769	4.344094
widow2012	-.8647929	2.907682	-0.30	0.766	-6.563744	4.834158
khalwa2012	.6995777	.7770465	0.90	0.368	-.8234055	2.222561
basic2012	-1.140834	.7160504	-1.59	0.111	-2.544267	.2625986
secondry2012	-2.405515**	.9611535	-2.50	0.012	-4.289341	-.5216888
univers~2012	-2.775465***	1.046534	-2.65	0.008	-4.826635	-.7242955
hhfamil~2012	-1.165724	.9021867	-1.29	0.196	-2.933977	.6025297
securit~2012	-.5619786	.5483982	-1.02	0.305	-1.636819	.5128621
totalar~2012	.0013381	.376574	0.00	0.997	-.7367335	.7394096
product~2012	-.1027861	.2292648	-0.45	0.654	-.5521369	.3465647
hhtotalexp~2	3.964691***	.9268369	4.28	0.000	2.148124	5.781258
_cons	-30.34743**	10.98192	-2.76	0.006	-51.8716	-8.823253

9. Income from household members share

Equation	Obs	Parms	RMSE	"R-sq"	chi2	P
Pre conflict	202	17	2.563899	0.1991	49.80	0.0000
Conflict	202	18	3.576646	0.1366	30.20	0.0355
Peace	202	18	3.892835	0.0809	21.07	0.2760
Pre conflict						
Variables	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
gender2000	-.5865636	.4257148	-1.38	0.168	-1.420949	. 247822
agein2000	-.064976	.9309948	-0.07	0.944	-1.889692	1.75974
town2000	.173311	.5566732	0.31	0.756	-.9177483	1.26437

idpscamp2000	(dropped)					
fareeg2000	-.3677875	.4839323	-0.76	0.447	-1.316277	.5807022
damra2000	2.06558	1.849701	1.12	0.264	-1.559767	5.690927
married2000	-.3278144	.6539022	-0.50	0.616	-1.609439	.9538103
divorced2000	-.0923114	1.94871	-0.05	0.962	-3.911712	3.727089
widow2000	.192728	2.687081	0.07	0.943	-5.073853	5.459309
khalwa2000	-1.566285***	.5065298	-3.09	0.002	-2.559065	-.5735047
basic2000	-.0092878	.5379735	-0.02	0.986	-1.063696	1.045121
secondry2000	-.6140959	.6610146	-0.93	0.353	-1.909661	.6814688
univers~2000	-5.063084***	1.36886	-3.70	0.000	-7.746	-2.380169
hhfamil~2000	1.81511**	.8609404	2.11	0.035	.1276977	3.502522
securit~2000	5.557627**	2.75187	2.02	0.043	.1640618	10.95119
totalar~2000	.078443	.4358136	0.18	0.857	-.775736	.9326219
product~2000	-.2525901	.2439015	-1.04	0.300	-.7306283	.2254481
househo~2000	1.515669**	.6887295	2.20	0.028	.1657835	2.865554
_cons	-13.30453**	6.16882	-2.16	0.031	-25.39519	-1.213864
Conflict						
gender2006	-1.683874***	.6221907	-2.71	0.007	-2.903346	-.4644029
agein2006	1.463305	1.314239	1.11	0.266	-1.112556	4.039166
town2006	-.9297321	1.147184	-0.81	0.418	-3.178172	1.318707
idpscamp2006	-1.249182	1.16826	-1.07	0.285	-3.53893	1.040566
fareeg2006	.0834545	1.252192	0.07	0.947	-2.370797	2.537706
damra2006	-.9324201	1.14277	-0.82	0.415	-3.172209	1.307369
married2006	1.796985	1.45413	1.24	0.217	-1.053057	4.647027
divorced2006	2.846559	1.97549	1.44	0.150	-1.02533	6.718449
widow2006	1.582792	1.619287	0.98	0.328	-1.590952	4.756537
khalwa2006	-.7295514	.7633199	-0.96	0.339	-2.225631	.7665281
basic2006	-.8977783	.7636786	-1.18	0.240	-2.394561	.5990043
secondry2006	-.1846467	.9155777	-0.20	0.840	-1.979146	1.609853
univers~2006	-.513899	1.275828	-0.40	0.687	-3.014476	1.986678
hhfamil~2006	.1854279	1.133865	0.16	0.870	-2.036907	2.407763
securit~2006	.6411594	.8555226	0.75	0.454	-1.035634	2.317953
totalar~2006	-.3890014	.4841603	-0.80	0.422	-1.337938	.5599353
product~2006	.2324011	.3227185	0.72	0.471	-.4001155	.8649178
househo~2006	1.739148*	.9299461	1.87	0.061	-.083513	3.561809
_cons	-16.60829*	9.229697	-1.80	0.072	-34.69817	1.48158
Peace						
gender2012	-2.091636***	.6660744	-3.14	0.002	-3.397118	-.7861545
agein2012	1.548203	1.583675	0.98	0.328	-1.555742	4.652149
town2012	-.2543134	1.034887	-0.25	0.806	-2.282655	1.774028
idpscamp2012	-.1176323	.8992315	-0.13	0.896	-1.880094	1.644829
fareeg2012	1.529271	1.23948	1.23	0.217	-.9000659	3.958608
damra2012	.3326812	1.032028	0.32	0.747	-1.690057	2.355419
married2012	-4.647489	3.537114	-1.31	0.189	-11.58011	2.285127
divorced2012	-3.513008	3.982572	-0.88	0.378	-11.31871	4.29269
widow2012	-4.753711	3.694034	-1.29	0.198	-11.99388	2.486463
khalwa2012	.1033711	.8955778	0.12	0.908	-1.651929	1.858671
basic2012	-.142319	.8317241	-0.17	0.864	-1.772468	1.48783
secondry2012	.1188986	1.112383	0.11	0.915	-2.061332	2.299129
univers~2012	-.7499597	1.23588	-0.61	0.544	-3.172241	1.672321

hhfamil~2012	1.212415	1.058284	1.15	0.252	-.8617833	3.286613
securit~2012	-.3689777	.7112195	-0.52	0.604	-1.762942	1.024987
totalar~2012	.137075	.4749686	0.29	0.773	-.7938463	1.067996
product~2012	-.1716828	.2864092	-0.60	0.549	-.7330346	.3896689
hhtotalexp~2	1.32039	1.187062	1.11	0.266	-1.00621	3.646989
_cons	-10.25001	13.40051	-0.76	0.444	-36.51452	16.0145