University of Khartoum

Faculty of Economic and Social Studies

Department of Economics

Poverty and Economic Growth in Sudan

During 1986-2000

A thesis Submitted in Partial Fulfillment of the
Requirement for MSc. Degree in Economics

By:

Yousif Mohamed Ahmed Bashir El Tahir

Supervised by:

Dr. Fadia Khaleil Hassan

August 2006
Acknowledgement

It goes without saying that a study such as this could not have been undertaken without the assistance of a large number of individuals and institutions alike. If I desist from writing here long list of names, it is not because my indebtedness is smaller or less warmly acknowledged, but because it is so widely diffused.

I would to express sincere appreciations to Dr. Fadia Khalel, who supervised my MSc. thesis and gave generously her time and knowledge throughout the various stages of this work. I’m also grateful for my wife for her encouragement and support during difficult circumstances. I would also like to thank Dr. Kabashi Sulieman, who contributes by providing solutions to some econometric problems. I’m also grateful for my sister and brother for their support and provision of good academic environment.

It is impossible to express adequately gratitude to my uncles Eng. Abdel Rahaman Bashir El Tahir and Utz. Yousif Bashir El Tahir who represents supreme supervisors for my education and carrier and always shows everlasting patients and understanding to push me forward for success throughout my live.

I owe a great debt to my colleague Miss. Wissal Awad Mohamed Khair for her invaluable help, voluminous contribution and unfailing encouragement in the harsh days of the study and examinations. I also thank Miss. Faiza Awad, who was in charge of International Institutions section for her contribution and substantial help in econometric analysis. Thanks should also go to Miss. Amal El Kabeer for her tolerance in availing much time for me to study.

I also thank Mr. El Amin Abu El Gasim, who gave much time and help me in data analysis and results interpretations. To all of them I would like to express deep gratitude and deep appreciations.
List of contents

<table>
<thead>
<tr>
<th>Item</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of Tables</td>
<td>I</td>
</tr>
<tr>
<td>List of Figures</td>
<td>II</td>
</tr>
<tr>
<td>Abstract</td>
<td>III</td>
</tr>
<tr>
<td>Chapter one: Introduction</td>
<td>1- 4</td>
</tr>
<tr>
<td>Chapter two: Patterns of Economic Growth and Poverty in Sudan</td>
<td>5- 24</td>
</tr>
<tr>
<td>Chapter three: Literature Review</td>
<td>25-31</td>
</tr>
<tr>
<td>Chapter Four: Research Methodology and Data</td>
<td>32-42</td>
</tr>
<tr>
<td>Chapter Five: Poverty Growth Nexus</td>
<td>43-61</td>
</tr>
<tr>
<td>References</td>
<td></td>
</tr>
</tbody>
</table>
### List of Tables

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Table (3:1), Head count index, selected years, 1987-1998</td>
<td>6</td>
</tr>
<tr>
<td>2. Table No. (3:2), Population (millions) living on less than $1 per day, Selected years.</td>
<td>6</td>
</tr>
<tr>
<td>3. Table No. (2:3), GDP Structure During 1986 – 2002</td>
<td>14</td>
</tr>
<tr>
<td>4. Table No. (2:4), GDP Composition in Sudan in 1955/1956</td>
<td>14</td>
</tr>
<tr>
<td>5. Table (2:5), Poverty Trends during 1968 – 1978</td>
<td>17</td>
</tr>
<tr>
<td>6. Table (2:6), Poverty in Sudan during 1986 – 1993</td>
<td>19</td>
</tr>
<tr>
<td>7. Table (2:7), Poverty in Sudan During 1993 – 1996</td>
<td>20</td>
</tr>
<tr>
<td>8. Table (4:1), Headcount Index during 1986-2000</td>
<td>39</td>
</tr>
<tr>
<td>10. Table (4:3) Gini growth rates for different periods and locations</td>
<td>40</td>
</tr>
<tr>
<td>11. Table (4:4), the distribution patterns in Sudan During 1986 – 2000</td>
<td>41</td>
</tr>
<tr>
<td>12. Table (4:5), Per-capita Income During 1986-2000</td>
<td>42</td>
</tr>
<tr>
<td>13. Table (5:1), Poverty Growth Response</td>
<td>44</td>
</tr>
<tr>
<td>14. Table (5:2), Poverity Growth and distribution Responses</td>
<td>46</td>
</tr>
</tbody>
</table>
# List of Figures

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Figure (3:1), Global Economic Growth Trends.</td>
<td>8</td>
</tr>
<tr>
<td>2. Figure (3:2), the Global poverty trends during 1987-1998.</td>
<td>9</td>
</tr>
<tr>
<td>3. Figure (3:3), Sudan Volatile Economic Growth during 1983-2003</td>
<td>10</td>
</tr>
<tr>
<td>4. Figure (5:1), Recursive Estimation for the Rural Model</td>
<td>47</td>
</tr>
<tr>
<td>5. Figure (5:1), Recursive Estimation for the Urban Model</td>
<td>48</td>
</tr>
<tr>
<td>6. Figure (5:1), Recursive Estimation for the National Model</td>
<td>48</td>
</tr>
</tbody>
</table>
Abstract

The controversial issue of poverty in the Sudan has received great importance in line with the same momentum around the globe. On the other hand, economic growth as a major factor affecting poverty rates is also received great focus in Sudan.

This research is about economic growth and poverty in Sudan which is expected to tackle the strong perception that poverty rates are increasing, while, the national statistics register high economic growth. This paradoxical situation was very provoking to me to address the issue.

Poverty concept has developed from a mere lack of income to the concept of deprivations in terms of economic provisioning, political and cultural aspects. Around the world, poverty rates were found to move negatively with economic growth. Thus, the research studied growth effects on poverty benefiting from elasticity approach.

The research objectives were to see the reasons behind increasing poverty rates while GDP remain high and accordingly, propose policy options and recommendations. In order to do this, I regressed the number of people living below poverty line with per-capita income to get the elasticity to growth and also did multiple regression analysis for the number of people living below poverty line and per-capita income and inequality.

Generally, there seems to be some sort of paradox between economic growth and poverty in Sudan since the effect of inequality is very influential. We also found that the elasticities obtained were very small and its effect on poverty reduction will be very small. The results of the research also show that the response of rural poverty to growth is less than urban one.

The research looks into plausible explanation for the problem of paradox between economic growth and poverty in Sudan. In that context, its found that poverty response to Gini is higher than response to growth, thus, the mal-distribution is the main factor behind the phenomena. It was evident from the analysis that inequality is very high in the different sectors. Based on those results, I proposed some policy options that would help to redistribute income in the productive sectors in addition to propose some government interventions to enhance the provision of services and enhance the human capital which will latter improve the prospects for better income and welfare in the future.
لا يوجد نص يمكن قراءته بشكل طبيعي من الصورة المقدمة.
Chapter One
Introduction

1.1 Introduction:

Poverty, especially from the vantage point of eradication, should be defined in terms of the generation of low level of human welfare, best understood as a failure of human capability (UNDP, 1997a). In this perspective, poverty is almost synonymous to powerlessness. Powerlessness manifests itself in a lower level of satisfaction of basic needs, and more importantly, in lack of access to, and control over, capital: physical, financial, human and social. This characterization of poverty helps reveal processes of poverty generation and reproduction and, hence, informs policy formulation for poverty alleviation and eradication.

The word “poverty” is actually beyond the concept of income poverty. It is a multidimensional concept, thus in the perspective of human development, poverty is more than a lack of income. The rediscovery of human development, though late, has been revolutionary in placing a human dimension in economic development progress. The primary and the ultimate goal of development is to enlarge human choices, no matter how infinite, diverse and dynamic they are. Thus, the difference in concept and emphasis between traditional economic models and the discovered human development paradigm is that while, the former is confined to the enlargement of only one human choice “income”, the latter embraces the enlargement of all human choices in the economic, social, cultural and political spheres. Therefore, human poverty is about human choices being deprived (deprivation), while human development is human choices being enlarged (El Tahir M. Nur, 2003, “Income and Human Poverty in Sudan: an empirical assessment”).

In the view of the human development paradigm, in which income poverty represent a major part, growth is necessary for human development. But the context of human development paradigm, development can be measured not only in terms of what we
achieved economically (economic growth) but, ultimately in terms of what has happened to us (economically, culturally, socially and politically) as a result of what we have achieved such that, the present progress should not jeopardize the well-being of the future generations.

In Sudan, it is found that the casual wage rate in Khartoum is 800 SDD, less than the equivalent of a dollar per day for a family of four. The rate is lower in other urban areas. However, work is not guaranteed in the rural areas. It is usually available seasonally for 4-6 months a year only at an average of 400 SDD. A number of non-monetary indicators, which are known as poverty correlates, such as primary school enrollment rates and malnutrition among children under 5 also suggest high levels of poverty (CEM for Sudan 2003).1

According to National Account sources, GDP growth rate averaged 3.8 percent per annum during 1990-95, with marked fluctuations and during 1996-00 the growth rate accelerated averaging about 6.6 percent per annum. Furthermore, the government policies since early nineties have focused on boosting growth and reducing poverty. However, part of the target is accomplished, but the extent to which economic growth performance during the nineties impacted positively on poverty remains to be questionable.

In theory, the relationship between growth and poverty is negative. In practice, developed countries primarily have high growth rate followed by low rate of poverty among their citizens as in Europe and the United States. However, growth is not the only one factor that has influenced progress in reducing poverty because, changes in inequality has also strong independent explanatory power. But generally, countries that have been successful in terms of economic growth are also very likely to be successful in reducing poverty.2

In addition to this brief introduction, the rest of the chapter highlights the research problems in section two, the research objectives in section three, the research hypothesis/questions in section four and finally the content of the research in section five.

---

1The Country Economic Memorandum is a joint World Bank and Government of the Sudan (GOS) document illustrate Sudan’s socio-economic, political situation every ten years.
2 Michael Bruno, Martin Ravalion, and Lyn Squire, (1995); Equity and Growth in Developing Countries
1.2. Research Problem:

As stated in the introduction, GDP growth rates averaged 3.8 percent per annum during 1990-95, and were accelerated during 1996-00 with an average of 6.6 percent per annum. On the other hand, poverty non-monetary indicators were also worsening. The increasing GDP rates with rising Poverty in Sudan were subject to a prolonged controversy. Part of this dispute is the joint workshop (held in Khartoum, August 2002) between World Bank and participants from government officials, NGOs and national experts to discuss the Country Economic Memorandum for Sudan. In this workshop, some argued that (especially the World Bank experts) poverty in Sudan is not severe as in India, for example, where you can smell and touch poverty. Meanwhile, the local experts view is that “poverty exists and is severe but the outstanding social solidarity system is hiding a huge part of the phenomena”. Finally, the participants reached a consensus in line with the view of national experts that poverty is persisting despite high economic growth. Therefore, the question of why poverty is not decreasing while growth rate is increasing still remains unanswered.

1.3. Research Objectives: as poverty is very acute and hinder Sudan’s development process, the study will focus on the following objectives:

1. Examine a strong perception that says the poverty levels are increasing while GDP growth remains.
2. Examination of the main reasons behind the poverty growth nexus.
3. Provide policy options to enable policymakers to form an efficient poverty reduction program.

1.4. Research Hypothesis/Questions: the researcher makes the following two hypotheses:

1. Poverty levels have been increasing simultaneously with GDP growth which indicates an incidence of uneven distribution of income generated in the country.
2. As inequality increases, poverty rates become less responsive to growth in average incomes.

1.5. Contents of the thesis:
The research is organized into five chapters. As chapter one is displayed above, the second chapter shows the patterns of economic growth and poverty in Sudan and worldwide. In this chapter, we understood that the pattern of global economic growth and poverty move in the opposite direction while, the case of Sudan is found to be unique where the situation is that poverty rates were increasing when GDP remains high. Chapter three contains the literature review on issues including: inequality and growth, growth and poverty, the effects of economic growth and inequality on poverty and overview of methodology used in explaining the effects of economic growth on poverty. On this chapter I found that many researchers have substantial contributions to interpret the relation between economic growth and poverty as well as inequality. The relation between economic growth and inequality were found to be unsystematic as high inequality sometimes associated with high economic growth and vice versa. On the other hand, many case studies proved very strong relation from growth to reduce poverty.

In chapter four, the researcher will show the methodology as well as data sources. The methodology used concentrates on the concept of poverty growth elasticity, and due to the importance of inequality, the researcher also tackled the effects of inequality on growth to complete the model. Therefore, the test will be done in two separate processes by; (i) regressing the log of people living below poverty line with mean income (simple regression) and (ii) regressing the log of the proportion of people living below poverty line with the mean income and the Gini index (multiple regression). The data on the mean income is available, but data on poverty and inequality requires researcher’s own calculations to generate time-series data using the growth rate principle.

Finally, chapter five displays the results of the model as well as tackling the issue of poverty growth nexus and also consists of recommendations and provides policy options for poverty reduction purposes. Regarding the main empirical findings, it’s noticeable
that in the first model, the response of rural poverty to growth in per-capita income is less than that of the urban poverty which indicates that inequality is high in the rural areas. In the second model, the important empirical result is that the elasticity to Gini is greater than to the mean income which indicates that poverty levels change elastically to Gini than to the per-capita income. Since the researcher found that inequality has an enormous effect of poverty situation, the policy implications are focused on redistribution of income. The recommendations includes; prudent agricultural policies that will redistribute land and lead to increase in yields, investment in rural infrastructure particularly, better roads that facilitate commodity mobilization. In line with other pro-poor sectors, the researcher proposed some policy options including; increase education coverage on a path towards reaching MDGs and continued improvement in water supply and sanitation in order to enhance the situation of significant amount of people drinking water and environmental health.
Chapter Two

Patterns of Economic Growth and Poverty in Sudan

2. 1. Introduction

This chapter will address the patterns of economic growth and poverty by reviewing the economic growth in real terms and have an overlook on poverty levels and incidence in Sudan. More focus will be put on per capita income, since a relation is always observed between poverty levels and per capita income growth. Furthermore, the sectoral contribution to GDP growth will also be reviewed to see where income is concentrated and what was the effect on poverty situation. This chapter will also review the global economic growth and poverty levels and see how income growth affects the poverty phenomena worldwide. The rest of the chapter includes section two that displays the aggregate poverty trends, section three tackles global economic growth trends, section four reviews the economic growth in Sudan and finally reviewing the causes and poverty trends in Sudan.

2.2. Aggregate Poverty Trends:

Chen and Ravallion, (1995) stated that both the global share of population and the absolute number of people living on less than one dollar a day (table 2:1 & 2:2) declined substantially in the mid-1990s, after increasing earlier in the decade. The decline in the numbers is almost exclusively due to the reduction in the number of poor people in East Asia, most notably China. But progress was partly reversed by the Asian financial crisis, or was at least stalled, as in China. In south Asia, the incidence of poverty (the share of population living in poverty) also declined moderately through the 1990s, but not sufficiently to reduce the absolute number of the poor, which was rising steadily between 1987 and 1996. Also, in Africa, the share declined (at least after 1993), while the number increased. The estimates indicate that Africa is the region with the largest share of people living below $1/day. In Latin America, the share of the poor people remained roughly constant over the period, while the numbers generally increased. In the countries of the former Soviet Union Bloc, poverty rose markedly, both as a share, and in numbers.
### Table (2:1)

**Global Head Count Index, selected years, 1987-1998**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>East Asia and Pacific (excluding china)</td>
<td>26.6</td>
<td>27.6</td>
<td>25.2</td>
<td>14.9</td>
<td>15.3</td>
</tr>
<tr>
<td>East Europe and Central Asia</td>
<td>0.2</td>
<td>1.6</td>
<td>4.0</td>
<td>5.1</td>
<td>5.1</td>
</tr>
<tr>
<td>Latin America and the Caribbean</td>
<td>15.3</td>
<td>16.8</td>
<td>15.3</td>
<td>15.6</td>
<td>15.6</td>
</tr>
<tr>
<td>Middle east and North Africa</td>
<td>4.3</td>
<td>2.4</td>
<td>1.9</td>
<td>1.8</td>
<td>1.9</td>
</tr>
<tr>
<td>South Asia</td>
<td>44.9</td>
<td>44.0</td>
<td>42.4</td>
<td>42.3</td>
<td>40.0</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>46.6</td>
<td>47.7</td>
<td>49.7</td>
<td>48.5</td>
<td>46.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>28.3</td>
<td>29.0</td>
<td>28.1</td>
<td>24.5</td>
<td>24.0</td>
</tr>
<tr>
<td>Excluding China</td>
<td>28.5</td>
<td>28.1</td>
<td>27.7</td>
<td>27.0</td>
<td>26.2</td>
</tr>
</tbody>
</table>

*Source: Chen and Ravallion, forthcoming.*

### Table No. (2:2)

**Global Numbers of Population (millions) living on less than $1 per day, selected years**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>East Asia and pacific (excluding china)</td>
<td>417.5</td>
<td>452.4</td>
<td>431.9</td>
<td>265.1</td>
<td>278.3</td>
</tr>
<tr>
<td>East Europe and central Asia</td>
<td>1.1</td>
<td>7.1</td>
<td>18.3</td>
<td>23.8</td>
<td>24.0</td>
</tr>
<tr>
<td>Latin America and the Caribbean</td>
<td>63.7</td>
<td>73.8</td>
<td>70.8</td>
<td>76.0</td>
<td>78.2</td>
</tr>
<tr>
<td>Middle east and North Africa</td>
<td>9.3</td>
<td>5.7</td>
<td>5.0</td>
<td>5.0</td>
<td>5.5</td>
</tr>
<tr>
<td>South Asia</td>
<td>474.4</td>
<td>494.1</td>
<td>505.1</td>
<td>531.7</td>
<td>522.0</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>217.2</td>
<td>242.3</td>
<td>273.3</td>
<td>289.0</td>
<td>290.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1183.2</td>
<td>1276.4</td>
<td>1304.4</td>
<td>1190.6</td>
<td>1198.9</td>
</tr>
<tr>
<td>Excluding China</td>
<td>879.8</td>
<td>916.0</td>
<td>956.0</td>
<td>980.6</td>
<td>985.7</td>
</tr>
</tbody>
</table>

*Source: Chen and Ravallion, forthcoming.*
2.3. Global Economic Growth Trends:

According to World Development Statistics reference, the global economic recovery continued after constrained by Asian crisis and the real GDP growth has increased during the nineties with GDP growth ranging between 4.8% and 1.6% with an average of 3.5% during the period 1991 –2001. During this period, it is most important to note that 2001 has witnessed the lowest GDP growth with 1.6%.

The Global economic recovery continued to gain momentum as the real world growth GDP rate accelerated from 3.0 percent in 2002 to 3.9 percent in 2003 and expected to peak at 4.6 percent in 2004. Increased, business investment spending due to the continued easing of fiscal and monetary policies in high-income countries, which reduced interest rates to their historic lows, was the main drive of the global recovery. The recovery renewed confidence in international financial markets, leading to a considerable decline in bond market risk spreads that fueled a strong rally in equity prices. Low interest rates and increased market liquidity triggered a rebound of capital flows to developing countries. Against this background, global trade is expected to continue growing, thereby leading to a further strengthening of the recovery of the economic growth.

The following figure (2:1) shows the global economic growth patterns.
Generally, we can say that the global poverty trends were affected very much by the GDP growth. From table (3:1) we notice that the headcount index for the whole world has benefited very much from the continued economic recovery which started earlier in the nineties. Total headcount index for poverty in the world (excluding china) has increased from 28.3% in 1987 to 29% in 1990. However, the effects of successive economic growth have impacted enormously in poverty levels worldwide and the headcount index for the world population has decreased greatly thereafter. The following figure (2:2) displays the world poverty trend during 1987-1998.
Given the clear evidence from the world experience with regard to poverty growth response, one would say that the relation is quite obvious for an ordinary observer. The naked eye will not ignore the reduction in the percentage of people living below the poverty line as the result of increase in growth rate for the years under study. The rest of the chapter will look into Sudan’s case compared to that of the world and more focus will be on whether the sustained economic growth accomplished since early nineties affect the poverty situation in the country.

2.4 Overview of Economic Growth in Sudan:

Endowed with vast and rich agricultural land and considerable animal as well as capable human resources, Sudan was expected to achieve high rates of growth after independence. However, these expectations were not realized for the greatest part of the last four decades. After, enjoying moderate rates of growth and economic stability till 1975, Sudan began to enter into deep structural problems. From 1976 to 1989, Sudan’s
GDP grew at a trend rate of 2 percent. On the other hand, population was growing at around 2.8 percent per annum. This has resulted in reducing the real per capita GDP by 11 percent over the fourteen years period\(^3\).

According to Ali A. (2002), Sudan has alternating sub-periods of positive and negative growth. The negative growth periods are the longest ones but with relatively low negative growth rates. By contrast, positive growth sub-periods are shorter with relatively high per capita growth rates. For the whole period, there was a positive but insignificant growth rates\(^4\).

The details show that during the negative growth sub-periods there were fluctuations around the sub-period trend. Thus, for example, during the negative growth episode of 1960-1973 real per capita GDP increased for the years 1965, 1966, 1970 and 1971. Similarly, during the 1984-1994 episodes real per capita GDP increased for the years 1986, 1987, 1989, 1991, 1992 and 1994. During these two periods, the magnitude of rates of growth also varied. Overall, Sudan’s growth record was one of volatile growth. The following figure (2:3) illustrates the economic growth volatility.

According to the National Accounts, GDP growth rate averaged 3.8% per annum during 1990-1995, with marked fluctuations. The growth rate accelerated averaging about 6.6 percent per annum during 1996-2003. It is also noteworthy that agriculture has historically been the engine of growth and has typically accounted for an average of 4% of GDP during this period. Moreover, agriculture has spillover effects on GDP also through services and manufacturing sectors such as agro-industries through trickle down effect. About 80 percent of the labor force is employed in agriculture and related activities. Agriculture is, therefore, the main dominant of year-to-year changes in poverty levels and the food security situation throughout the country. The weaknesses of the agricultural sector performance before 1990s were a result of failed macroeconomic and sectoral policies that distorted incentives and left agricultural infrastructure without resources.

Figure (2:3)
Volatile Economic Growth

---

The new products, including oil, have entered the production base and petroleum has emerged as a major source of economic growth and revenues for the government. In terms of direct impact on Sudan’s GDP, the government is developing methods for oil sector value added, but these have not yet been completed.

However, although agriculture continues to be the most important production sector, the industrial sector is also becoming important for growth in urban areas.

2.5. Glimpses Over Sectoral Contribution to GDP:

The structure of GDP has changed drastically between the time of independence and thereafter. While agriculture contributed about 60% of total production in Sudan and industry accounted for 5 percent and services to about 35%, agriculture only represent 38 percent of the GDP after mid-nineties. The expansion of the industrial sector took place at the expense of the agricultural sector. The industrial sector income distribution is relatively mal-distributed compared to that of agricultural sector. Because, the industrial sector depends very much on entrepreneurship and the numbers of employed persons were very few. However, contribution of sectors to GDP will be further elaborated because it is of vital importance for equality structure and thus poverty levels.

With regard to agricultural sector, the recent statistics from the National Accounts indicate a shift toward increased industrial production. However, according to table (2:3), agriculture accounted for 39 percent of GDP in 2001. Among the three main agricultural systems, irrigation contributes to 27 percent of agricultural GDP, and it produces most of the cotton, wheat, sorghum, sugar cane, legumes, peanuts and grain forage. This sector also suffered many constraints and challenges due to many factors such as poor infrastructure and management, magnitude and pace of the implementation of the economic reform that was, though late, reduced its contribution to GDP not exceeding 15 percent. On the other hand, rain-fed agriculture depends on two modes of production one is mechanized and the other is traditional. This sub-sector has registered appreciable growth due to both macroeconomic policies and favorable climatic conditions. Its contribution to GDP had risen from 18 percent in the 1980s to 33 percent in the 1990s
with the highest contribution from livestock 21 followed by cash crops 6.9 percent, forestry 3.2 percent and lastly mechanized production 2.5 percent. This fact donates that output structure and growth of real output had moved in favor of plant and animal traditional sector, both of which had shown steady output increase since 1991/92. However, productivity of the sector is still very much low compared to minimum international standards. Furthermore, production of some traditional crops such as cotton and Gum- Arabic have declined, with livestock maintaining its dominant position accounting for about half of the GDP from the agricultural sector.

By the end of the 1980s, the economy has entered into deep structural problems. Prominent of them was the major budgetary imbalance represented in excessive expenditure, growing at a much higher rate than revenues. This had resulted in escalation of the budget deficit with increased borrowing from the banking system. These unfavorable conditions have impacted negatively on agriculture performance afterwards.

The weak contribution from the manufacturing sector by 1 percent of GDP in the 1950s encourage the government to take a leading role in the industry, a policy, then cherished by successive governments through implementation of import substitution strategies aimed at industrial growth and transformation. Therefore, since early 1960s the public sector became the main investor in industry. The share of industry and services had increased to 18 percent and 43 percent of GDP respectively. Such orientation did not observe the major difference in consumption patterns at sectoral, geographical and social levels, and between income groups. In addition to the high physical capital-intensity relative to labor intensity. The growing situation in industrial sector taking no care to labor-intensive technology, has been a bad prognosis for distribution status in the country, which though late, worsen the situation in Sudan in terms of poverty and equality.

The services sector includes all non-agricultural and non-industrial activities. The most important of these is transport, communications, commerce, banking, education, housing,

---

7 Least Developed Countries 2000; Document prepared by Government of Sudan to participate in LDCs Forum.
health and other social services. The contribution of the services sector to GDP was estimated at 50 percent in the year 1973/74 and 45 percent in 1990/91. The high GDP contribution from the services sector, given that few people benefited from this sector, also give a sense of voluminous deprivation in most parts of the country. In other words, almost all the services are directly or indirectly benefited the urban people and the rural people who are out of reach of subsidized services are not making use of the service facility. Nevertheless, the contribution of the service sector to the GDP had progressively decreased in the 1990s due to policies favoring the productive sectors through provision of financing, various administrative, financial and monetary incentives, reduction of government spending and budgetary control aimed at rationalizing aggregate demand.

Generally speaking, going back to the time of independence the production structure of the Sudan economy could be summarized in table (2:4). Not surprising, the economy was dominated by agriculture, which contribute to about 61 percent of GDP. There was virtually no industrial sector to speak of (contributed to about 1.1% of GDP) with the service sector accounted for remaining 37.9% of GDP.

In spite of this relatively high growth, evidence seems to suggest that its effect did not trickle down to considerably reduce poverty or expand formal employment opportunities. However, poverty reduction, unemployment and promotion of productive employment still remain as major challenges for the social and economic policy.
Table No. (2:3)

GDP Structure During 1986 - 2002

<table>
<thead>
<tr>
<th>Years</th>
<th>Agriculture</th>
<th>Industry</th>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986-1990</td>
<td>40.2</td>
<td>11.6</td>
<td>48.2</td>
</tr>
<tr>
<td>1991-1995</td>
<td>40.8</td>
<td>10.6</td>
<td>48.6</td>
</tr>
<tr>
<td>1996-2000</td>
<td>40.5</td>
<td>14.0</td>
<td>45.5</td>
</tr>
<tr>
<td>2001</td>
<td>38.9</td>
<td>18.5</td>
<td>42.6</td>
</tr>
<tr>
<td>2002</td>
<td>39.1</td>
<td>18.3</td>
<td>42.6</td>
</tr>
</tbody>
</table>

Source: Central Bureau of Statistics.

Table No. (2:4)

GDP Composition in Sudan in 1955/1956

<table>
<thead>
<tr>
<th>Sector</th>
<th>GDP At current prices (millions L.S)</th>
<th>GDP share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>172.6</td>
<td>60.7</td>
</tr>
<tr>
<td>Industry</td>
<td>3.0</td>
<td>1.1</td>
</tr>
<tr>
<td>Construction</td>
<td>16.2</td>
<td>5.7</td>
</tr>
<tr>
<td>Transport</td>
<td>37.6</td>
<td>13.2</td>
</tr>
<tr>
<td>Public utilities</td>
<td>1.0</td>
<td>0.4</td>
</tr>
<tr>
<td>Government</td>
<td>17.2</td>
<td>6.0</td>
</tr>
<tr>
<td>Real Estate</td>
<td>8.2</td>
<td>2.9</td>
</tr>
<tr>
<td>Other</td>
<td>28.4</td>
<td>10.0</td>
</tr>
<tr>
<td>Total</td>
<td>284.2</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Ali A. “Sudan’s Economic Growth performance”
2.6. Poverty Trends in Sudan:

To measure the trends of poverty in a systematic way one needs a continuous flow of household-level data pertaining to income and expenditure. The first household budget survey carried out in Sudan was in 1968 followed by the second and last one in 1978. In 1992 the ILO funded the migration and labor force survey. Also, in 1992 the Social Solidarity Fund funded the poverty line survey.

This section will review the pattern of poverty in different periods. However, before we have a look on poverty trends let us glimpse the factors behind poverty in Sudan.

2.6.1. Causes of Poverty in Sudan:

The causes of rural poverty in Sudan are to be found in the sustained urban bias of the development strategies adopted since independence. This tended to neglect the traditional agricultural sector where the vast majority of population lives. This has resulted in high rural to urban migration unaccompanied by either increased productivity in the sector or sufficient urban development to generate the necessary urban employment opportunities. As a result of this unbalanced urban/rural development structure, the traditional agricultural sector continued to be the major source of limited supply of unskilled labor to urban centers thereby swelling the ranks of the informal labor markets where there is little employment at or near the subsistence wage level. This has also exerted additional pressures on the already limited and over stretched social services and facilities. These trends were further aggravated by those displaced by both natural (rainfall failures leading to famines) and man made disasters. Tahir Nur, (1992).

In addition and throughout the period since independence, there has been a clear pro-urban bias in policies adopted by successive Governments. These manifested themselves in the provision of a reasonably adequate social and economic infrastructure not matched by similar facilities in the rural areas. These pro-urban biases were further strengthened by the long running policies of subsidizing a variety of goods consumed by urban population. However, such goods were out of reach of many urban poor particularly, the recent migrants from rural areas who represent the poorest of the urban poor who are manually employed in the marginal jobs in the informal sector. But, it must be pointed
out that most of these consumption subsidies have been abolished under the recent economic reform programs, though electricity and piped water are still subsidized such that piped water is cheaper in urban than in rural areas. (Tahir Nur’ 1992).

The effects of urban bias were further aggravated by government marketing policies for some of the major export crops mostly grown in rural traditional sector, where export monopolies very much along the lines of the old marketing boards, were established for Gum Arabic, oilseeds (abolished in late 1980s) and more recently livestock. This marketing structure has adversely affected farmers’ incomes, their incentives to increase production and their chances to raise their living standards. In the context of poverty alleviation, the current marketing structure for those exports needs radical reform.

As discussed above, causes of poverty are more complex. Part of the explanation is certainly the lack of rural focus in the various development efforts since independence. The other part of the explanation relates to the basic characteristics of the traditional sector. In other words, it is vulnerability that constitutes the major cause of impoverishment and deprivation.

The unstable climatic conditions of rural Sudan, with their characteristics of frequent rainfall variability, have from time to time affected rural producers to the periodic oscillation from feast to famine situations. A basic strategy of rural producers was and continue to be hoarding of surpluses in good years to transcend the hardships of lean years.

Furthermore, conflicts in Sudan, as in elsewhere where, represent the most devastating factor to nation’s infrastructure and welfare. Civil strife which took place in various parts of the country since independence, represents one of the most ravaging factors and has a tremendous impact on poverty situation in the country. Southern Sudan was the most severe conflict and has been counted as the most destructive elements of development in the whole country. The war has also resulted in numerous cases of Internally Displaced Persons (IDPs) and returnees whose situation became aggravated after they were put in bad stage of living.
2.7. Magnitude and Poverty Trends in Sudan:

It is most important to note that the poverty trends differ very slightly and sometimes very greatly between groups. In general terms, the number of the poor people in rural areas has increased with a rate nearly equal to the rate of population increase. And the number of the poor urban household has increased at a higher rate than the urban population growth rate. This situation was created due to immigration that took place from the rural areas to urban centers responding to the economic incentives consistent with the objectives of maintaining industrial revolution centered in urban sector. However, as we mentioned earlier, the industrial sector was not able to absorb the rural migration. An elaboration of poverty situation will be presented in the sub-periods below depending mainly on studies made by Ali Abdel Gadir: “Poverty and Structural Adjustment Programs in Sudan”.


The trend of head count index (the ratio of people living below a certain poverty line) in Sudan over this period (1968-1978) had been increasing at an annual rate of 0.5% (table 2: 5). Over the same period, the number of rural households had been growing at a rate equal to the rural population growth rate while the number of poor urban households had been growing at a rate higher than the urban population growth rate. Over the same period, poverty gap ratio in the whole country had been decreasing at an annual growth rate of 0.64%. This shows that although poverty had been spreading at an annual rate of 0.5% over the period, the economic conditions of the poor had improved over the same period.
### Table (2:5)

**Poverty Trends during 1968 - 1978**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>1968</th>
<th>1978</th>
<th>Growth rate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Head count Index (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>62.68</td>
<td>64.17</td>
<td>0.23</td>
</tr>
<tr>
<td>Urban</td>
<td>15.9</td>
<td>20.51</td>
<td>2.58</td>
</tr>
<tr>
<td>Sudan</td>
<td>51.59</td>
<td>54.26</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Poverty Gap Index (%)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>28.11</td>
<td>30.56</td>
<td>0.84</td>
</tr>
<tr>
<td>Urban</td>
<td>4.56</td>
<td>8.58</td>
<td>6.53</td>
</tr>
<tr>
<td>Sudan</td>
<td>24.66</td>
<td>23.12</td>
<td>-0.64</td>
</tr>
</tbody>
</table>

*Source: Ali A. G. (1994)*

### 2.7.2. Poverty Trends During (1978-1986):

Ali’s analysis of this period shows that over the period (1978-1986) the headcount index increased from 54.3% in 1978 to 77.8% in 1986 at an annual rate of increase 4.6% and the rural urban poverty disparity was that the rural headcount index for urban increase from 20.5% in 1978 to 52.9% in 1986. However, the rural incidence of poverty (83.1) remained higher than the incidence of urban poverty (53%). However, the period had witnessed that the incidence of urban poverty had been growing at a higher annual rate 12.6% than the rural (3.3%). Meanwhile, the number of poor families in Sudan increased from 1.7 millions in 1978 to 2.7 million in 1986 with an annual rate of 6.2% which is higher than the population growth rate. Up to 1986, the number of the poor rural families exceeded the number of the urban poor families by 2.33 millions but growth rate of the poor urban families exceeded that of rural by 9.4% percentage points (Nur, 2003:5).

The observed high pace of the incidence of urban poverty (12.6%) over the period (1978-1986) was attributed to the Structural Adjustment Programs (SAPs) and the urban bias development policies (i.e. the development that overlooks the rural areas without creating enough urban jobs) coupled with urban poverty growing faster than rural poverty.
Sudan poverty gap index, over the period (1978-1986) increased from 23.1% in 1978 to 45.4% in 1986 at an annual rate of increase of 8.8%. This implies that, given the incidence of poverty, the income gap ratio increased from 42.6% in 1987 to 58.4% in 1986 at an annual rate of increase of 3.9%. By contrast, during the period (1968-1976) the incidence of poverty has been increasing at an annual rate of 0.5% but poverty and income gap ratio has been decreasing at an annual rates of 0.64% and 1.2% respectively (improve economic conditions of the poor). Comparing the two periods, we notice that the poverty levels, both in urban and rural, have increased sharply. Therefore, the situation has become more and more complicated and the existing social safety nets (Zakat and other social funds) were unable to address the phenomena at that time.

During this period, the incidence of poverty has also increasing. The national headcount index increased from 77.8% in 1986 to 91.4% in 1992. The rural and urban headcount indexes increased from 82.1% to 93.2% and from 52.9% to 84.4% respectively. In addition to, the number of poor households increased from 2.71 millions, in 1986 and to 3.43 millions in 1992 at an annual rate of increase of 4% (Nur, 2003:7). The poverty trend is shown below in table (2:6).

Table (2:6)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>1986</th>
<th>1993</th>
<th>growth rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head Count Index (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>83.12</td>
<td>93.16</td>
<td>1.26</td>
</tr>
<tr>
<td>Urban</td>
<td>52.86</td>
<td>84.43</td>
<td>3.9</td>
</tr>
<tr>
<td>Sudan</td>
<td>77.8</td>
<td>91.41</td>
<td>1.7</td>
</tr>
<tr>
<td>Poverty Gap Index (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>51.67</td>
<td>62.61</td>
<td>1.4</td>
</tr>
<tr>
<td>Urban</td>
<td>24.38</td>
<td>47.78</td>
<td>2.9</td>
</tr>
<tr>
<td>Sudan</td>
<td>45.43</td>
<td>59.35</td>
<td>1.7</td>
</tr>
</tbody>
</table>


The national poverty gap index increased at an annual rate of 1.7% over the period (1986-1992). The rural and urban poverty indices increased at an annual rate of 1.4% and 2.9% respectively. The national, urban and rural mean income of the poor as a ratio of the poverty line decreased over this period from 0.42 to 0.33, from 0.54 to 0.43, and from 0.38 to 0.22 respectively. This indicates that poverty had been deepened all over the country, particularly in the rural areas.

Generally, the result shows that there are three main poverty indicators namely, the head count index, the income gap index and poverty gap index, had been increasing at an
increasing rates all over the period. It is also revealed that structural rural and urban forms of poverty exist in Sudan since 1986 and continued to exist at higher rates. Again, the continued urban bias characterized development in Sudan, overlooked the agricultural sector, lead to reduction in rural livelihoods. The result is that high rates of rural migration took place without creating sufficient employment opportunities for migrant, coupled with displacement resulting from natural and manmade disasters has worsened the situation.

The public spending on social services like health and education was reduced and the poor are obliged to pay for this essential services, putting more pressure on their earnings in the formal sector, defected their coping efforts to catch up with the rising cost of living.

2.7.4. Poverty during 1993-1996:

During this period, the incidence of poverty has also increased. However, unlike the previous periods the rates of increase were not very severe. The national headcount index increased from 91.41% in 1993 to 92.65% in 1996. During the same period, the rural and urban headcount indexes increased from 93.16% to 94% and from 84.43% to 85% respectively(Ali, 1994 and Nader Fergany 1998). The poverty trends as shown below in table (2:7).
Table (2:7)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>1993 (i)</th>
<th>1996 (ii)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Head count Index (%)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>93.16</td>
<td>94.0</td>
</tr>
<tr>
<td>Urban</td>
<td>84.43</td>
<td>85.0</td>
</tr>
<tr>
<td>Sudan</td>
<td>91.41</td>
<td>92.65</td>
</tr>
<tr>
<td><strong>Poverty Gap Index (%)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>62.61</td>
<td>72</td>
</tr>
<tr>
<td>Urban</td>
<td>47.78</td>
<td>58</td>
</tr>
<tr>
<td>Sudan</td>
<td>59.35</td>
<td>69.90</td>
</tr>
</tbody>
</table>

(ii) Nader Fargany, 1996.

The national poverty gap index increased at an annual rate of 5% over the period (1993-1996). The rural and urban poverty gap index increased at an annual rate of 4% and 6% respectively during the same period. Compared with the previous period, the result shows that the three main poverty indicators namely, the head count index, the income gap index and poverty gap index, had been increasing with relatively low rates except the poverty gap index which has increased at much higher rate than the previous periods.

After the study conducted by Fergany (1997), there is a serious vacuum in the data about poverty and other human indicators that have direct or indirect relation with surveys. Therefore, this period depend very much on perceptions and no recognized survey oriented research is conducted in this field. However, several attempts were undertaken to tackle the issue. These attempts were not able to cover that huge gap. Nevertheless, they were able to produce an acceptable results and arguments that could be used as an indicator for the poverty phenomena in Sudan. The most interesting attempt was
conducted by Eltahir M. Nur “Human Poverty in Sudan (2000); Magnitude and Distribution” then updated in 2003.

El Tahir Nur said that poverty in the human development perspective manifests itself in the deprivation of lives. These areas of deprivation include deprivation in survival, deprivation in knowledge, and deprivation in economic provisioning. The methodology involves the identification and measurement of human poverty indicators that are directly related to each area of deprivation. The individual poverty indicators are aggregated in a composite poverty index for each area of deprivation.

Deprivation In Survival Index (P1):
This is a composite of poverty index of the following three human poverty indicators, which are directly related to deprivation in survival.

P11:   the probability that a person will die before age 40.
P12:   the probability that a child will die before his fifth birthday.
P13:   the probability that an infant will die before his first birthday

Deprivation In Knowledge Index (P2):
This is a combined index of the following four human poverty indicators that are directly related to the deprivation in knowledge:

P21:   people with no access to media – radio and T.V - (%)
P22:   adults (15+) who are unable to read and write (%)
P23:   children at the age of basic education who dropout of basic education (%)
P24:   adolescents at the age of secondary education who dropout of secondary education (%)

Deprivation In Economic Provisioning Index (P3):
This is a combined index, which is closely related to income inability to attain the minimum component of a decent standard of living. it is a proxy for income poverty and it combines the following poverty indicators:

P31:   people with no access to electricity (%)
P32: people with no access to safe drinking water.
P33: people with poor sanitation (no toilets) (%)
P34: people dependent on biomass energy (firewood and charcoal)(%)
P35: people with incomes below the food poverty line (%).

It is important to note that while the twelve individual poverty indicators used (p11 – p35) are head count indices, the aggregated poverty indices p1, p2, and p3 by virtue of being composite indices are not head counts. Each combined poverty index can be interpreted as the proportion of the population affected by the number of poverty indicators used.

Applying this methodology to nationwide data pertaining to the twelve poverty indicators, two broad types of result could be observed. The first type of results is a state – level rural–urban profile of poverty for each of the three areas of deprivation. States are ranked and grouped by poverty levels rural–urban differences in poverty are also demonstrated. The second type of results present a sector – rural – urban profile of poverty for the whole country using a rural – urban distribution of the national means of poverty for the three areas of deprivation. Such a sectoral map of poverty is useful in targeting poverty through the economic and social sectors.

Analyzing size and distribution in deprivation in survival, the study indicates that deprivation in survival is all over the country but particularly high in the rural areas. While the rural national averages of means or the probabilities that a person will die before age 40 (p11), a child will die before age 5 (p12), and an infant will die before his (her) first birthday are 20.2%, 10.5%, and 7.2%, the urban national means of the same poverty indicators are 19.4%, 9.95% and 6.89% respectively.

Looking at the state rural ranking of poverty in annex (1), we note that the top five states in rural poverty are the Red Sea, the blue Nile, Kassala, South Kurdufan, and North Darfur (arranged in order of poverty). The group means of the three poverty indicators (29.66%, 15.52%, and 10.52%) are higher than the national means (23.59%, 12.3%, and 8.334%) of the same poverty indicators. The Southern States are not in the rural ranking of poverty because of the lack of data. Looking at the state urban ranking of poverty we
quickly note that while North Darfur dropped out of the top five poor states, Malakal State joined the top urban poor states. We also note that the States with the least rural deprivation in survival are El Giezira, the Northern, the River Nile, North Kordufan, West Kordufan, and South Darfur—arranged by the order of being the least poor state. For urban deprivation in survival, Wau State joined the least poor State. Khartoum State is among the middle poor States. The probability that a person will die before age 40 (p11) is the largest component of the deprivation survival index through out the States—a great loss of productive human capital.

**In the context of size and distribution of the deprivation in knowledge**, the study shows that rural—urban differences in the deprivation in knowledge is striking. The rural national deprivation is almost double the urban national deprivation in knowledge. While the rural national (excluding the South) means of inaccessibility to media, adults illiteracy rate, basic education drop-out rate, and secondary education dropout rate are 67.2%, 27.4%, 29.8%, and 53.6%, the urban national (including the South) means of the same poverty indicators are 42.4%, 15.8%, 26.8%, and 27.4% respectively. Therefore, priority in the re-education of the deprivation in knowledge should go to rural areas. Provision of basic and secondary education service is vital for the reduction in the deprivation in knowledge because education dropout rate is the major component of the deprivation in knowledge index in all the States and across the board of rural and urban location. The rate of inaccessibility to media (radio and T.V) is the largest component of the rural deprivation in knowledge index.

Upon ranking the states by the basic education dropout rate, the States of the Blue Nile, North Kordufan, West Darfur, North Darfur, and South Kordufan come top of the states—level rural profile of the deprivation in knowledge. Their rural group means of inaccessibility to media (75%), adults illiteracy rate (29.3%), basic education dropout rate (69.6%), and secondary education dropout rate (71.1%) are higher than the national rural means (67.2%, 27.4%, 49.8%, and 53.6%) of the same poverty indicators respectively. For the national urban poverty ranking, while the blue Nile and west Darfur states retain their positions among, Wau, and Malakal replaced north Kordufan north Darfur, as south Kordufan as top poor urban areas in knowledge. While rural Khartoum is among the
middle poor state in knowledge, urban Khartoum is among the least poor states in knowledge. In view of these results, basic, secondary, and adults education services should be extended to the rural areas with emphasis on the top five poor states.

On the other hand the size and Distribution of the Deprivation in Economic Provisioning as indicated in the study demonstrates significant rural – urban differences in the deprivation of economic provisioning. Rural national deprivation in economic provisioning is higher than the urban national one. The rural national means of the proportion of people with no access to electricity (75.5%), with no access to safe drinking water (46.7%), with poor sanitation (46.5%), dependent on the use of biomass energy (79.6%), below food poverty line (55.9%) are higher than the urban national means except for the head count index (80.9%) and the proportion of people dependent on the use of biomass energy (82.8%) which are higher in the urban areas. However, the rural national mean of the composite poverty index (59%) is higher than urban national mean of the composite poverty index (54%). Therefore, rural areas rank number one in the deprivation of economic provisioning. On average, while the proportion of people who have no access to electricity (75.5%) and that of those who depend on the use of biomass energy (79.6%) are the highest rural poverty indicators the latter (82.8%) and the proportion of those who are below food poverty line (80.9%) are the highest urban poverty indicators.

The result of this study indicates the poverty situation in the country using new definition for poverty. Despite that such results could be beneficial to may work, the previous data I had were obtained using different methodology. Therefore, such data could be used from the perspectives of human development but the useful information that I can take is the trend of poverty whether it is increasing or other wise.
Chapter Three
Literature Review

3.1. Introduction

This chapter will focus on reviewing the studies on the important issue of economic growth and poverty. However, although the prime objective of this research is to address the relationship between poverty and economic growth, the important relation between poverty and many factors necessitate reviewing other relations. There is a scant literature written on the decomposition of changes in poverty into growth and distributional effects. Therefore, I found it beneficial to address first what has been written on the relations between poverty, inequality and living standards with special emphasis on the controversial relationship between poverty and economic growth.

The rest of the chapter consists of three more sections. Section two looks into the literature on inequality and growth, section three tackles literature on growth and poverty and finally reviews the effects of growth and inequality on poverty.

3.2. Inequality and Growth:

Simon Kuznets (1955) investigated the relationship between per capita income and inequality in a cross-section of countries. He found that there was an inverted-U pattern, that is, inequality first increased, and then decreased, as per capita income increased. Many researchers have doubted the hypothesized relationship, and Kuzents’ inverted-U has been exposed to a large number of tests over the years.

While earliest models, such as Harrod-Domar Models, predicted that greater inequality would lead to higher growth rates, there was, during the 1960s, a shift in focus towards the opposite effect: Can greater inequality lead to a lower level of overall growth? Empirical evidence from both industrialized and less developed countries has tended to confirm the negative impact of inequality on growth. Persson and Tabellini (1994) found
such a relationship in cross-countries data. These authors interpreted the results in a political economy context. Their argument being that when inequality is high, the medium voter will push for high (distortionary) taxes on the better-off, which will have disincentive effects on efforts and saving, which would then reduce growth.

A third possible channel from inequality to growth is via social conflicts. Alesina and Perotti (1996) argued that inequality leads to increased political instability, as the case of Sudan, which tends to reduce efficiency and investment levels and then growth. However, it is not easy to generalize about the impact of change in pattern of distribution upon growth. The impact can be positive or negative to the political and social context. Ravallion and Chen (1997) and Matin Ravallion (2000) also did not find any systematic relationship between the rate of growth and inequality.

Deininger and Squire (1998) provided the most comprehensive attempt so far, to test Kuznets hypothesis. They systematically collected a data set of better quality than the previous researchers had. They went on to investigate whether there was a link from fast growth to increasing inequality, and again they did not find any systematic evidence in favor of such a relationship. Rapid growth was associated with growing inequality as often as it was associated with falling inequality or with no changes at all.

Banerjee and Duflo (1999) provide a simple but elegant model of the inter-generational accumulation of wealth in which individuals start with an endowment from the previous generation but face a borrowing constraint. In this model, individual wealth at one date is a concave function of the individual’s endowment, given a declining marginal product of capital. Thus, mean wealth in the economy at one date is quasi-concave function of the vector of endowments left over from the previous period. It follows from the well-known properties of concave function that higher initial inequality will entail lower future wealth for any given initial mean growth.

Based on the above brief review, the effect on economic growth and inequality can be summarized as follows:
First: the effect can go either way, contingent on a number of factors. Second: there is little convincing evidence that growth alters distribution in a systematic way. Third: in the absence of a clear relationship, there is a case for pursuing a policy aimed at as rapid growth as possible.

3.3. Growth and Poverty:

Countries that have been successful in terms of economic growth are also very likely to be successful in reducing poverty. In this context, Ravallion (1997) studied the effect of growth in average incomes on poverty during the sixties. He made two comparable surveys across countries in the period 1984 through 1994. He confirms that absolute poverty measures typically respond elastically to growth, but also that the elasticity varies markedly with the initial Gini index. A country with a low initial Gini index of about 0.25 can expect elasticity of about -3.3, while a high inequality country with a Gini of, say, 0.60 could expect an elasticity of only about -1.8.

Ravallion and Chen (1997) also found a very strong relationship between growth and poverty. They distributed their observation into four quadrants, according to the direction of changes in mean consumption and poverty rate. Virtually all observations fell either in the quadrants with rising poverty and falling mean-income or in the quadrants with falling poverty and increasing mean incomes. Empirically, there is thus a very strong relationship from per capita income growth to poverty reduction. However, while the incomes of the poorest are positive to growth, this may hide important dynamics among the poor.

Other studies shows that growth in per capita incomes has an indirect effect on poverty. For example some studies show that health improves with higher per capita incomes. In this respect, Kakwani (1993) investigated the relationship between income levels and welfare indicators such as life expectancy at birth, literacy and the infant mortality rates. He found a strong relationship, particularly in the poorer countries, between these indicators and per capita growth. The study illustrated that the higher the improvement in
per capita income growth, the more declining will be the indicators. Anand and Ravallion (1993) also found a significant relationship between national income and life expectancy and mortality indicators. Pritchett and Summers (1996) and Filmer and Pritchett (1997) also found a highly significant effect from income to a range of health indicators.

However, as pointed out by Appleton and Teal (1999) there have been cases where structural adjustment loans led to growth without having any significant positive effect on health indicators. The relationship is thus complicated. But it seems that economic growth tends to improve the health of the population, though the extent of the improvement depends on the growth process. A process that leads to reduction in poverty, and to the improvement in the provision of health services, will most likely have a positive effect on health indicators. In addition, especially when considering the irreversible effects of failing to make such investments, long-term intergenerational effects of healthcare and education are an important reason for promoting social sector investments, despite tight current fiscal constraints.

On the other hand, Michael B., Martio Ravallion and Lyn Squire (MRS) in 1997 work on the question that “do the poor lose, either absolute or relative, from policies that promote aggregate economic growth? Does the answer differ between the middle income newly industrialized economies and low income developing countries”? The claim has been made that the growth-oriented reform policies of the kind usually advocated by the International Financial Institutions (IFIs) have worsened the lot of the poor. They (MRS) argued that the key components linking growth as a necessary condition for sustained poverty reduction, and adjustment, (stabilization plus structural reform) as a necessary condition for aggregate growth recovery, come out strengthened from the recent growth crisis and associated reform efforts. Obviously, necessity is not sufficiency and we do not argue that growth always benefits the poor or that non-of the poor loses from any pro-growth policy reform. But they do content that macroeconomic adjustment and structural reform are of the policy changes advocated as promoting growth increase inequality.

It’s also very crucial to say that the responsiveness of various measures of poverty, to growth and changes in distribution, differs between urban and rural areas. Using
household budget survey data from 16 Sub-Saharan African Countries, Ali and Thorbecke (1998) provide evidence that the rural poverty is more responsive to growth than urban poverty. Urban poverty seems to be more responsive to changes in income distribution.

At the end one can say the even if there is strong relationship from GDP growth and poverty reduction it might be the case that countries with initially severe inequality may be less successful at reducing poverty.

3.4. The Effects of Growth and Inequality on Poverty:

The recent literature review dealing with the relationship between economic growth, income distribution, and poverty has generally failed to find any systematic link from fast growth to increasing inequality. Some recent empirical evidence has tended to confirm the negative impact of inequality on growth. Others have found that the level of initial income inequality is not a robust explanatory factor of growth, though high inequality in the distribution of assets, such as land, has a significantly negative effect on growth.

Growth is not the only factor that has influence progress in reducing poverty, albeit it is an important one. Regressions for rates of poverty reduction against rates of growth still leave a sizable share of the variance in the country performance unaccounted for by growth. Some of this is measurement error. But measured changes in inequality have strong independent explanatory power; indeed, rates of poverty reduction respond even elastically to rates of change in Gini index than they do to the mean. Such argument was further strengthened by the study conducted by Martin Ravalion (1996) by regressing the change in the log of the proportion of the population living on less than one dollar per day, on the change in the log of the survey mean and the change in the log of the Gini index across twenty countries with two reasonably comparable observations in the period 1984 through 1992. The countries that included in the study have similar poverty and growth situation. He (Martin Ravalion) obtained an average elasticity to the mean of \(-2.28\) (\(t=6.07\)) while the average elasticity to the Gini is \(3.86\) (\(t=3.20\)). Even seemingly modest changes in overall inequality can entail sizable changes in the incidence of poverty. When combined with the tests of Kuznets hypothesis discussed above, one can
postulate a number of other factors that matter through their influence on inequality, including education, the trade regime, and sectoral composition of growth.

Therefore, a pro-poor growth strategy does not have to only focus on economic growth, but also be combined with an active policy of income distribution. However, there may be trade-offs. If more rapid reduction in poverty can be achieved through reductions in inequality, then distributional policy takes place in greater priority; but on the other hand, if greater levels of inequality appear to secure rapid growth leading to faster poverty reduction, then there may be relative tolerance of distributional inequalities. Thus, the relationship between growth and inequality are important from a policy perspective, and has been highly controversial since the 1950s.
3.5. Overview of Methodologies used:

As discussed above the relation between poverty and economic growth has witnessed various attempts and diverse methodologies were used in measuring effects of economic growth on poverty. One of the most famous analysis in that respect was conducted by Kakwani (1990-1993) and reviewed by Ali. This methodology depend on analyzing the relationship between poverty and growth depending on the general determinants of poverty that indicate poverty as a function of poverty line \( z \) and average income \( u \) and income distribution \( m \) as follows:

\[
P = p(u, z, m) \hspace{1cm} (3:1)
\]

By taking total differentiation of the poverty index and assuming a constant poverty line (Kakwani) we get:

\[
P^* = e u^* + c m^* \hspace{1cm} (3:2)
\]

Where \( c \) & \( e \) are the elasticities for poverty index with average income and income distribution and \( * \) above the parameter indicate the relative change.

Equation (3:2) split the change in poverty index into two effects; (i) growth effect assuming constant income distribution function and; (ii) the effect of income distribution assuming constant average income of the community. This proposal requires the computation of elasticities of poverty index for average income and inequality. Kakwani has found mathematical expressions for those elasticities using available data on income and inequality at a point in time as follows:

\[
e = - a \frac{p(a-1) - p(a)}{p(a)} < 0 \hspace{1cm} (3:3)
\]

\[
c = e + \frac{p(a-1)}{p(a)} \frac{av}{z} \hspace{1cm} (3:4)
\]
From equation (3:3) and (3:4) we notice that \( p(a-1) \) is greater than \( p(a) \) which indicates that the elasticity of poverty index with average income is negative. In other words, the increase in average income will reduce poverty.

This framework is simple due to simplicity of data required to test the model at a point in time. However, we notice that differentiating equation (3:1) assuming constant poverty line was very arbitrary and thereby, will not display the whole picture. In order to develop Kwakani’s results Ali tried to get the elasticity of poverty using what is called Foseter Index as shown in the equation below:

\[
\frac{Z}{P(a)} \frac{dp(a)}{dz} = \frac{a[p(a-1) - p(a)]}{p(a)} \quad \text{ ................. (3:5)}
\]

To proof equation (3:3), (3:4) & (3:5) see Ali, (1994).

Based on the above developments, the equation that measure poverty index behavior over time is as follows:

\[
P^*(a) = -ez^* + ey^* + cm^* \quad \text{.................. (3:6)}
\]

\[e(y^* - z^*) + cm^*
\]

Where (*) above the parameter show the relative change over time (growth rates).

This method has been developed further by Ravallion & Wahbi (1991) that enable people afterwards to conduct before and after studies for poverty and to evaluate the policy implication in that respect (Structural Adjustment Programs SAPs).

The methodologies conducted earlier by Ravallion, Kakowai & Ali require a considerable set of information regarding poverty line, inequality and income. Given the limited time and resources for this research, the researcher prefers to concentrate on the relation between growth, distribution and poverty by generating data from the available information on poverty and distribution.
Chapter Four
Research Methodology and Data

4.1. Introduction:
The purpose of the study is to see to what extent did Sudan benefit from the positive growth rates accomplished during the nineties in reducing poverty. The extent to which the growth rates benefit the poor depends on the elasticity of poverty to growth. Despite the fact that studying the response as pointed out earlier, entails the incorporation of other variables in the model, the scope of the study will be limited to tackling the relationship between poverty, per capita income and income distribution.

This chapter will display the methodology to be used in studying the poverty growth nexus as well as presenting the data to be used in the analysis. The problems of information on poverty require a lot of work to generate time series data to enable conducting the required tests. Therefore, the chapter will display in same details how such data was generated using growth rate principle.

In addition to this brief introduction, section two outlines the research methodology and section three is concerning the data and how it was generated.

4.2. The methodology:

It was noted in 3.4. page 28 in the literature review, experience showed that regressing the change in the log of the proportion of the population living on less than one dollar per day, on the change in the log of the survey mean and on the change in the log of the Gini index across twenty countries with two reasonably comparable observations in the period 1984 through 1992. Martin Ravalion obtained an average elasticity to the mean of –2.28 (t= 6.07) while the average elasticity to the Gini is 3.86 (t = 3.20). Even seemingly modest changes in overall inequality can entail sizable changes in the incidence of poverty.

Along the same lines, this research will focus on the relation between the proportion of people living below the poverty line and per capita income to maintain the elasticity to
the mean income and see how poverty index responds on growth. The effect of income
distribution is also considered to see the overall effect of these variables on poverty
phenomena. To try to capture these two indicators, the test will be done in two separate
steps by; (i) regressing the log of people living below poverty line with mean income
only and (ii) regressing the log of the proportion of people living below poverty line with
the mean income and the Gini index as illustrated below:

(i) Simple Regression Model:
In this model we regress the absolute people living below poverty line on the per-capita
income. The general format of the model will take the following form:

\[ P = p(\mu), \]

where

\( P \) is the headcount poverty index.

\( \mu \) is the per-capita income.

The expected relationship between the dependent variable \( P \) and the independent variable
\( \mu \) is such that \( p(\mu) < 0 \). This is to say that increases in per-capita income is expected to
reduce the absolute number of the poor since with the increase in income more people
will jump above the poverty threshold poverty line.

Since the prime objective of the research is to see the effect of growth in per-capita GDP
on poverty levels, we regress the log of the proportion of the population living below
poverty line on the log of per-capita income to get the elasticity to income using the
following equation:

\[
\begin{align*}
\text{Log } P_r &= \beta_r \log \mu \quad \text{------------------------ (4:1)} \\
\text{Log } P_u &= \beta_u \log \mu \quad \text{------------------------ (4:2)} \\
\text{Log } P_s &= \beta_s \log \mu \quad \text{------------------------ (4:3)}
\end{align*}
\]

Where:

\( P \) is the proportion of people living below poverty line.

\( \mu \) is the per-capita income.

\( \beta_i \) is the coefficient to be estimated (poverty growth elasticity).

\( r, u, \) and \( s \) stated for rural, urban and Sudan respectively.
(ii) Multiple Regression Model:

In this model we regress the number of people living below poverty line on the mean income and Gini Index. The functional form of the model will be given by the following:

\[ P = p(\mu, G), \]

where:

- \( P \) is as defined above.
- \( \mu \) is also as defined above.
- \( G \) is Gini index measure.

The expected signs of the model are such that \( P(\mu) < 0 \) and \( p(G) > 0 \). As we mentioned above for the first function \( \{ P(\mu) < 0 \} \), an increase in per-capita income is expected to reduce the absolute number of the poor since with the increase in income, more people will move above the threshold poverty line. Regarding the second function \( \{ p(G) > 0 \} \), the increase in the Gini index measure will raise the number of people living below poverty line, as high inequality increase poverty.

Using the methodology of regressing only poverty with mean income is confronting with several observations. Because, such causal relationship between poverty and economic growth may suffer from auto-correlation. Also, the problem of specification error is most likely to occur because the complete model should include other variables such as income distribution and poverty line as well, as noted in Ali (1994) model. Therefore, the absence of this variable will create the problem of specification error in the model.

Since time and resources are not adequately availed, this major shortcomings enforced me to enlarge the model by introducing one more variable only, that is other than per-capita income variables to reflect some essential effects on the phenomena like an income distribution measure. Thus, the new additional model will contain the regression of the proportion of people living below the poverty line on both per-capita income and the Gini index to see the overall effect of these two important variables and to get the elasticity to the mean income as well as the elasticity to the Gini. The two models could be illustrated by the following functional relationships:
\[
\begin{align*}
\log P_r &= \beta_{01} - \beta_{11} \log \mu + \beta_{21} \log G_r \tag{4:4} \\
\log P_u &= \beta_{02} - \beta_{12} \log \mu + \beta_{22} \log G_u \tag{4:5} \\
\log P_s &= \beta_{03} - \beta_{13} \log \mu + \beta_{23} \log G_s \tag{4:6}
\end{align*}
\]

Where: \( P, \mu, G, r, u, \) and \( s \) are as defined above and the \( \beta_{ij} \) are the parameters to be estimated.

For both models (simple and multiple regression), I will transform the data obtained into logarithms to solve linear model using the Ordinary Least Squares (OLS) method. I also used the econometrics views (E-views) package to analyze the relationship between per-capita income and poverty in aggregates for rural, urban and national level.

As the above linear models are expected to have some problems especially, autocorrelation problem, some measures to rectify the problem will be taken. Autocorrelation problem happened due to the errors occur in data entry, seasonality or measurement problems. There are many methods to detect the autocorrelation problem such as Jacko Bura Test (normal distribution) and Durbin Watson Stat. In order to solve the problem, researchers used different methods such as repeating the regression process using the moving averages as well as using the recursive estimator method. The recursive estimator is a graphical test where it locates the estimated error between two standard error bands. If the estimated error crosses the two bands of the standard error then autocorrelation is a problem and vise versa.

### 4.3. The data:

In chapter two, where I reviewed the pattern of economic growth and poverty in Sudan, it became clear that time-series information concerning per-capita income is available with considerable degree of accuracy but, the information on poverty and the pattern of distribution to cover time series data is not available. Poverty data was found in a fragmented way through the years 1968, 1978, 1986, 1993 and 1996. In order to put such data in time series format an extra exercise is needed. In the following we will explain
As well known, a natural exponential function can be used to estimate growth of any variable over time (see for example Chiang 1989). For example the exponential growth of a variable $A$ over time is expressed as:

$$ At = Ao e^{rt} \quad \text{(4.7)} $$

Where $At$ is the value of the variable at time $t$, $Ao$ is the base period value, $t$ is the time and $r$ is the rate of growth. Taking the natural log of both sides of equation yielding:

$$ \ln At = \ln Ao + rt \quad \text{(4.8)} $$

Since $\ln e$ is equal to unity, then differentiating (or alternatively regressing) $At$ with respect to $t$ will give $r$ as growth rate i.e.

$$ \frac{\partial \ln At}{\partial \ln t} = r \quad \text{(4.9)} $$

For short time intervals where degrees of freedom are not enough to apply regression analysis, equation 4.8 can be rewritten to enable the calculation of the growth rate of $A$ between two start periods in the following manner:-

$$ R = \frac{\ln At - \ln Ao}{T} \quad \text{(4.10)} $$

In this case $r$ represents the average annual of change of the variable $A$ over the period represented by the two points in time and $T$ is the number of years after the base period.

Applying the above to the case of the poverty headcount index $P$ we get:

$$ \alpha t $$

$$ P_t^* = P_t e^{\alpha t} \quad \text{(4.11)} $$

Where:

$P_t$ = poverty at the base period.

$P_t^*$ = poverty at the end of the period (second interval).

$\alpha$ = growth rate.

$T$ = number of years after the base year.

Applying equation (4.11) could be rewritten in log linear form as follows:
\[ \ln P_{t*} = \ln P_t + \alpha T \quad \text{------------------ (4:12)} \]

To get \( \alpha \) equation (4:12) could take the following form:

\[ \alpha = \frac{(\ln P_{t*} - \ln P_t) * 100}{T} \quad \text{------------------- (4:13)} \]

Accordingly, to get poverty growth rates for rural, urban and national poverty during the period 1993-1996 (values are obtained from table 2:7) would be obtained as follows:

\[ \alpha = \frac{(\ln P_96 - \ln P_93) * 100}{3} \]

where:
- \( P_93 \equiv \) poverty at the initial interval.
- \( P_96 \equiv \) poverty at the second interval.

1. growth rate for the rural (\( \alpha_r \); wherever \( r \) appear it refer to the rural) is as follows:

\[ \alpha_r = \frac{(\ln P_{r96} - \ln P_{r93}) * 100}{3} \]

\[ = (4.5432 - 4.5343)/3 \times 100 = 0.297 \]

2. growth rate for the urban (\( \alpha_u \); wherever \( u \) appear it refer to the urban) is as follows:

\[ \alpha_u = \frac{(\ln P_{u96} - \ln P_{u93}) * 100}{3} \]

\[ = (4.443 - 4.424)/3 \times 100 = 0.633 \]

3. growth rate for the urban (\( \alpha_s \); wherever \( s \) appear it refer to the Sudan) is as follows:

\[ \alpha_s = \frac{(\ln P_{s96} - \ln P_{s93}) * 100}{3} \]
Now we have shown the possibility of generating time series data for the headcount index for the period 1986-1996 using the above mentioned growth rates, there remains the problem of is completing the series up to 2000. In this respect, we are going to assume that poverty has been increasing over this period. So, what are the evidences that poverty has been increasing?

There are some important indicators, which are always used by poverty experts to see the poverty situation known as poverty correlates or non-monetary indicators. These include school enrollment rate, provision of health services and other health indicators like infant mortality rates.

In Sudan, a number of non-monetary indicators suggest high levels of poverty. The average primary school enrollment rate has only slowly increased, to about 58 percent in 2002 compared with about 50 percent at the beginning of the 1980s. Low ability for parents to make some payments and the need for children to contribute to household income have consequences for the education of children from poor homes, since even free public schools require parents to make some payments toward education. For the majority of Sudanese households, the payment of a significant contribution to basic education is a substantial burden (CEM for Sudan, 2003).

A more crucial poverty indicator is the health of children. Nutrition surveys suggest that malnutrition among children under five in all over Sudan is between 10 to 20 percent depending on the location. Such high malnutrition levels, children tend to suffer severe cognitive retardation that can not be compensated by subsequent feeding, and will therefore, reduce their productivity for life. Even if malnourished children enter the workforce at 15, their capacity to learn has been seriously impaired, making them susceptible to the vicious cycle of intergenerational poverty. These indicators also illustrate that poverty is increasing (CEM for Sudan, 2003).
Another health indicators such as infant mortality and maternal mortality suggest that efforts that the poor pursue to establish families are also subject to tragic and costly disappointments. Unless the access to basic health care for the poorest families is increased and its cost decreased, the cycle of poverty will repeat itself (CEM, 2003).

In addition, the result of a few recent surveys, though not poverty specific in focus or design, also underlines a widespread poverty in the country. The recent surveys are: the household survey 1992, the Safe Motherhood Survey (SMS) 1999 (carried out by the Central Bureau of Statistics in collaboration with the UNFPA) and the Multiple Indicators Cluster Survey and non-of these surveys covered the whole country.

Accordingly, the poverty trend could be assumed to be increasing at least at the same rate of growth for the period 1993 - 1996. Therefore, the poverty levels for rural, urban and national levels for the period 1997 – 2000 are assumed to increase by 0.297%, 0.633% and 0.333% respectively.

Using the above mentioned, poverty data for the period 1986 – 2000 is generated as shown in table (4:1):
<table>
<thead>
<tr>
<th>years</th>
<th>Rural</th>
<th>Urban</th>
<th>Sudan</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>83.12</td>
<td>52.86</td>
<td>77.80</td>
</tr>
<tr>
<td>1987</td>
<td>84.47</td>
<td>56.40</td>
<td>79.59</td>
</tr>
<tr>
<td>1988</td>
<td>85.85</td>
<td>60.91</td>
<td>81.42</td>
</tr>
<tr>
<td>1989</td>
<td>87.25</td>
<td>65.42</td>
<td>83.29</td>
</tr>
<tr>
<td>1990</td>
<td>88.67</td>
<td>69.93</td>
<td>85.21</td>
</tr>
<tr>
<td>1991</td>
<td>90.11</td>
<td>74.44</td>
<td>87.17</td>
</tr>
<tr>
<td>1992</td>
<td>91.58</td>
<td>78.95</td>
<td>89.17</td>
</tr>
<tr>
<td>1993</td>
<td>93.16</td>
<td>83.46</td>
<td>91.41</td>
</tr>
<tr>
<td>1994</td>
<td>93.44</td>
<td>83.71</td>
<td>91.82</td>
</tr>
<tr>
<td>1995</td>
<td>93.72</td>
<td>83.96</td>
<td>92.23</td>
</tr>
<tr>
<td>1996</td>
<td>94.00</td>
<td>84.21</td>
<td>92.65</td>
</tr>
<tr>
<td>1997</td>
<td>94.28</td>
<td>85.00</td>
<td>93.06</td>
</tr>
<tr>
<td>1998</td>
<td>94.56</td>
<td>85.26</td>
<td>93.48</td>
</tr>
<tr>
<td>1999</td>
<td>94.84</td>
<td>85.51</td>
<td>93.90</td>
</tr>
<tr>
<td>2000</td>
<td>95.13</td>
<td>85.77</td>
<td>94.32</td>
</tr>
</tbody>
</table>

Source: Own calculations.

It is important to mention the shortcomings of the data depicted in table (4:1) above. This data is inconsistent because it has been taken from different sources, no surveys were conducted and no solid computerized database exists. However, as we pointed out several times we had resort to this method to generate the required data.
Using the Gini ratios for wage laborers in urban and rural areas calculated by the ILO and a team from Ministry of Manpower and Administrative Reform illustrate that after the huge brain drain took place, Sudan has put upward pressures on wages for the remaining well-educated labor force. It may also mirror the large increase of very poor people in urban areas have unquestionably inequality and poverty. The following table (4:2) show the Gini ratios during the period 1968-1996.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>0.34</td>
<td>0.51</td>
<td>0.69</td>
<td>0.65</td>
</tr>
<tr>
<td>Urban</td>
<td>0.41</td>
<td>0.41</td>
<td>0.56</td>
<td>0.72</td>
</tr>
<tr>
<td>Total</td>
<td>0.41</td>
<td>0.50</td>
<td>0.61</td>
<td>0.74</td>
</tr>
</tbody>
</table>


Now we turned to the other independent variable, the time series information on G could be generated in the same manner which was used to generate data on poverty. Therefore, using the exponential function, the growth rate in the Gini index can be defined as:

\[ \theta = \frac{(\ln G_{t*} - \ln G_t)}{T} \times 100 \]  

(4:9)

Where:

- \(G_t\) ≡ Gini Index at the initial period (first interval).
- \(G_{t*}\) ≡ Gini Index at the end of the period (second interval).
- \(\theta\) ≡ growth rate.
- \(T\) ≡ number of years between the two intervals.

Using equation (4:9) and the information in table (4:2), the growth rates for Gini for rural, urban and the whole Sudan are given in the following table

<table>
<thead>
<tr>
<th>Description</th>
<th>Growth rates by periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>4.05</td>
</tr>
<tr>
<td>Urban</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>1.98</td>
</tr>
</tbody>
</table>
Then finally using the growth rates mentioned above, time series data for the Gini index were generated as shown in table (4.4) below:

### Table (4.4)
The Income Distribution Patterns in Sudan During 1986 - 2000

<table>
<thead>
<tr>
<th>Years</th>
<th>Rural</th>
<th>Urban</th>
<th>Sudan</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>0.61</td>
<td>0.50</td>
<td>0.56</td>
</tr>
<tr>
<td>1987</td>
<td>0.63</td>
<td>0.51</td>
<td>0.57</td>
</tr>
<tr>
<td>1988</td>
<td>0.65</td>
<td>0.53</td>
<td>0.59</td>
</tr>
<tr>
<td>1989</td>
<td>0.67</td>
<td>0.54</td>
<td>0.60</td>
</tr>
<tr>
<td>1990</td>
<td>0.69</td>
<td>0.56</td>
<td>0.61</td>
</tr>
<tr>
<td>1991</td>
<td>0.68</td>
<td>0.58</td>
<td>0.63</td>
</tr>
<tr>
<td>1992</td>
<td>0.68</td>
<td>0.61</td>
<td>0.65</td>
</tr>
<tr>
<td>1993</td>
<td>0.67</td>
<td>0.63</td>
<td>0.67</td>
</tr>
<tr>
<td>1994</td>
<td>0.66</td>
<td>0.66</td>
<td>0.69</td>
</tr>
<tr>
<td>1995</td>
<td>0.66</td>
<td>0.69</td>
<td>0.71</td>
</tr>
<tr>
<td>1996</td>
<td>0.65</td>
<td>0.72</td>
<td>0.74</td>
</tr>
<tr>
<td>1997</td>
<td>0.64</td>
<td>0.75</td>
<td>0.76</td>
</tr>
<tr>
<td>1998</td>
<td>0.64</td>
<td>0.78</td>
<td>0.79</td>
</tr>
<tr>
<td>1999</td>
<td>0.63</td>
<td>0.81</td>
<td>0.81</td>
</tr>
<tr>
<td>2000</td>
<td>0.62</td>
<td>0.84</td>
<td>0.84</td>
</tr>
</tbody>
</table>

Source: Own calculations using ILO and Ministry of Manpower data.

The above data on Gini depend very much on the assumption that distribution is worsening after the year 1996. However there are many evidence of inequality increase in the Sudan between the income groups and within the sectors.

Finally detailed data on national income are reproduced from Central Bureau of Statistics in table (4:4). As it’s clear from the table per-capita income fluctuated between positive and negative growth rates and was sustained at an average growth rate of 3.5% since 1991.
Table (4:5)

Per-capita Income During 1986-2000

<table>
<thead>
<tr>
<th>years</th>
<th>GDP at Constant Price Billion SDD</th>
<th>GDP Growth Rates %</th>
<th>Population size (Millions)</th>
<th>Per-capita GDP SDD (000)</th>
<th>Per-capita GDP Growth Rate %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1986</td>
<td>670.83</td>
<td>5.4</td>
<td>22.09</td>
<td>32.54</td>
<td>-</td>
</tr>
<tr>
<td>1987</td>
<td>766.08</td>
<td>14.2</td>
<td>22.59</td>
<td>31.82</td>
<td>-2.2</td>
</tr>
<tr>
<td>1988</td>
<td>763.79</td>
<td>-0.3</td>
<td>23.09</td>
<td>31.13</td>
<td>-2.2</td>
</tr>
<tr>
<td>1989</td>
<td>831.76</td>
<td>8.9</td>
<td>23.59</td>
<td>30.48</td>
<td>-2.1</td>
</tr>
<tr>
<td>1990</td>
<td>786.02</td>
<td>-5.5</td>
<td>24.09</td>
<td>29.84</td>
<td>-2.1</td>
</tr>
<tr>
<td>1991</td>
<td>844.97</td>
<td>7.5</td>
<td>24.59</td>
<td>31.43</td>
<td>5.3</td>
</tr>
<tr>
<td>1992</td>
<td>900.73</td>
<td>6.6</td>
<td>25.09</td>
<td>32.84</td>
<td>4.5</td>
</tr>
<tr>
<td>1993</td>
<td>941.27</td>
<td>4.5</td>
<td>25.59</td>
<td>33.64</td>
<td>2.4</td>
</tr>
<tr>
<td>1994</td>
<td>950.68</td>
<td>1.0</td>
<td>26.29</td>
<td>33.08</td>
<td>-1.7</td>
</tr>
<tr>
<td>1995</td>
<td>1007.72</td>
<td>6.0</td>
<td>27.01</td>
<td>34.13</td>
<td>3.2</td>
</tr>
<tr>
<td>1996</td>
<td>1067.18</td>
<td>5.9</td>
<td>27.75</td>
<td>35.18</td>
<td>3.1</td>
</tr>
<tr>
<td>1997</td>
<td>1134.41</td>
<td>6.3</td>
<td>28.51</td>
<td>36.39</td>
<td>3.4</td>
</tr>
<tr>
<td>1998</td>
<td>1207.01</td>
<td>6.4</td>
<td>29.50</td>
<td>37.42</td>
<td>2.8</td>
</tr>
<tr>
<td>1999</td>
<td>1285.47</td>
<td>6.5</td>
<td>30.33</td>
<td>38.77</td>
<td>3.6</td>
</tr>
<tr>
<td>2000</td>
<td>1363.88</td>
<td>6.1</td>
<td>31.91</td>
<td>40.14</td>
<td>3.5</td>
</tr>
</tbody>
</table>

Source: Central Bureau of Statistics.

I used the data reviewed in above after being transformed to logarism in order to solve linear model using the Ordinary Least Squire (OLS) method. I also used the econometrics views (E-views) package to analyze the relationship between per-capita income and poverty in aggregates for rural, urban and national level. The same methodology is used to run the multiple regression and interpret the relation between poverty rates, per-capita income and Gini index.
Chapter Five
Poverty Growth Nexus

5.1. Introduction:

This chapter will display the statistical results of the study and illustrate the economic interpretation to these results. This chapter will focus on data analysis and the test will be conducted by regressing the log of poverty levels with mean income and further regressing the proportion of people living below poverty line with the per-capita income and the Gini index. Thus, one could observe the overall effect of these two important variables and to get the elasticity to the mean income and the elasticity to the Gini.

The rest of the chapter will be organized in way to address the sectoral contribution to GDP in an attempt to see the income distribution pattern and its effects. The chapter also contains the result of the single regression model, multiple regression model in addition to look for some plausible explanations to poverty growth nexus. Moreover, policy implications and recommendations for poverty reduction would also be mentioned.

5.2. Results of the Single Regression Model:

The equations of this model [(4:1), (4:2), (4:3)] illustrates the relation between poverty at national level (Sudan), urban poverty levels and rural poverty level as a dependent variables and the per capita income as an independent variable.

The relation between poverty growth at national level (the dependent variable) and the per-capita income for Sudan (the independent variable) is fairly significant as measured by the t-statistic of the individual estimated co-efficient. Meanwhile, the relation between poverty growth for urban and rural and per-capita income is highly significant as measured by t-statistics of the individual estimated co-efficient. The F-test of the overall model is highly significant P(0.0), the R-squire is very high 99% for all rural, urban and Sudan. On the other hand, Durbin Watson Stat is 1.7, 1.3 and 1.7 for rural, urban and Sudan respectively. This Durbin Watson Stat is below the normal level (2-3) and this may result in a problem of autocorrelation. However, given the data availability such
Durbin Watson Stat rate could be accepted. Because, it is important to note here that this data suffer from various problems including; (i) inconsistency of data as it has been taken from different sources; (ii) lack of national surveys especially the household budget survey therefore, the data depend very much on estimations; and (iii) the absence of solid computerized database and lack of measures to check the discrepancies of the data. Given all these reasons and the experiences of some Sudanese studies that accept similar values (values greater than one), we can accept these values in our study. The estimated elasticities are as depicted in table (5:1).

Table (5:1)

<table>
<thead>
<tr>
<th></th>
<th>Rural</th>
<th>Urban</th>
<th>Sudan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated Elasticity</td>
<td>-0.87</td>
<td>-0.98</td>
<td>-0.97</td>
</tr>
<tr>
<td>Absolute t-value</td>
<td>2.5 (0.0035)</td>
<td>0.8 (0.0049)</td>
<td>0.8 (0.005)</td>
</tr>
<tr>
<td>F-test</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Durbin-Watson Stat</td>
<td>1.7</td>
<td>1.3</td>
<td>1.7</td>
</tr>
<tr>
<td>R²</td>
<td>0.994</td>
<td>0.992</td>
<td>0.994</td>
</tr>
</tbody>
</table>

Estimated equation: $\text{Lin p} \alpha = \beta_1 \text{Lin } \mu$

From the above table, we could notice that the estimated poverty growth elasticity in rural Sudan is –0.98 with absolute t-value of 2.5 (Std.Error 0.0035) and $R^2$ equal 0.994.

The urban poverty response to per capita GDP is greater than that of the rural with estimated elasticity of –0.98 and absolute t-value of 0.8 (Std.Error 0.0049) and $R^2$ equal 0.992, whereas the estimated elasticity for the whole Sudan is –0.97 with t-value of 0.8 (Std. Error 0.005) and $R^2$ equal to 0.994.

The quick notice to observe is that the response of rural poverty to growth in per capita is less than that of the urban poverty. That is to say, when the urban households acquire
more income, this will create tendency for him to raise his expenditure and maintain
more utility from income generated and accordingly, his welfare will be enhanced given
good distribution system. Furthermore, when the share he (urban individual/household)
gained from annual income is decreasing (decrease in per capita), the negative response
of poverty will be greater than that of the rural household.

By contrast, when the rural household’s per capita income increased there will, definitely,
be some sort of increase in the rural household expenditures but, not with the same
degree of response for the urban population given very limited needs and market access
available for the rural inhabitants. Thus, when the rural individual or household loses part
of his annual income, he will suffer less than the urban household/individual do.

Its also observed that the resulted elasticities are very small compared to what has been
reached before. This may be attributed to the impact of the overall negative growth of the
period 1983-1993 which was so tremendous and can not easily be recovered unless
substantial growth rates were met. That is why the effect of positive growth periods still
minute. Nevertheless, poverty reduction needs a high-sustained economic growth rate to
abolish the severe effect of those eras.

5.3. Results of the Multiple Regression Model:

The second model consists of incorporating the two independent variables by regressing
the Poverty Headcount index on the per-capita income and distribution (Gini Index) after
transforming all values to log to solve linear model. Conducting the test in the new form
makes it more sensible and economically meaningful. Using the E-views tool, the results
of this model are as illustrated in table (5:2) below:
Table (5.2)

Poverty Growth and Distribution Response

<table>
<thead>
<tr>
<th>Results</th>
<th>Rural</th>
<th></th>
<th>Urban</th>
<th></th>
<th>Sudan</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Per-capita GDP</td>
<td>Gini</td>
<td>Per-capita GDP</td>
<td>Gini</td>
<td>Per-capita GDP</td>
<td>Gini</td>
</tr>
<tr>
<td>Estimated Elasticity</td>
<td>-0.6</td>
<td>1.0</td>
<td>-1.7</td>
<td>1.7</td>
<td>-0.5</td>
<td>0.8</td>
</tr>
<tr>
<td>Absolute t-value</td>
<td>13.6</td>
<td>(0.19)</td>
<td>9.0</td>
<td>(0.11)</td>
<td>4.5</td>
<td>(0.38)</td>
</tr>
<tr>
<td>Durbin-Watson</td>
<td>0.64</td>
<td>-</td>
<td>0.82</td>
<td>-</td>
<td>1.0</td>
<td>-</td>
</tr>
<tr>
<td>R²</td>
<td>0.94</td>
<td>-</td>
<td>0.92</td>
<td>-</td>
<td>0.93</td>
<td>-</td>
</tr>
</tbody>
</table>

Estimated equation: \( \log P_\alpha = \beta_0 - \beta_1 \log \mu + \beta_2 \log G \) ---- (4:4)

Note: the value between pracets is the standard errors.

It is important to note that the introduction of the Gini Index has improved the test regarding the significance of estimated t-value although R² is less than the previous test. From the above table, we could notice that the estimated poverty growth elasticity in rural Sudan is –0.6 with absolute t-value of 13.6 (Std.Error 0.19) and R² equal 0.94, and the estimated Gini elasticity is 1.0 with absolute t-value of 9.06 (Std.Error 0.11). The urban poverty response to per capita GDP is greater than that of the rural with estimated elasticity of –1.7 and absolute t-value of 4.5 (Std. Error 0.38 ) and R² equal 0.92, whereas the estimated elasticity for Gini is 1.65 with absolute t-value of 8.5 (Std.Error 0.20). On the other hand, the estimated elasticity for the whole Sudan is –0.5 with t-value of 3.8 (Std. Error (0.14) and R² equal to 0.92, and the elasticity to Gini was 0.8 with t-value of 8.4 (Std. Error (0.09).

The important notice to be considered here is that rural poverty seems to be less responsive to increase in per-capita and that also indicate high inequality in the traditional sector compared to other economic sectors. These results were not as that found by Martin Ravallion and Chen (1997) with regard to rural/urban response to changes in per
capita income growth when they did their cross-country survey. The responses they get revealed that the rural poverty is most responsive to increase in per capita while urban poverty appeared to be more responsive to income distribution. However, as I said earlier relationships between poverty and economic growth are not always systematic and it differs between countries and communities depending on the initial situation of other variables such as inequality and poverty line.

Although, Durbin-Watson Stat seems to be small which gave suspicion that there is an autocorrelation problem, but using the recursive test to check this problem has proved the fitness of the model. The following are the figures [(5:1), (5:2) and (5:3)] supporting this argument.

\[Figure (5:1)\]

Recursive Estimation for the Rural Model

\[\text{the experience of Martin Ravallion and Chen was presented in chapter two “Literature Review” from which it was clear that poverty respond more elastic to growth in urban than in rural.}\]
Figure (5.2)
Recursive Estimation for the Urban Model

Figure (5.3)
Recursive Estimation for the National Model
Using the recursive estimator above, we found that the autocorrelation in the model in not a problem, because we found that the estimated errors do not cross the two bands of the Standard Error. Thus, one could argue that this model does not suffer from autocorrelation problem.

In the case of rural, it is observed that the elasticity to Gini is equal to 1.0 while the elasticity to the mean income is only 0.6. This illustrate that the poverty levels are more responsive to income distribution than to the mean income. Therefore, the bad distribution in income at national level has worsened the poverty levels. While in the urban, its observed that the elasticity to Gini is more or less similar to the elasticity to the mean income which indicate that poverty rates in the rural areas tend to reduce and increase with the same degree of response regarding per-capita income and Gini. The positive effect of increased per-capita in the rural areas is cancelled by the negative effect of mal-distribution of income. If other things are equal (i.e. poverty line), the positive effect of the per-capita income is equal to that negative effect of high Gini levels.

In the case of Sudan as a whole, the elasticity to Gini (0.8) is bigger than the elasticity to the mean income (0.5). This indicates that poverty levels change elastically to Gini than to the mean income. Given this result, its clear that the effect of income distribution is more influential than the mean income which indicate that the economic growth which is purported to reduce poverty is greatly hindered by mal-income distribution.

5.4. Comparison between the two models:

In the first model (simple regression), the estimated poverty growth elasticities are very small values and the absolute t-value was high and significant for rural poverty, but not significant for urban and Sudan and R² values were very high for all rural, urban and Sudan. In the second model (multiple regression model), the estimated poverty growth elasticity is relatively high and the absolute t-values are high and significant for all rural, urban and Sudan and the R² is also high. Given the results, the second model is which incorporate the two sides of the problem is expressing the phenomenon more than the first model.
Since the first model did not contain the inequality factor, so the specification error might occur, whilst the second model was reflecting the two main variables which make such econometric phenomenon is not a problem. Regarding Durbin Watson Stat, the first model generate relatively high DW although below the normal level, but the second model result in very small DW which mean that the problem of autocorrelation is a problem and that was important to take corrective measures in the second model (recursive estimator) while, DW level of the first model is accepted as the case with similar previous studies.

The response of rural poverty to changes in the mean income is very small in both models and the urban response is relatively high in the two models which give an indication that the effect of economic growth in poverty reduction does changed much, because the number of poor people are higher in the rural than urban. On the other hand, the poverty growth response in the case of Sudan is the highest in the first model which mean that high response from growth to poverty, but in the second model, we found that poverty growth response for Sudan is the lowest which mean that the effect of inequality have an enormous effects on the poverty growth response.

As found by some regression analysis conducted before, the measured changes in inequality have strong independent explanatory power (rates of poverty reduction respond even elastically to rates of change in Gini index than they do to the mean). It is also important to note that the urban elasticity obtained goes in line with some results reached by Ravallion before. He found that poverty had responded elastically to growth, but these differ according to initial Gini levels. The results of this research also reveal that due to high Gini levels the poverty growth response is week in all urban, rural and national levels.
5.4. Is there poverty Growth Nexus?

According to the test conducted, we have come out with response from growth to poverty. Despite that it is minimal, it should be taken into consideration when we evaluate the experience of the Sudan. Martin Ravallion has said “the response of poverty to growth in per capita depend on poverty situation”. That is to say, if the incidence of poverty is very high, the response from growth to poverty will not be obvious unless a high sustainable growth is accomplished.

5.5. Some Plausible Explanations:

The puzzle of the Sudanese economy is that, while economic growth was strong during the 1990s, poverty has remained high. Of course, the actual levels of poverty at present are a matter of judgment, especially after 1996, because of no national poverty survey since 1978. But, assuming that poverty levels are as high as indicated in chapter four and GDP is also high, what can be said about puzzling?

However, in order to study the situation, we have to look for interpretation for the puzzle in each sector.

5.5.1. Agricultural Sector:

Since most of the poor live in rural areas and growth in agricultural GDP average close to 9 percent per annum through the 1990s, it is reasonable to begin looking for answer in the agriculture sector.

According to the Country Economic Memorandum for Sudan (2002), the irrigated and semi-mechanized rain-fed areas have always provided a crucial source of employment for low-income groups. Such employment has involved about 1 million workers every year who, with their families, represent some 20 percent of the population. Most of these workers come from small farms in the tradition farming areas or are already located in and around the large-scale irrigation schemes. Employment, while seasonal, is reasonably well assured, even though in the semi-mechanized farming areas has been slow and prone to large annual fluctuations as a result of droughts and the disincentives effects of government policies for some crops such as sorghum. In irrigated areas, employment is
somewhat less seasonal and many workers have therefore settled close to major irrigation schemes. They, like the tenant farmers, have benefited from subsidies, but employment has not increased as much as would be expected because of inadequate management of the schemes.

Since the early 1990s, the government has lifted most of its controls on agriculture but it has continued to interfere with sorghum production and marketing. Depending on the food security situation, the government’s price support and export policy for sorghum has varied from year to year. This has contributed to uncertainty among producers and creates disincentives for further growth in semi-mechanized farming areas. As a result, semi-mechanized sub-sector had an overall negative growth in GDP during 1990s and only 2 percent per annum GDP growth in the last 15 years. The semi-mechanized is the smallest sub-sector in agriculture, but its decline has been devastating for seasonal employment of close to a million workers who typically come from traditional farming areas.

The government did not interfere in the traditional rain-fed farming sub-sector. Improvements in infrastructure in traditional rain-fed farming areas were minimal, and yet output in these areas has increased rapidly. The Ministry of Agriculture and Forestry estimates that the traditional rain-fed sub-sector grew at a rate of more than 20 percent per annum during the drought-free 1990s. if one add to this the 20 percent per annum growth in livestock production, with a value more than double that of the crops produced in the traditional farming areas, then the story is one of a buoyant traditional rain-fed sub-sector during the 1990s. However, expert opinion is that the welfare of those in the traditional farming has not improved appreciably. Nevertheless, information about production and employment in the traditional farming areas indicate that although production has increased, the pace has not kept up with the growing number of dependents and income distribution is also highly skewed. This situation has attributed to many reasons.

First, much of the production growth in the traditional areas represents a rebound from the stagnation and decline of earlier decades, rather than a structural transformation of the sub-sector to sustain high production levels. For example, the total production of
sorghum averaged 858000 metric tons during 1995/96-1999/00, about the same as it was for the average of 1977/78-1981/82. The long-term stagnation in traditional rain-fed crop production took place due to increases in harvested area (from 1.29 million ha to 1.70 million ha during the same period). Productivity, therefore, remained low and in same years declined because of the absence of significant technological changes. To address this problem, it is of vital importance that improved technologies become more productive without resorting to an expansion of area planted, thereby increasing the risk of natural resource degradation.

Second, the contribution of the traditional rain-fed crop and livestock-producing areas is less than the share of population working in these production systems, even in years of high growth. For example, whereas the traditional rain-fed areas accounted for about 56 percent of agricultural GDP in 1999, about 70 percent of population contributed to the production. In other words, even in periods of high production (such as 1990s) the traditional rain-fed crop and grazing areas do not produce a share of GDP that is equal to their share of the population in the agricultural and pastoral Sub-sectors.

In addition, it is likely that, because of the substantial capital required for livestock production, the benefits from livestock sales accrue to only a small portion of the people involved in livestock production, such as herders and those who lease grazing lands. Of course, it is the relatively small share of GDP that accrues to those who live in the traditional crop and grazing areas that derives the labor migration in the irrigation and semi-mechanized areas. In contrast, to the traditional rain-fed areas, the irrigated areas produce 22 percent of the GDP but have only 0.7 percent of the people. Clearly, there is a skewed distribution of income from an aggregate agricultural growth that is quite substantial. Therefore, the relative terms, those who live and work in large numbers in the traditional farming areas fell behind those occupied in other farming systems. This is probably the main solution to the puzzle of the persistent poverty across the large areas covered by the traditional farming areas. For more information see CEM (2002).

The conclusion is that there is a growth poverty-reduction nexus for the agricultural sector because growth in the volume and in value of production in all farming systems has not benefited people who are resident and work in those areas.
On the other hand, the distribution of growth among the farming systems is not in accordance with their share of population. Obviously, there are large numbers of people resident or working in the traditional areas, and as long as they depend on those areas for their livelihood, they will (on average) remain poor relative to other sub-sector in agriculture, unless the marginal productivity increases or income distribution favors those in the rain-fed areas. Some of the issue that need to be addressed include land redistribution within farming systems, migration out of the rain-fed areas to alternate permanent employment outside agriculture, the development and the use of improved technologies, and improved human capital (through better access to education, health, and so forth). Solutions will require structural change based on improvements, and to enhance their chances of gaining remunerative employment in other sectors of the economy.

5.5.2. Industrial Sector:
The share of industry in GDP fell continuously from the mid-1980s to the mid-1990s, after which it began to increase. In 2001, the share of industry amounted to about 18 percent of the GDP. Between 1998 and 2001, the industry sector grew by about 10 percent on average annually. The main industrial activities of the Sudan include manufacturing, construction, water, mining and other large-scale investment such as sugar.

Although, industry represents 18% of GDP and grew by 10% annually, but according to 1999 labor force estimates based on 1996 survey, only 5.6 percent of the population are involved in the sector.

It’s also worth noting that the growth of industrial sector has benefited very few people in the country. Because, people work with low wages as the result of huge labor supply confronting very limited job opportunities. Those people are always stay near or below the poverty line. Furthermore, the workers, especially the unskilled, are subject to humiliation, social violence and hence, resulted in firing them out of work. Nonetheless, the industrial laborers are always unstable and enjoy very little, if not any, working facilities. This unhealthy working environment make the work force operating in the
industrial sector is the most vulnerable to fall into severe poor conditions. Despite that the new emerging industrial activities create some sort of employment, they were not to the extend that make some change in the poverty situation. That is why we saw a very slight change when measuring poverty growth response.

Given the growing share of industry in GDP and the limited number of people benefiting from this growth, the industrial sector is also puzzling. While it was anticipated that this would result in reducing the number of poor people appreciably, the response turn out to be very week. Eventually, the workforce in the industrial sector did not benefited much from manufacturing growth and thereby increases their welfare. Therefore, poverty growth nexus is also persisting in the industrial sector.

5.5.3. Services Sector:
The services sector consists of sub-sectors that have evolved in different magnitudes. Transport, communication, hotels and restaurants have been among the fastest growing sub-sectors during the past few years. These have likely grown in response to increased demand for services from oil and oil-related industries. Public services have also grown, although not as far as hotels and restaurants.

As public services do not involve investments, but a mere salaries and operating costs, those items shows a trend of increase in the public expenditure. According to labor force estimates in 1999 based on Sudan labor force survey conducted in 1996, the workforce operating in the service sector represents about 24% from the total labor force.

It is important to note that the growth in this sub-sector has benefited most of the people working on it. Because, when civil service salaries increased, it will be generalized to all working groups relative to their grades. Eventually, the global slight response from growth to poverty could mainly be attributed to increase in service sector growth as well as oil.

5.5.4. Oil Sector:
Petroleum has emerged as a major source of economic growth and revenue for the government. In terms of the direct impact of Sudan’s GDP, the government is developing
methods for calculating oil sector value-added but these have not yet been completed. However, the oil contribution to GDP is so tremendous. One important indicator is the oil revenue appeared in the budget. The federal budget of Sudan is supplemented by oil income amounting to US$ 700 million in 2002.

Despite the fact that no reliable data on oil to enable the researcher drive some sort of scientific analysis pertaining to participation of oil sector to GDP and percentage of people working on it, one could still argue that petroleum has drag quite a lot of national workforce to be employed in the sector. The wages and salaries of both skilled and unskilled labor are relatively very high compared to other sectors. Hence, those employees would be able to provide decent living conditions for themselves and their dependents. This argument could be evident by enhancement in people’s standards of living and prosperity took place in the oil production areas. That is to say, petroleum like wise the services sector, has some effect on poverty situation by creating more well-paid job opportunities.

However, given the limited number of people directly involved in the sector, the effect of petroleum on people’s welfare is not so obvious. Nevertheless, increasing the oil exploitation in the production fields will lead to more job creation that could expand the effect of this sector and its response to poverty reduction in the foreseeable future.

5.6. Income and Welfare Distribution in Sudan:

It is easy for an ordinary observer to note that income and welfare distribution in Sudan is changing so rapidly that in a short period some people have become rich while many others have become poor. Under such fast changing conditions, the first step in the right direction towards proper identification of the poor is the construction of an up-to-date observable welfare distribution. Economic theory postulates that, other things remaining the same, individuals’ levels of welfare rise with increased consumption of goods and services. Although, economic theory assumes that it is consumption, not income that raises the welfare, many studies of welfare often focus on the income data to the exclusion of the expenditure data. The argument is that present income savings could be
spent to raise the welfare in the future. The validity of this argument depends on the purpose of the income for which income distribution is constructed.

The main reason is that the consequences of war have impoverished people in war-affected areas and resulted in massive population movements. Military expenses crowded out social services and development expenditures, discriminating primarily against rural areas where there are few private alternatives to public health and education services. Another reason is that more Sudanese families are permanently settling abroad, resulting in reduced remittance to support relatives at home.

Inequality in income has been found to be much higher in the urban than in the rural areas. The exodus of the professionals and middle income groups from urban areas has also increased inequality indirectly through its effect on the dispersion of wages. In order to retain well-educated staff, employers have had to offer higher wages to the remaining professionals. Labor survey data in the 1990s suggest widening inequality in formal salaries. The top 10 percent acquired 51.6 percent of the all earnings in 1990 and 64.3 percent in 1996. At the same time, the lowest income groups share decreased from 28.3 percent in 1990 to 21.9 percent in 1996.

Time series data for wages and salaries show rising inequality from the end of the 1960s until 1996. During the 1990s, however, rising inequalities were explained solely by worsening income distribution in urban areas. This is consistent with the hypothesis that the departure of many professionals from Sudan has put upward pressures on wages for the remaining well-educated labor force.

---

1 M. K. Fageer and A. B. Merghany et al. 2002. “Poverty and Social Development in Sudan”
5.7. Conclusion and Recommendations:

The results of the models illustrated that the overall response from growth to poverty reduction was found to be relatively weak compared to the results of previous studies conducted in this field. One of the most suspected reasons behind the minute effect trickled down from growth to poverty is the income distribution. This situation (inequality) was proved to be rampant in many aspects of economic activity in the country which was then considered the strongest interpretation to Sudan’s contradiction between poverty and growth.

As a conclusion, we can say that although the overall response is weak, we noticed that the response of rural poverty to growth in per-capita income is less than that of urban poverty. Later we came to know that rural poverty seems to be less responsive to increase in per-capita and that also indicate high inequality in the traditional sector compared to other economic sectors. When introducing inequality in the model, the elasticity to Gini would either be equal or greater than the elasticity to per-capita income, which would also support the explanation of poverty growth nexus. Comparing the results we got with those of Martin Ravallion and Chen (1997) with regard to rural/urban response to changes in per capita income growth when they did their cross-country survey the results were differ greatly. The responses they get revealed that the rural poverty is most responsive to increase in per capita while urban poverty appeared to be more responsive to income distribution. However, experience proofed that relationships between poverty and economic growth are not always systematic and it differs between countries and communities depending mainly on the initial inequality situation.

As poverty reduction process require a comprehensive package of policies and programs, each sector in the economy should have its own set of policy options and procedures that should be taken into account when designing a plan for poverty reduction. Accordingly, the researcher provide separate recommendations for each area that could address poverty problem as follows:
In agriculture, we found that inequality is very high in this sector particularly on the traditional and irrigated. Thus, the most essential target is the pro-poor distribution of income and increased marginal productivity through improved technology and structural reforms. Policies and investments required to achieve these goals need to be established. The most important policies could be summarized in the following:

- Prudent agricultural and land policies that will redistribute land and then lead to raise yield levels and eliminating government intervention in production and marketing, and concentrate on the role of government on providing the predisposing factors for development.
- Investment in rural infrastructure and rural services with particular emphasis on better roads and provision of inputs.
- Support market efficiency and help farmers maintain better market information, agricultural credit, improved stock routes and veterinary services, and improved and sustainable water supplies for domestic use and for livestock as an urgent need for broad-based rural development.

Social Services: it’s the one of most crucial sector that has a tremendous impact on poverty situation worldwide. Indeed, any strategy or plans that ignore the social service will definitely be insufficient to have an obvious impact on poverty. Therefore, the recommendations for each sub-sector regarding social services can be incorporated in a comprehensive package to be implemented for poverty reducing sectors.

In the education sector, we know that it is the main factor behind low income and low productivity, therefore, the strategy of poverty reduction should focus on increase education coverage on a path towards reaching MDGs and this could be achieved by:

- Raising national average intake to primary education from 75% to 90%, through concentrating efforts and resources for the states that have intake ratio significantly below the national average.
- Increase the proportion of students who continue with their primary education from 59% to 70%, by concentrating attention on states with below national average retention.
• Bridge the gender gap in enrolment by raising girls’ intake from 72% to 90% starting, since the role of women is considered very substantial in development and poverty reduction strategies.
• Improve school environment by providing every student and teacher with necessary aids and equipments (i.e. books, blackboards, decks. etc).
• Significant reduction in illiteracy rate of the country.

In water sub-sector, continued improvement in the water supply and sanitation are essential in order to enhance the situation of significant amount of people drinking water and environmental health. These could be achieved by:
• Rehabilitation of deteriorating water supply sources with emphasis on replacement of obsolete and low efficiency systems and introduction of simple low cost technologies particularly in the rural areas followed by development of new water supply projects.
• Giving high priority for vulnerable groups in water supply and sanitation programmes.
• Encourage the use of renewable energy technology particularly in remote areas to reduce cost of transport and overcome the difficulties in provision of fuel and spare parts.
• Training and capacity building at the top and middle management levels to improve technical skills to sustain efficiently operational water resources and conduct public advocacy programs to increase public awareness.

In health sub-sector, we pointed out that productivity is very low due to bad health indicators. Since this sector is the one of the most affecting sectors in the income of the poor, special focus is directed towards it to achieve good indicators directly affecting productivity matters. This could include the following:
• Directing substantial amount of government spending to the health activities that combat the major disabling diseases in Sudan such as Malaria and tuberculosis especially in the rural areas.
• Strengthening the decentralization system adopted by the government to enable the local government levels to properly provide the primary health care.
As we illustrated in the plausible explanation for poverty growth nexus, *industrial sector* was found to be one of the sources of nexus. In this endeavor, the sector required drastic reforms to rectify the mal-distribution of income. Thus far, the researcher proposed the following recommendations:

- Reforming the law of recruitment to protect the employees from firing out or any sort of violence.
- Enhancing the investment environment to induce more entrepreneurs to invest in various sectors which would create numerous job opportunities for the unemployed workforce.

We also demonstrate that *oil sector* was playing a big role in the poverty situation in the previous years; however, it’s purported to contribute more on poverty reduction if some solid measures are followed. The following are proposed policy directions:

- Reinvesting the oil revenues in productive sectors that could have a quantitative impact on enhancing the population income and create well-paid jobs to improve the human welfare and thereby, reduce poverty.
- Conducting oil processing industries (i.e. establishing refineries and power plants) to add value to the oil industry as well as creating more job domestically.

In conclusion, high growth rates for the economy as a whole with a more pro-poor distribution throughout the economy are needed for poverty to come down. In this context, the rural poor should gain the lion share with regard to resources allocation and policy focus. However, a lot is anticipated to be done in the area of poverty reduction as Sudan is approaching a period of prosperity given the discovery and exploitation of oil and the momentum of peace and the influx of the donor community. The Sudan great potentials coupled with the projected huge amount of resources from the international community for reconstruction and development will provide a platform for the productive sectors to grow and thereby, mobilize the entire economy and give hopes for better living conditions to the Sudanese people in the foreseeable future.
References


