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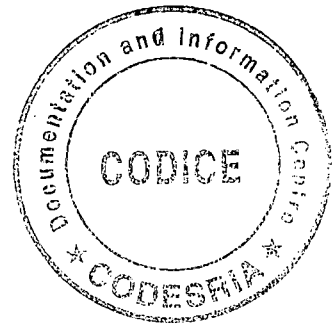

The Impact Of Economic Crises On Health In Sudan 1978-1997

A Theoretical And Empirical Exploration

By

Muneef Abdel Bagi Babiker Elbasheer

Thesis Submitted In Fulfillment Of The Requirements Of The Degree Of Doctor Of Philosophy In Economics

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CONTENTS

Abstract

Though past studies have probed the social impact of economic crises and the adjustment policies designed to reverse them, a relative paucity of studies of the health impact persists. Moreover the diversity of the impact makes individual country case studies essential. Against this background this study undertook a comprehensive survey of the theoretical literature that frames the analysis of the interrelations between health and economic adjustment.

Based on the literature survey and guided with the research objectives the study adopted an analytical framework that traces the impact of the economic adjustment variables from their macro level through the intermediate level down to the micro level where decisions affecting health conditions are taken. Throughout the analysis a combined methodology that uses the before and after and the theoretical approaches has been adopted. This research design proved its efficacy especially within the context of data constraints.

The chosen analytical framework and analytic strategy described above were applied to Sudanese data covering the reference study period 1978-1997 or a sub-period(s) within this period. Although each data set taken separately may not meet the optimally desired data requirements, the analyses showed that the conclusions reached on the basis of different data sets corroborate each other. Also the analytical framework adopted enabled the theoretical assessment of the adequacy of the statistics by checking empirical consistency of findings with theoretical a priori expectations. This ability to assess the quality of the data is of importance in an area where the availability of data is an admitted problem.

The study investigated the impact on the macroeconomic health related inputs, then moved to consider the impact on intermediate health inputs, and finally the effects on health status were explored. The available data indicated that the changes in all these variables were consistent and many of the odd changes in single variables could in most cases be explained by subscribing to theoretical reasoning and/or more thorough investigation of data. Therefore it has been concluded that there was deterioration in the general health levels of the population, which are consistent with the deterioration in the availability of health-related inputs at the macro and meso levels. However the available evidence suggests an association between the deterioration in health levels and economic adjustment variables, but may not be sufficient to suggest causality. Thus despite the consistency of this finding with the chosen analytical framework the utility of further studies in this virgin field of applied economic research should not be underestimated.

بسم الله الرحمن الرحيم

وصلي الله علي سيدنا محمد طب القلوب ودوائها وعافية الأبدان وشفائها وعلي آله وصحبه وسلم

خُلاصة

رغم أن الدراسات السابقة قد تناولت الوقع الاجتماعي للأزمات الاقتصادية وسياسات التكييف التي صممت لمواجهتها، إلا أن ندرة نسبية في الدراسات التي تتناول الوقع الصحي لا تزال سائدة. كذلك نجد أن التنوع الكبير في آثار الأزمة الاقتصادية و السياسات المرافقة يجعل من دراسات الحالة لكل قطر علي حدة أمرا ضروريا. بناء علي هذه الخلفية قامت هذه الدراسة بمسح شامل للأدبيات النظرية التي توطر لتحليل العلاقات المتبادلة بين الصحة والتكييف الاقتصادي.

بالاستناد علي مسح الأدبيات عمدت هذه الدراسة مسترشدة بأهدافها الي تبني إطار تحليلي يتتبع وقع متغيرات التكييف الاقتصادي إبتداء من مستواها الكلي مرورا بالمستوي الوسيط ووصولا إلى المستوي الجزئي حيث يتم اتخاذ القرارات التي تؤثر علي الأوضاع الصحية. وقد تم تبني منهجية مشتركة تؤلف بين منهجي التحليل القبلي والبعدي و التحليل النظري ؛ وقد أثبت هذا التصميم البحثي فعاليته خصوصا في سياق وجود قيود علي توفر المعلومات المطلوبة.

تم تطبيق كل من الإطار التحليلي المختار والإستراتيجية الموصوفة عاليه علي بيانات تخص السودان خلال الفترة ١٩٧٨-١٩٩٧ وأي فترة (أو فترات) تقع ضمن هذا الإطار الزمني. برغم أن كل تشكيلة من البيانات مأخوذة على انفراد قد لاتفي بشروط البيانات المطلوبة بصورتها المثلي نجد أن التحليل قد أوضح أن النتائج التي تم التوصل إليها بناءا علي تشكيلات بيانية مختلفة تعضد بعضها البعض. كذلك نجد أن الإطار التحليلي المستخدم قد أمكن من إجراء تقييم نظري لجودة البيانات المتوفرة وذلك باختبار الاتساق الإمبيريقي (التطبيقي) للنتائج مع التوقعات النظرية القبلية. وتعتبر هذه القدرة علي تقييم جودة البيانات ذات أهمية في مجال يعتبر فيه عدم توفر البيانات الكافية مشكلة معترف بها.

بحثت هذه الدراسة وقع الأزمات الاقتصادية علي مدخلات الإنتاج الكلية ذات الصلة بالمجال الصحي ثم عرجت علي دراسة الأثر علي مدخلات الإنتاج الصحي الوسيطة وأخيرا قامت باستكشاف الآثار الواقعة علي الوضع الصحي. أشارت البيانات التي توفرت للدراسة إلى أن التغييرات الشاذة في آحاد المتغيرات يمكن تفسيرها ،في معظم الحالات، إما بالاعتماد علي التسبيب النظري أو بالفحص المتقن للبيانات. عليه فقد توصلت هذه الدراسة إلى حدوث تدهور في الأوضاع الصحية العامة للسكان، وهذا التدهور الحادث يتسق مع التدهور في وفرة مدخلات الإنتاج ذات الصلة بالصحة علي المستويين الكلي والوسيط. وعلي كل نجد أن الأدلة تشير إلى وجود ارتباط بين التدهور في الأوضاع الصحية ومتغيرات التكييف الاقتصادي ولكن هذه الأدلة لا ترقى لإثبات عنصر السببية في هذه العلاقة. وعلي الرغم من اتساق هذه الخلاصة مع المنهج التحليلي المختار نحث علي عدم التقليل من شأن منفعية إجراء دراسات لاحقة في هذا المجال البكر من مجالات البحث الاقتصادي التطبيقي.

الحمد لله الذي بنعمته تتم الصالحات.

Acronyms and Abbreviations

Act. Health Exp. : Actual Health Expenditures.

Act. PC Health Exp. .: Actual Per Capita Health Expenditures.

BNHP: Blue Nile Health Project.

BCG: Bacillus Tubercle G

CPI: Consumer Price Index.

DALYS: Disability Adjusted Life Years.

DS: Dressing Stations.

EPI: Expanded Program of Immunization.

Spec. Hosp.: Specialized Hospitals.

GDP: Gross Domestic product.

GOS: Government of Sudan.

HFA200: Health for All By the Year 2000),

Hosp.: Hospitals.

IMF: International Monetary Fund.

IMR: Infant Mortality Rate.

LDCs: Less Developed Countries.

OAPEC = Organization of Arab Oil Exporting Countries

Medical Assis.: Medical Assistants.

OPV: Oral Poliomyelitis Vaccine.

Pap Child: Pan Arab Project for Mother and Child Health.

PCGDP: Per Capita Gross Domestic product.

PEM: Protein-Energy Malnutrition.

PHC: Primary Health Care.

PHCUs: Primary Health Care Units.

QALYS: Quality Adjusted Life Years.

SHD: Sustainable Human Development

TB: Tuberculosis.

U5MR: Under-five mortality rate.

UNDP: United Nations Development Program

UNICEF: United Nations International Children Emergency Fund.

WHO: World Health Organization.

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CHAPTER ONE

INTRODUCTION

1.1 Background and Justification:

The impact of the world economic crisis on different aspects of health has been a major subject of concern for economists, health care researchers, policy makers and administrators of health care systems in developing countries since the mid-1980s. Whether attributed to the economic difficulties or the attendant policies prescribed to reverse them, the unfavorable performance of developing countries in health and social indicators has been highlighted by a number of academic and institutional studies. The most notable institutional investigation was that of the United Nations International Children Emergency Fund (UNICEF) (Cornia et. al. 1987); while Abel-Smith (1986), Chen (1987), and Freund (1986) made the earliest academic contributions. The empirical data and analytical perspectives upon which these studies were based have since been greatly enriched and developed both by inclusion of new variables, more case-study -based data, and a number of newly developed or adapted analytical models. The stepping in of the World Bank through its initiatives of the Social Dimensions of Structural Adjustment (Cf. World Bank 1990a & 1990b) along with the increased interest shown by the World Health Organization (c.f. WHO 1992 & WHO 1993), has given an added force for the relevance of studies probing the social impact of economic variables and policy changes.

In response to the above mentioned developments in the intellectual and practical atmosphere of the economic and policy landscape, the 1990s witnessed further and accelerated growth of studies and research endeavors assessing the impact of economic reversals and of adjustment policies on the social dimensions, including health. Despite this mounting research interest and research work there is still a felt need for more research for a number of reasons:

1. Completed studies are not evenly distributed among the developing countries that have undergone (or are currently undergoing) economic adjustment.
2. The diversity in the timing and circumstances under which developing countries faced economic adversity necessitates wider coverage to allow comparison of individual country experiences.
3. Besides its epistemological value, the needs of health policy and health administration make country-specific research an indispensable activity for the efficient operation and evolution of any health care system.
4. The relatively recent emergence of the sub-discipline of Health Economics coupled with the equally nascent nature of structural adjustment policies leave a number of conceptual and practical issues in need of clarification that can only be resolved through a widening and deepening of research in this area.

Against the above-mentioned general background we now turn to the case of Sudan. Being no exception to other developing countries the Sudan has been very much affected by economic reversals of the last two decades and the concomitant economic adjustment policies and programs that were at the beginning suggested and supported by the

International Monetary Fund (IMF) and the World Bank. Although the Fund's influence started since 1966 (Awad 1997), economists agree that the Bank's and Fund's involvement became more visible in the country's policy-making process since 1978 (cf. Awad, 1992; Ali, 1994). Several authors have repeatedly assessed the impact of the IMF-supported policies in Sudan. Earlier investigations concentrated on the economic impact, which mostly evaluates the policy in terms of its ability to achieve its professed objectives. Recently, Sudanese and non-Sudanese economists showed much interest in the social dimensions of adjustment. However the aspect that received most attention by the national research community is poverty (cf. Ali, 1994,Awad Op. Cit., Nur 1997, Sahl 1996).

Because of the close linkages between poverty and health the above mentioned works on poverty are a prerequisite and a complementary first step for efforts aiming at the investigation of the interconnections between health and economic reversals. The few direct investigations of the health impact of economic change in Sudan (Babiker 1996, 1997; Elias, 1998) pointed at the health implications of increasing poverty rates. The poverty-health nexus is most visible when relative (rather than absolute) poverty is considered. This is due to the inclusion of the poor's access to health services in the index of relative poverty.

However despite the high importance of poverty as a determinant of health status it can not be claimed to be the sole or even the major route via which economic crises transmit their effects on the health system, its processes and its outcomes. Therefore a comprehensive understanding of the ways and means via which economic difficulties impact on health remains to be done. The proposed study has thus been motivated by the

humble desire to contribute to this formidable task. Because this effort is part of the first attempts at illuminating this research area it would have achieved its aim if it has been able to throw just enough light to show the major signs of the road for future research in this area. It remains the responsibility of subsequent researchers to show the final details and do the fine sweeping of the presently intractable research issues.

1.2 The Research objectives:

Against the background outlined above and within the context of its own human and physical resource inputs, this research study has set out for achieving the following objectives:

1. Make a review of the major literature on the interface between health and economic variables especially during periods of economic adjustment.
2. Based on the above-mentioned review, formulate an empirically relevant model to assess the impact of economic crises on health and nutrition.
3. Apply the formulated model to the case of Sudan during the period 1978-1997.

1.3 The Research Questions:

The proposed research aims at attaining its stated objectives by trying to find answers to a number of questions. These questions are:

1. How did the Sudanese socio-cultural, economic, and health environment mediated in the transmission of economic and policy changes to the health status?

2. Can the changes that took place in the Sudan during the study period be explained, at least partially, by reference to contemporaneous economic and policy changes?
3. If the answer to 2 is in the affirmative, what form (s) does this explanation take?
4. How does the Sudanese experience fit the theoretical models that have been suggested for studying the relationship between health & economic variables?
5. Does the model that has been adopted satisfactorily answer the previous questions?

1.4 Research Hypotheses:

The proposed research has been conducted with the following working hypotheses in mind:

- The economic reversals and the accompanying policies have had an adverse impact on health services.
- The impact of the economic reversals and of the policies more or less work in the same direction; this implies that:
- The adjustment policies have, at least, been ineffective in reversing the trends of economic deterioration in a manner conducive to health improvements.
- The impact of economic changes/adjustments has been transmitted to health status through three main routes. These routes are:
- The direct impact of macroeconomic inputs, the impact through the institutional changes and through the impact on the directly health related inputs.

- The changes via the above mentioned routes of the impact are mainly transmitted to the individual health and nutritional status through the changes in resource use at the household level where households decisions affecting health and nutrition are taken.

1.5 Methodology and Sources of Data:

In pursuance of achieving its objectives and answering the basic questions it poses within the working hypotheses adopted this study chose to use two tried approaches that have been suggested and applied by researchers who had similar research concerns. This methodology of combining approaches is dictated by both analytical and practical considerations (see chapter 3 for more details). On the analytical side combination of methods (referred to as triangulation in the research methodology literature) is thought to strengthen the research results as cross-checking of results becomes feasible. Practically also the use of different methods makes it possible to make maximum use of existing data. When data comes from diversified sources it is unlikely that a single research method can exhaust its analytic potential therefore data that is not conducive to the analysis by one method can be analyzed by using the other. The two methods we intend to use are known as the theoretical approach and the before and after approach and we have discussed their merits in comparison with other methods in Chapter Three. When we applied these two methods of analysis to the Sudanese case we have followed a general analytical framework suggested by the World Bank for analyzing the impact of economic changes/adjustments on social dimensions. It should be mentioned that and because of the general paucity of data we have traced the impact along the above-mentioned framework using the two analytical methods in a

complementary manner i.e. given the nature of the available data we decide on the relevant method. Therefore the same section may witness the use of both menthols. Of course in some instances both methods are applied to the analyses of the same set of data in a mutually supporting manner.

The bulk of data on which this study has depended is of a secondary and a tertiary nature. Secondary data comes from official governmental and non-governmental sources. Governmental information is basically in the form of reports which could be periodical reports, statistical survey reports, and reports on special studies. The main reports that we consulted are annual reports of the ministries of Health, Finance, and Labor, and the annual reports of the Bank of Sudan besides some data from other ministries. The major surveys we referred to are the Sudan mother and Child Health Survey (SMCHS) often known as the pap-child survey, and the Demographic and Health Survey. The major non-governmental sources of data are the reports and surveys and published data of the United Nations and other non-governmental organizations. The major sources we made use of are data from the World Bank World Tables, UNICEF/Government of Sudan documents and WHO Documents. Tertiary data is secondary data that is provided in books, articles and studies. The difference between this data and secondary data proper is that this tertiary data would usually be subjected to special treatment by the author. The nature of our study and the relative shortage of relevant data made this study rely on tertiary sources as significant providers of data. Thus data from published books, journal articles, published and unpublished studies have been used and when modified the modification has been indicated in place. The author has

drawn heavily on data collected for studies he did with full reference to the specific studies used.

1.6 Organization of the Study:

This study has been divided into 8 Chapters. The present chapter 1 is basically an introduction to the topic and how it has been handled by the study. Chapter 2 gives a relatively elaborate account of attempts at modeling the interrelationships between health and the economy. While a number of economic and health models were discussed emphasis is laid on the household model. Chapter 3 has been devoted for outlining the specific analytical framework that has been used in conducting this very research endeavor. In Chapter 4 the salient features of the Sudan economy, the Sudan health delivery system and the state of the economy and adjustment experience during the study period have been reviewed with special stress on the health implications. Chapters 5 through 7 contain the major thrust of the empirical part of the investigation as they relate - guided as much as possible by the analytical framework - changes in economic conditions and economic policy on health input and output variables. The sequence of the chapters tries as far as possible to pursue the logical sequence of the transmission of macroeconomic variables to health status in concordance with the outlined and adopted analytical framework depicted in the flow diagram 3.4.1. Accordingly Chapter 5 traces the impact of economic reversal and policy changes on the macroeconomic related health and social inputs including the significant institutional changes of the informal and private sectors. Chapter 6 probes the impact on directly health-related inputs that include health facilities, health manpower, public health, food and medicines. While chapter 7 monitors the health status during

the Study period using dimensions of morbidity and mortality indicators. Finally a summary and conclusions chapter closes this study.

1.7 Limitations of the Study:

Far from claiming perfection, this study has been carried out within constraints that inevitably makes it coexist with certain limitations that may detract from its completeness. However, despite awareness of the existence of these limitations, the study has been judged as a viable project for a number of reasons. Firstly, many of the limitations are related to factors that are beyond the control of a single researcher or even a group of researchers. Secondly, other limitations, although could be surmounted by an individual researcher, have been admitted on cost effectiveness grounds i.e. given the objectives of the study overcoming these limitations would not add much to the analytic quality of the study while the cost will be formidably high given the resource constraints of the present researcher. Finally, and as mentioned in the previous section, the explorative nature of this study makes it natural to expect obstacles that lead to presence of limitations. In what follows the major limitations that appeared to the researcher of this study are listed hoping that that they be of use to both assessors and future researchers. These limitations are:

- The approach adopted in this study broadly traces the impact of both economic difficulties and the accompanying economic reform policies on the health sector over the period within which the difficulties are observed and the reforms are implemented. This has been done by simultaneously following the movements in the set of economic and policy variables along with the movements in

the health-related variables. The advantage of such an approach is the bypassing of the controversial issue of whether the difficulties are relieved or complicated by the policy reforms. However, the limitation of this is the reduction of the policy utility of the findings as detailed knowledge of the magnitude of the impact of each single policy change and economic reversal indicator cannot be measured. Instead the direction and magnitude of changes are only given in an aggregate manner.

- The extreme shortage of data and the smaller size of the modern social security system precluded a thorough assessment of the changes in social security. The sporadic touching of social security issues made in this study is not a substitute for an in-depth investigation of how the social security system(s) has (ve) been affected by economic downturns and related policy developments.
- The fact that this study has not used quantitative statistical techniques such as regression analyses or other relevant techniques, though has been justified (See Chapter 3), still limits the generality of some of its findings. Specifically, when we considered the health impact we have selected some inputs as relevant while we omitted some others. Since both the inclusion and omission of input variables has not been based upon use of a relevant statistical technique such as stepwise regression to select the statistically more significant inputs, some arbitrariness remains in our analyses. However, the fact that we have emulated past studies and attempted to use qualitative and theoretical justifications will hopefully reduce this arbitrariness.

CHAPTER TWO

MODELING HEALTH AND THE ECONOMY

Historical and Analytical Profiles

Physicians of the utmost fame,
Were called at once; but when they came,
They answered as they took their fees,
'There is no cure for this disease.'

Hilaire Belloc[1]

2.1: Introduction

In this chapter we analyze the evolution of the present conceptual frameworks that are frequently used in the application of analytical tools to health. By necessity the relevant techniques are a function not only of the abstract theoretical developments in analytical tools, but also of the practical policy-induced predictive or explanatory power of these tools. In section 2.2 we give a brief historical account of economic analysis in the health and health services field. We have attempted to trace, in as a concise manner as possible, the practical and methodological factors that induced the use of economic tools. In section 2.3 a profile of the main models that have been used in explaining the linkages between economic and health variables is drawn. In section 2.4 we give a relatively more elaborate discussion of the household model. With these contents, this chapter is essential as the groundwork for the more

[1]Quoted in Macleod 1984 PP. 808.

specific chapter that will discuss the conceptual framework to be used in guiding the analysis in the rest of this study.

2.2 A brief history of Economics in Health

History stands witness to the fact that the importance of the 'state of the economy for the health of individuals and societies' has been recognized long before the actual application of ' economic analysis' in the field of health. The cost to humanity of this lag remains to be assessed. In fact the use of economics in the analysis of health states and health systems came only after the Second World War. Health economics came to being as an offshoot to the development of the 'Human Capital' doctrine. The interest of economists in Human Capital itself came as a response to the inability of the conventional theories of economic growth to explain the high rates of economic growth in European countries. These conventional theories were based on the understanding that labor and physical capital are the major determinants of economic growth. Labor in these theories was conceived as mere undifferentiated quantitative units. Thus the level of production in any economy was assumed to be determined according to a production
function of the following format:

Q= Q(K,L). (2.1)

Where:

Q = the level of output.

K= Units of physical capital.

L= Labor units.

Given equation 2.1 and assuming constant returns to scale the growth in output (Q) depends solely on changes in K & L. Models based on this relation and its underlying assumptions have reportedly failed to explain the observed rates of growth which were higher than what they can predict (Mushkin 1962). Therefore economists realized the need to seek alternative explanations. A possible candidate for explaining the unexplained residual growth rates was the increased accumulation of Human Capital embodied in the labor force. Thus the human capital hypothesis came into being. The additional growth rate was attributed to the fact that the labor force became more educated and healthier-and hence more productive- as result of the investments in education and health services that took place during the periods of high economic growth. As remarked by Mushkin (ibid) the wide interest in the human capital argument:

> " indicates much more than academic curiosity. It reflects the desires and aspirations of people throughout the world- people anxious to add weight to their demands for action against disease and illiteracy by showing that such action is not only humanitarian, but will make a major contribution to economic growth as well." The need to demonstrate the economic viability of health and educational expenditures emerged with force in developing countries. At first to maintain the momentum of social development in the face of "trickle down theories" especially after the fading out of the initial enthusiasm for social development following independence, and lately in the face of the expenditure cuts implied by the stabilization and structural adjustment policies.

Despite the plausibility of the human capital hypothesis it was not the sole intellectual and practical reason behind the growth and persistence of the role of economics in health. More and more recognition of non-medical determinants of health levels in the corridors of health policy-making helped to promote the application of economic methodologies in the health field. George Cumper (1984) described the shift in views in health determinants in the following words:

> "Broadly, the emphasis was changing from specifically medical inputs into the health services, to the management of these services, then to the causative role of social services other than health services (such as water supply, sanitation, and education), and further to even broader factors such as housing, diet and income levels in general." (Cumper 1984 P.2).

The interplay of different factors in the determination of health levels with the need for assessing the relative effectiveness of health policies and programs gave economics an indisputable role in the analysis of health systems, policies and programs. Moreover research by medical historians has strengthened the move towards more use of economic techniques. McKeown (1976) using data on England and Wales was able to show that nutritional and economic factors played the crucial role in the reported decline of infant mortality in England and Wales during the century. Fuchs (1973) without denying the contribution of medical services demonstrated that mortality associated with tuberculosis in the United States started to decline before the discovery and formulation of modern treatment preparations confirming that the role of medical technology in bringing about health improvements is relative rather than absolute.

Beside the policy developments cited above, two major practical reasons stood behind the confirmation of the utility of economic analysis in the health field. The first of these is the great advances in the field of diagnostic and curative medical techniques that have been realized in western societies. These advances created a great social and professional enthusiasm for further developments in medical research and, therefore, a greater inclination for the use of sophisticated and costly technologies irrespective of economic cost. The result was a very high increase in medical costs as a percentage of the GDP of developed western countries. In the United States expenditures on personal medical services increased from $10.8 billion in 1951 to $255 billion in 1981, and most of the increase was claimed to have happened during the 1970s decade (Feldstein 1983 P.1). Thus the so-called health cost explosion came into being as a great issue for public debate in which economists had a lion's share. Further ground in health policy research became the domain of economists and fellow social scientists especially sociologists. Although medical sociology as a recognized discipline existed before health economics its domain has been enriched greatly by the advent of the latter. Thus, medical sociologists, beside their traditional areas of social discourse, started to investigate not only the social limits and limitations of medicine as a social institution, but also the efficacy and efficiency aspects of medical technology[1].

Economic difficulties that bedeviled the developing world in the wake of the first and second oil shocks, the debt crises and the accompanying problems of financing have created a crisis situation for the social sectors. Within these circumstances both governmental and non-

[1]Evidence of this could be found in the works of Illich (1976), Zola (1978) & Mahler (1978) detailed in the reference citations.

governmental organizations involved in the provision of health services have been pressed to look for better ways of using the dwindling funds which could be won for health and education. The national and international donors and the financing governmental bodies started to look for value for the money they allocate to the social sectors. Therefore both donor organizations and national governments became keener to ascertain the efficient use of resources they allocate to health and education. This made the demand for the services of health economists to continue to rise. The situation has been consolidated by the exceptionally harsh adjustments of health sectors in the developing world to cuts in governmental expenditures on health as required by economic stabilization and adjustment programs. The already low levels of health indicators and the ever-widening gap between developed and developing countries according to these indicators made the rationalization of available resources an inescapable necessity.

2.3. Profile of some economic and medical models

In the previous section we have shown how economic analysis came to be used in the field of health. In this section we will review the ways in which both economists and health researchers have conceptualized the interrelations between health and economic variables. Our aim is to select the model or models most suitable for synthesizing interdisciplinary (medical and economic) analytic endeavors. Since a large number of models exists we will review only those which represent the major theoretical viewpoints and that are more relevant to our analysis.

The reviewer of health-economic models can easily identify a perceptible pattern of historical developments. These models which are presently in applied use have drawn on both the traditions of economic and epidemiological research. At the beginning each discipline, naturally, started to develop its own independent models with convergence emerging later on. In 2.3.1 we will pursue the development of economic models; in 2.3.2 models developed by epidemiologists and other medical researchers will be reviewed; synthesis or multi-disciplinary models will then be outlined in section 2.3.3.

2.3.1 Economic Models:

Economists introduced multi-variable models to analyze health services based on the traditions of their own discipline. If one wished to review all economic models in a census-like manner, (s)he would be setting himself an impossible task. There can be many models as there are economists and even the same economist may entertain the application and testing of more than one model in different time and topical contexts. Therefore a useful and practical strategy in this review will be to include only the major economic models applied in the analyses of health and health care. These will be the models that have either played a major role in applied research and/or are considered as theoretical landmarks in the discipline. Even models with these characteristics will not receive emphasis in the discussion unless they are of particular relevance to the theme of our study.

To begin, with we should state that the first attempts at economic health research were not welcome to the medical community, and were considered a sort of parasitism. The belief that health was *'not a subject for economic analysis'* was even adopted by economists. It is claimed

that in Great Britain the early economic debate on health was mainly political and concentrated on either showing the advantages of *'socialized medicine'* or ' *defend the private market for medical care* ' . This political dimension of the economic debate in health gave way to a view that economic dimensions of health transcend political frontiers (Teeling Smith 1987 P. 1). Earlier economic investigations of health concentrated on the impact of the health variables on economic variables, such as the growth rate, the share of health expenditures in overall government expenditures, the contribution of health services on resources. Therefore the conventional analytic economic models of growth theory, public finance and labor economics were used. The major modifications that were made in adapting these economic models to suit the analytic needs of the health sector drew on the monumental paper by Kenneth Arrow on the characteristics that differentiate health from the standard economic good (Arrow 1963). On the basis of Arrow's article subsequent works (cf. Culyer 1973) started to draw distinct features of an emerging discipline of health economics. The readings compiled by Cooper & Culyer (1973) are an excellent illustration of the type of health economic research that drew on conventional economic models using the Arrovian caveats as modifiers.

In developing countries, earlier research targeted the empirical analysis of influence of health inputs on health outputs. A number of traditional designs were used. The unit of analysis was the individual country and therefore cross-country data was assembled and analyzed by applying statistical techniques such as simple correlation and regression techniques. Using a health production function framework with mortality as an output indicator and a wide range of input measures covering health services, diet, income, education and population density,

Cochrane Et. Al. (1978) derived estimates of the parameters. The results have been commended as confirming many of the hypothesized relationships; but a number of anomalies, such as a positive correlation between the number of doctors and the Infant Mortality Rate, have been shown (Cumper 1984). Other studies that used the production function technique were reported in the United States at state, district, and even at household levels (for details see Chapter 2 of Feldstein 1983). Another cross-country study (Preston 1973) attempted to carry out analysis of the stability of health and income levels over time. He compiled data on life expectancy at birth from a number of developed and developing countries centering on the period 1930 and 1960. The logistic curves fitted to this data showed a marked upward slope of the curve with time. Of the earliest economic models that understandably found publicity is the Barlow's model (Barlow 1968) which was a macroeconomic model that aimed at the assessment of the economic impact of malaria eradication in Sri Lanka. This model has been overwhelmed by investigating the demographic impact of malaria eradication. This model is more or less of a pedagogic value only since it was essentially aiming at assessing the impact of a single autonomous health improvement and also because it lost topicality since the re-emergence (or reintroduction of Malaria) in Sri Lanka (Cumper Op. cit.).

Most of the economic models referred to above fall within the frame of studying the allocation of resources to the health sector compared with other sectors as they help analyze the impact of multiple variables on health with health services being treated as one of these inputs. Economic models have been used also for allocating resources within the health sector. The conventional techniques of economic evaluation

have been used, both in developed and developing countries, to assess the allocative efficiency of different health administrative and organizational setups. The health cost escalation problem referred to earlier led to increased use of evaluation techniques, especially of diseases that demand high diagnostic technologies (Mahler 1978). Economic evaluation methods also became popular in developing countries as more donors started to ask for reports on the use of the funds that they advance. Also with the financial retrenchment accompanying the pressing economic conditions, governments started to become more cost conscious. Anne mills reflected this in her survey of studies in developing countries (Mills 1984).

Hopefully, the above account is sufficient to illustrate the encroachment of economic analysis into the analysis of health issues. A careful follow up of the above will reveal that economists, at the beginning, became interested in health as much as it impinges on the traditional categories of economic analysis. Realizing the size of economic resources used by the health sector, economists became more interested in a closer investigation of how the resources allocated to the health sector are reallocated within it. The economic significance of this sector led economists to not only look at the impact of health on the economy but also at the impact of the economic and related demographic and social variables on health. Therefore the shift of interest to the micro-determinants of health levels helped the convergence between economic and medical models that will be described later.

2.3.2 Medical Models:

As economists developed a gradual interest in studying the impact of the health sector on the economy, health researchers of different sub-

disciplines developed an in interest in studying the impact of economic variables on health. At the beginning this interest was dictated by purely scientific motivations arising from the need to unravel reasons behind the spread and control of diseases in an attempt to improve both diagnosis and prognosis. The economic pressures of the last few decades with their concomitant pressures on the health sector from both sides of demand and supply made the consideration of economic variables a practical necessity. Thus even at this stage we find common factors and considerations that drive economists and health researchers to take notice of each other which explains reasons for convergence in methods and subject matters.

Of all health researchers epidemiologists were the first to take interest in probing the role of non-medical factors in the determination of health levels in a scientifically rigorous manner. Nutritionists were among the first health workers to recognize the role and function of economic variables and institutions in determining nutritional and health status. The writings of Alan berg (1973) and the proceedings of the International Conference on Nutrition, National Development, and planning (Berg, Scrimshaw and Call 1971) are prominent evidence of this. The works of McKeown (1976), Cochrane (1972) and the Black Report (DHSS 1980) demonstrate the recognition of the role of economic factors in health in the Developed World, while King (1966), Bryant (1969), Mosley and Chen (1984), and a plethora of recent writings established this fact for Developing Countries. The eminent place that non-medical factors have occupied in the minds of students of health issues, is attested to by the fact that the 4th edition of the famous medical textbook " DAVIDSON'S PRINCIPLES & PRACTICE OF MEDICINE (Macleod 1984) has devoted a whole chapter for the study

of the role of non-medical factors in the provision and the impact of medical care .

The increasing recognition of the role of economics in health led health researchers to develop models that studies the importance of community and economic variables on health. A number of models were developed. The most famous and widely recognized are those reviewed in Mosley & Chen (1984). Most of these models recognized the impact of economic variables either directly or indirectly (through other inputs) on health status indicators. For example Barnum and Barlow attempted to develop a model to guide resource allocation on child survival (1984). Their model is an optimization model that relates health program inputs to outcomes such as morbidity, fatality, and mortality. It includes 36 interventions and 7 socio-economic variables (Ibid.). T. Paul Schultz (1984) developed an integrated model to study the impact of household economic and community variables on child mortality. He demonstrated how the epidemiologists' direct association between inputs to health such as nutrition and medical care and health outcomes such as child morbidity, mortality, and disability leads to statistic al bias. The use of an integrated epidemiologist-cum-economist framework will allow one 'to estimate without bias both the underlying biological and behavioral relationships that will allow one to assess the benefits of technology-based health interventions and the consequences of socio-economic change that affects the prospects for child survival by influencing peoples opportunities and thereby their use of health related inputs'. (Ibid.).

2.3.3. A Synthesis between Economic and Medical Models:

Despite its brevity and highly selective nature the above account of the economic and medical models that relate socio-economic and health variables, demonstrates the unmistakable tendency toward convergence between medical and economic perspectives. Interdisciplinary approaches to economic aspects of health are not only an attractive fashion but a professional necessity dictated by decades of researches and investigations by both economists and health workers. The shortly reviewed Schultz's article demonstrates the need for such convergence. The following section will present a comprehensive framework that permits researchers from both disciplines to explore health-economic issues in a theoretically satisfactory manner.

2.4 Household Production: A Framework for Convergence between Economic and Medical Models:

An important path-breaking development in economic research that found extensive acceptability and application in the field of health and health care is the development of household models. Its comprehensive multi-variable nature and the fact that it uses the family as its basic unit of analysis helped to bridge the large conceptual gaps that separated economists and health care researchers. The economist's basic units of analysis are optimizing individuals or firms who purchase an assortment of goods (or resource inputs) in such a way as to maximize their utility or (profit) given the amount of resources available to them usually referred to as budget (or cost) constraints. This conceptualization has the following basic features (or underlying assumptions):

- There is a clear-cut separation between production and consumption activities. I.e. production is the domain of firms while consumption is the domain of individuals and/or households.
- The individual utility functions are defined over quantities of market goods purchased, and constraints are functions of market goods and incomes and prices.
- Prices and incomes are assumed to be completely exogenous.
- Based on these assumptions and some other standard assumptions demand and supply functions, which are functions of incomes and prices, are derived from the maximization and minimization of the respective utility and cost functions subject to standard constraints.

The shortcomings of the above-outlined model in explaining many of observed economic phenomena paved the road for the development of alternative theoretical frameworks. The seperability assumption has been challenged in the seminal work of Gary Becker (1964) who formulated the household model and pioneered the theory of household production. According to Becker (Ibid.) household utility functions should be thought of as defined over more fundamental objects of choice that he called commodities instead of being defined over market goods. Households produce commodities by combining their own time with market goods. Therefore time, monetary income, and household production functions are the relevant multiple household constraints. The idea of household production discusses many awkward assumptions in the traditional theory. First among these is the seperability assumption i.e. the idea that demand and supply are completely not linked and that income and prices are exogenous. Now income itself is defined within the system as time, which could be spent on consumption or production

activities, is part of the constraint. The seperability assumption was a great nuisance for economists studying the behavior of small producers in developing countries whose production is partially for subsistence and partially for the market. Therefore the first applications of this model were in developing countries agriculture (Singh, Squire and Strauss 1986). The seperability assumption is also not applicable for many informal sector productive activities in developing countries, and as this sub-sector has been enlarged in response to economic adversity, the arena for the practical use of the household production model expands.

Another unrealistic assumption, which can now be abandoned, is the omission of time as a relevant input in consumption. As a matter of fact the importation of the importance of the time element in the analysis of consumption and production was the major force behind the development of the household production model. Becker's analyses (Op.Cit) sought to emphasize the role of time by explaining the expansion in demand for higher education in the U.S.A. despite rising costs in terms of the prevalence of high rates of unemployment (i.e. low opportunity cost of time). Also the importance of the element of time has been emphasized in the debate on the role of time prices in influencing demand for health services by imparting a downwards bias in the estimated price elasticity of demand (see Sorkin 1975 P.). Time prices were also used as an alternative explanation for the empirically observed increase in demand for medical care that accompanies the increase in the doctor stock. Such increases in demand were explained within the analytical framework of the doctor-induced demand hypotheses.

It is also apt here to mention that we believe that household production theory must have added much substance to labor market economic analysis, beside those features relating to job search and information mentioned by Gravelle & Rees (1981) and Blaug (1984). We believe that a genuine explanation of the previously considered anomalous back-bending labor supply curve is permitted by this theory. Instead of explaining the back-bent of the labor supply curve on the basis of the marginal utility of leisure compared to marginal utility of work we can now resort to a more thorough comparison of market and (household) productivity of time. What was previously considered leisure time is now the time input used in either producing recreation or even sleeping time when combined with the relevant market goods, such as sports and bedding equipment. Grossman (1972) has celebrated a further analytical virtue for household production theory in the field of health. In his pioneering article on the demand for health capital he used Becker's contribution in formulating a demand for health capital. The most prominent feature of this theory is its ability to provide a conceptual framework for dealing with health as the direct subject of demand. Previously economists were at great pains to analyze the demand for health indirectly by analyzing the demand for health services as a proxy or derived demand. Now with the analytical courage bestowed upon them by household production theory, economist can directly send their spears of analysis at the elephant (health) rather than its shadow (health services).

The above-mentioned features of the household production model are easily seen when a mathematical formulation is offered. In what follows we will use the formulation described by Behrman & Deolalikar (1988) in their comprehensive review of economic

writings on health and nutrition. Many different formulations of household models reflecting both the historical development and the contextual application exist, and the salient feature of the formulation we are going to outline is its inclusion of almost all the relevant features for the analyses of health and nutrition behavior. Although this formulation is basically based on Grossman's Model, it is easier in exposition than that original model. The following algebraic statement of the household model, as the authors say, is not 'necessarily to derive a priori predictions of household responses to exogenous shocks.' Because 'the model is far too complicated for such exercises' and 'testable predictions can be derived only if one is willing to simplify the assumptions considerably and probably unrealistically' (Behrman and Deolalikar, Ibid.). Our overriding concern is the enunciation of a sound theoretical framework within which the impact of economic difficulties on health related inputs and ultimately on health can be analyzed. This objective is as legitimate as the basic objective of the model formulators, which was to ' indicate how the available empirical estimates of health, nutrition, mortality, and health care determinants (and of the impact of health, mortality, and nutrition) on labor productivity and on fertility fit in a household decision framework.' (Behrman & Deolalikar Op.Cit.). In fact the frequent use of the household production conceptual framework in assessing the impact of economic structural programs gives added force to our justification. Below is an outline of the model in a stepwise format:

1. ***Household Preference functions****:*

Assume that the household has a preference function:

$U = U(H^i, \mathbf{C}^p, C^i, T^i_L, E^{i/c}, S; \varepsilon)$ i=1……,..I. *(1).*

Where

H^i is the health of household member i.

C^i ,C^p is the consumption of household member i, with the superscript p referring to pure public goods.

T^i_L is the leisure time of household member i.

$E^{i/c}$ is the education of household child i.

S is the number of surviving children.

ε Stands taste norms.

I is the number of individuals in the household.

It can readily be seen that this preference function has arguments, which are not market goods but objects of choice that themselves have passed through an intermediate production stage i.e. commodities in the Beckerian sense. In particular health rather than medical care (or health goods) is directly entering the preference function. This allows the researcher to deal directly with households' decisions on the quantity of health (or health capital) that they desire. It should be remarked that this particular formulation does include infant mortality (measured by the number of surviving children) as an argument separate from health. This reflects the overwhelming consciousness of the well-known difficulty of calibrating morbidity and mortality measures in a single health status measure[1]. It would have, perhaps, been more appropriate to subsume mortality within the health variable. The increasing use of single health status measures such as quality adjusted life years (Qalys) and disability adjusted life years (Dalys), and the general theoretical framework nature of this formulation (see above) would have been sufficient justifications for such an action.

[1] For a more thorough discussion of this topic refer to the discussion on mortality in Chapter 7.

The above outlined preference function is assumed to be maximized subject to two sets of constraints given assets and prices. The first set of constraints can be divided into three subcategories of production functions : Ones that produce health and nutrition, ones in which health and nutrition affect other outcomes and ones in which health and nutrition do not enter. Our primary concern will be with the first subcategory to which we turn below.

Production functions determining health, mortality, and nutrient intakes:

It is assumed that the health of the ith individual is a function of a number of choices relating to the consumption and time use of that individual, the educational status of that individual and of the key persons in the household making and implementing health-related decisions, and the individual and household endowments:

$$H^i = H(N^i, C^p, I, E^i, E^m, T^i_L, T^i_H, T^m_H, \eta^i, \Omega). \qquad (2).$$

Where

N^I is the nutrient intake of the ith individual.

E^I is the educational status of the ith individual.

E^m is the educational status of the person - often the mother or wife - who makes critical health-related decisions and implements them within the household.

T^i_H is the time of the ith individual devoted to health related procedures.

T^m_H is the time of the person who makes critical health-related decisions and implements them within the household devoted to health related procedures.

η^i Natural endowment of the ith individual (e.g. genetic make-up).

Ω The endowment of the household/firm (e.g. the general environment).

All other variables are as defined in (1) above.

The arguments of the health production function can have different effects on health. For developing countries where food deficiency prevails for a vast majority of people nutrient intakes are expected to have positive effects on health i.e. $\delta H/\delta N > 0$, although in general $\delta H/\delta N$ could be negative e.g. too much intake of carbohydrates could lead to obesity and thus increases the risk of cardiovascular diseases. The other consumption goods C^i & C^p include commodities with direct effects on health such as medicines, alcohol, driving vehicles, sports and physical infrastructures such as roads and industrial safety equipment. The effects of these goods could be either positive or negative depending on the type and quantity consumed and/or provided. In mathematical idiom $\delta H/\delta C^i > \text{or} < 0$. the household size I is included to represent possible scale and congestion effects. The individual's time use is included because the nature of his occupation (not explicitly included), the extent of leisure time T^i_L and the time devoted to health-related activities $T^i_{H\,\&}\ T^m_{H,}$ may have strong health effects. Occupational status has a strong effect through job more job hazards for example more than average vulnerability to water-related diseases (such as schistosomiasis and malaria in irrigated agricultural projects) and high levels of energy input required by jobs such as road construction or sugar cane cutting. Educational status of the

individual and of the key decision person in the household affect health through health practices and effectiveness of the use of health inputs such as use of oral re-hydration salts and choice of the appropriate level of care. η^i & Ω, which are the endowment variables, differ from the other variables in that they are presumed not to be choice variables of the household during the modeled decision period.

The mortality function for individual i is intimately related to his health with death occurring if health falls below a critical minimum level (H^*):

$$M^i = M(H^i - H^*) \quad i = 1....,I. \qquad (3).$$

The food intake of the ith individual N^i depends upon the food intake of that individual (C^i, with non-food items having 0 weights), perhaps as modified by the skills E^m, and time input $T^m{}_H$ of the food preparer and the household environment (Ω).

$$N^i = (C^i, E^m, T^m{}_H, \Omega). \qquad (4).$$

The three last terms of 4 may modify the nutrients obtained from given food intakes, since such nutrients depend on the methods of food storage and preparation.

2. Production Functions With Health And Nutrients As Inputs:

Two types of income-generating production functions have been frequently postulated. We chose to introduce these production functions

into our analysis because of their importance in completing the set of constraints which provides the relevant framework of maximizing equation (1). Moreover, the analysis of the following chapters make frequent reference (direct or indirect) to many of the variables we are entering in these functions.

The wage of the ith individual P^i_L is assumed to reflect a maximizing choice given the individual's characteristics and the labor market characteristics (or community endowments):

$P^i_L = P^i (H^i , N^i , E^i , \eta , \theta)$ (5).

Where

θ Refers to community characteristics including, but not limited to, labor market conditions.

P^i_L is the wage of the ith individual.

N^i , E^i , η As defined earlier.

This equation postulates that the wage level of the ith individual depends upon the health and nutritional status of that individual, his educational attainment, and natural endowment and the community endowment. This is not far away from the neoclassical assumption that the real wage is a function of the marginal physical productivity but is a substantiation of that assumption by direct investigation of the factors (both natural and human capital) that govern productivity.

The other income-generating production function is a household production function that is of particular relevance in describing and analyzing the behavior of semi-subsistent rural households and urban

households engaged in informal sector activities. The basic feature characterizing such households is production of items the output of which is partially withheld for own consumption and partially sold in the market. Therefore the consumption and income generation decisions are taken simultaneously. When the product in question is a food item as is often the case in urban informal sector production or a health-related service as in traditional healing and herbal systems then the health and nutritional status decisions are part of the mentioned simultaneity.

The household farm/firm production function depends on the characteristics of all members of the household who are involved in the income generating activity; on the capital stock K (which may include land and agricultural implements for household farming households and premises and utensils for informal sector food producing households; intermediate inputs (A); on hired labor L*; and on the household environment (Ω). Following is the general format of the household/farm/firm production function:

$$Y^h = Y(H^i, N^i, E^i, T^i_F, \eta^i, K, A, \Omega). \qquad I = 1.....,I. \quad (6).$$

Where

Y^h the household farm/firm product.

K Capital stock used in the production process. (Note that this capital stock could partially be owned by the household K^h and partially rented K*.) A, Ω).

T^i_F the time of the ith household member spent on household firm/farm production.

A Intermediate inputs used in firm/farm production.

L^* Effective hired labor used in firm/farm production.

H^i , N^i , E^i , η^i, Ω All these variables are defined above.

Health and nutrition enter relations (5) & (6) according to the hypothesis of well-steeped authors (See Behrman and Deaolalikar 1988, P. 644) that better health and nutrition may increase labor productivity. Nutrition has been introduced as separate variable because in addition to its indirect labor productivity impact through improving health status, it has a direct effect on productivity by increasing energy expenditure.

3. Full Income Constraint

The concept of full income constraint had been introduced by the first pioneer human capital research Becker 1964 and Grossman 1972 and subsequently by most researchers in this tradition. Its full in the sense that it considers all possible sources income whether earned or unearned. Earned income is just a deduction from the total time available to household members which uses the rest of time in the production of household commodities that enter directly in their utility generating functions. The following are the time and income constraints combined in a single full income constraint:

$$\Sigma P^i_L\ T^i_W + R + p_y Y^h - PA - P_L{}^*L^* - \Sigma P^i_L\ T^i_F - dK^h - rK^* + \Sigma P^i_L\ T^i_L = P_C C + P_F C_F + \Sigma^k_{i=1} P_E E^I + \Sigma P^i_L\ (T^I - T^i_F - T^i_W - T^i_{H,}\ T^i_E). \quad (7).$$

Where

r rental rate on hired capital.

d the depreciation rate on capital.

T^i the total time of the ith individual.

T^i_W is the labor market work time of the ith individual.

R is transfers minus taxes (assumed to be lump sum for simplicity).

Pj refers to different prices.

With this full income constraint the equations 1..6 above complete the household production model upon the optimization of which estimable relations could be derived.

4. Reduced form relations:

If we assume that the underlying functions have the desirable properties that ensure the existence of an internal maximum, the constrained maximization of preferences (1) leads to a set of reduced form relations that can succinctly be symbolized by:

$$Z = f(V) \qquad (8).$$

Where $Z = (H^i, N^i, C^i, C_F, P^i_L, T_H, y^h, T^i_L, T^i_W, T^{i/c}_E, L^*, A, E^{i/c}, M)$.

And $V = (P_c, P_F, P_E, P^*_L, P_A, P_Y, r, P_K, E^{i/a}, \eta^i, \Omega, \theta, \varepsilon, \kappa^h, \Sigma, d)$.

The left- hand-side variables of (8) are all of the endogenous variables type of the system for the household described by the equations 1 through 7 while the right hand variables are of the exogenous type.

These reduced form equations are the subject of empirical estimation that does not give much information on the parameters of structural relations. Instead these equations furnish "a consistent (*theoretical*) framework within which to examine the impact of changes in market

prices, endowments and policies on the health and nutrition-related consumption of different types of individuals.). (Behrman & Deolalikar 1988). This property of the reduced form is of a very high relevance for our ensuing analysis and is also a strong legitimization for the methodology we intend to follow. If it is legitimate to use a household production framework to evaluate empirical estimates of health and nutrition related variables that have been carried out within other frameworks, it is quite legitimate to evaluate the impact of changes in economic variables on health and nutrition variables within this framework.

Before leaving this context it is informative to comment on some characteristics of the reduced form relations depicted in (8) above:

- The first characteristic is that all the exogenous prices enter into the determination of each of the endogenous variables. For example, health depends, among others, on the prices of all consumption goods and services, the prices of all farm/firm products and inputs and not just on food and directly health-related input prices. In practice and, especially in the context of developing countries, it is not possible to introduce all prices in empirical estimations. This will create some omitted variable biases in the obtained estimates. However, this remark does not detract from the viability of this study because it does not carry an econometric estimation.
- The second observation regarding the reduced form equations is that wages (price of labor) which are considered to be endogenous as in (5) above cannot be included in the right hand side exogenous variables of the reduced form. Therefore they

cannot be used in evaluating the opportunity cost of time in empirical studies as suggested by Rosenzweig (1985).

♦ The third characteristic is that all the predetermined assets enter in all the reduced form relations. The endowments of the adults and the production assets of the farm/firm for example, have an effect on the health and nutrient intake of children. Moreover, a number of the components of the endowments, such as the genetic make up of natural endowments of the ith individual ηi, and some environmental dimensions of the community endowments Ω, and community characteristics θ, are not usually observed in socio-economic data sets. The failure to observe, and hence to include, these variables also tends to create omitted variables bias in the empirical micro-estimates of reduced form determinants of health and nutrition as may be the case for the education of adults.

♦ The fourth characteristic is that the impact of government policies on health and nutrition usually works through prices, community endowments and income transfers. Policies acting via prices include subsidized or free provision of food and health services, but also any of the prices in the right hand side of (8) such as subsidized fertilizer prices. Policies may also change community endowments through public work and public health programs such as malaria control. To the extent that individuals can change endowments through programs, these endowments become endogenous and therefore would not appear among the right-hand-side variables of the reduced form equations.

♦ Th fifth characteristic relates to the influence of private firms and farms on altering the environment in which households operate, through the labor market and other markets, and through

community endowments. The technical choices made by such entities affect the wage and occupational choices made by households and the environment in which household members live and work. This observation is more pertinent in developing countries where semi-subsistent agricultural and informal sector production prevails. To the extent that the adopted production technology of the household firm/farm is sensitive to choices of these entities, the greater will be their influence. The final impact rests on health and nutrition.

- The sixth consideration is the possibility of the differential impact of exogenous changes in prices and endowments on different members of the household. For, example, the health of the breadwinner in the household may be affected negatively by choice of higher income more hazardous job while the health of children may be affected positively. Also a policy of food targeting may not be effective if food allocation criteria within the household are not conducive.

- The seventh characteristic of the derived reduced form equations is the lack of a specification of an appropriate lag structures because of gestational periods and expectation formation. For example, investment in children health may be dependent upon expectation of future labor market returns. This requires that the reduced form relations include some representation of the expected returns in the right-hand-side.

- The eighth consideration is that different households may have different reduced form relations because of inadequate representation of the constraints. This could be illustrated by the example of food subsidy that precludes reselling of the ration in the open market (See Behrman & Deolalikar 1988). Households

will be of one of the three types : Those who buy the ration and buy a topping in the open market, those who buy just the subsidized ration, and those who buy part of the ration. If the subsidized ration is to be increased the impact will be different for each type.

- Ninth, it should be noted that any imposed structure on the underlying structural relations will reflect on restrictions on the reduced form coefficients.

2.3.5: Macroeconomic Considerations and the household model:

The household production framework has been basically developed as a partial equilibrium microeconomic analytical tool. Later application of the model witnessed both horizontal and vertical expansion. In what follows, a brief review of the major areas of application of the household model would be mentioned before we turn to macroeconomic considerations.

Horizontally the model has been applied to several areas that were previously analyzed within the frameworks of received theory. The model, as noted in the above paragraphs, was first applied in analyzing problematic issues in the special and newly touched areas of education and health. Its comprehensive nature enticed researchers to spread its use to other areas such as the analyses of the deforestation impact of traditional households (cf. Amacher et.al. 1993). Vertically the model has been extended to handle complications such as infra-household allocation questions and infra-household conflicts. Some of these developments in the household model arose out of empirical anomalies

but some arose out of differences in approach that are precipitated by some positions of the feminist school which used the framework for discussing gender relations within the family (cf. Folbre1986). The impact of the household model as forceful analytical device is its ability to cross even the most guarded ideological boundaries. An obvious illustration of this last remark is the fact that although, the modern revival of the household as an appropriate unit of analysis started in the U.S.A. as theoretical off-shoot from the new classical tradition, Marxists adopted it as an appropriate unit of analysis long before the aftermath of the prestorika. This can be illustrated by the publication in 1984, within the Marxist tradition, of a book that mainly uses research methods that draw on concepts of the household (See Smith et.al. 1984).

Within the African context Mafeje (1991) pointed out a number of methodological considerations which should be considered in applying the household model in different geo-social contexts and when using different disciplinary perspectives. In our view the great ideological and methodological debates which the use of the household model provoked attest to its plausibility as an important methodological advance. This is because the controversies that arose centered not on the viability of using the concept per se but on the exact manner of conceptualizing this generally accepted unit of analysis. Therefore it becomes obvious why this concept has been extended to the macro level despite its micro-economic conceptual nature. To such considerations we turn in the following paragraph.

In principle the functions shown in (1) through (8) above could be aggregated over all households. They will then be valid at the macroeconomic level as well. The general truth of this observation is

verified by the its frequent appearance in the major professional sources. to illustrate this we refer the reader to three recent major works. The first is a recently published health economics textbook that used a simple diagrammatic representation using a four quadrant diagram to illustrate the influences of household choices on its individuals' health (Zweifel & Breyer 1997). The authors depicted the model at the micro level and then described the possibility of its extension to the macro level (ibid. pp. 4-7). Secondly, the World Health Organization in a recent program publication described a household model to guide micro-economic analysis of the interaction between poverty and health within a household framework (WHO 1997). The possibility of the movement from the micro to the macro was explicitly stated in the introduction to this study as follows: " ..these linkages will be studied from a microeconomic point of view. Impacts of the macroeconomic environment on poverty and health are not addressed explicitly. The latter are surely important and demand additional inquiry. In fact we understand the current analysis to be essential basis for macro-economic analysis". Thirdly, Behrman and Deolalikar (Op. Cit.) after presenting their version of the household model that we outlined above proceeded to discussing the macroeconomic issues as a matter of natural succession.

However, it should not be surprising to find virtual consensus on the movement from the micro to the macro when discussing household models. The wider discipline of Economics has concerned itself with the establishment of micro-foundations for macroeconomic analysis after the Keynesian tradition lost its earlier virility. General Equilibrium Models have forced their way into both theoretical and empirical works, as Computable General Equilibrium and Social Accounting Matrices

became essential explanatory tools. However it should be mentioned that despite the above mentioned basis for macroeconomic extensions of household models we need to, at least briefly, discuss the major considerations that arise when such extension is attempted.

There are four considerations regarding the procedure of aggregation from the micro to the macro level.:

1. The distribution of income and wealth make a great difference for health and nutrition Sen (1981) eloquently illustrates this when he discusses entitlement and nutritional status. Since inadequate health and nutrition concentrate at the lower income range of the income distribution curve, the analysis of averages over large groups becomes a bit misleading. In such analysis variables which are jointly determined by income along with the nutritional (or health) status may be only proxies for income rather than independently reflecting their independent expected effect.
2. Some variables that are exogenous at the level of the household may become endogenous at a more aggregate level of the analysis. For example community level variables such as prices and the physical environment become endogenous in as much as they are determined by governmental action and policy changes.
3. Although aggregate analysis has the advantage that random errors tend to average out as aggregation increases, systematic errors suggested by the micro level (due to unobserved endowments) will still create problems for the analysis at the macro level.
4. Aggregate relations appear to be aggregate representations of production functions or reduced form demand equations, but others take the form of market reduced form in which both

demand and supply factors are combined. The interpretation of such relations in a theoretically satisfactory manner will be difficult.

The above mentioned considerations are of high relevance from both theoretical and practical viewpoints; but this concession should not preclude us from the use of the household framework. A number of points support this remark. First, most of these considerations, it should be noted, are of an econometric and statistical nature. As such they only await refinement of statistical technique and methodology to be adequately handled without loss in the intellectual appeal of the household model. This is so because the household model is a relatively new discipline which is still in the early stages of its intellectual development; therefore there is still a chance to tackle the above mentioned considerations. History of science assures us that such a stage in the development of a new discipline is normal. Secondly, the quantitative and qualitative deficiency in available data precludes utilization of the full potential of the model even if no such considerations existed. It follows that, in practical terms, the handling of these considerations would not have any impact on improving the empirical content of studies carried within the analytical context of the household model. This reduces the potential loss consequential upon the presence of these considerations. Finally, we have already declared our intention to use the household model as a general analytical framework for our analysis and not for the estimation of any exact empirical relations directly derived from the structure of the model.

CHAPTER THREE

ECONOMIC CONDITIONS, ECONOMIC POLICIES AND HEALTH

Towards An Analytical Framework

3.1: Introduction

As earlier stated chapter 2 emphasized the discussion of the household model in a more or less general manner, without specific reference to economic changes and adjustments and their impact on health. Closer investigation of the health effects of economic reversals needs a more specific analytical framework. This chapter aspires at providing such a specific framework taking the theoretical background of the previous Chapter into account.

In section 3.2 the nature of the recent economic reversals in Developing Countries and the accompanying economic adjustment policies is described. Section 3.3 discusses the social dimensions of structural adjustment policy reforms and the shift in the approaches adopted in the analysis of the impact of the economic and policy variables on the social sectors, especially health. Section 3.4 outlines the empirical and theoretical research methods that have been used in the assessment of the economic and social effects of economic change and policy variables. Section 3.5 presents a discussion of the features and merits of the analytical framework that has been chosen for analyzing the effects of economic reversals on health in the Sudan.

3.2 Nature of Economic crises and Policy reforms during the 1980s:

Most countries in Sub-Saharan Africa, Latin America and some countries in Asia experienced severe economic crises during the 1980s. There is virtually consensus on the taxonomy of symptoms of these crises. The most clear and common symptoms are deficits in balance of payments, increasing government budget deficits, high rates of inflation and reduced economic growth (Cf. Pinsterup-Andersen 1993; Cornia et. al. 1987). Although not all researchers agree on the causes behind these symptoms, most of them are attributed to the adverse international developments during the late 1970s and the early 1980s. Notable among these developments are rapid changes in oil prices, falling and unstable prices of many export commodities, rapidly increasing rates of interest, increasing dependence on foreign loans as well as inappropriate domestic policies (Pinstrup-Andersen (Ibid.). In quantitative terms the world growth rate fell to 0.5% in 1981 and recovered to only 2.5% IN 1982. The developing countries as a whole had an average growth rate of 5% in the years 1977-1980, slightly slower than the 6% growth rate of the 1976-1978 period. The developing country growth rate dropped to an average of 1.5% . But this overall figure conceals wide differences between regions. Growth in Asia as whole was still over 5% though this conceals the much worse picture of the 7 least developed countries of the continent (Abel-Smith 1986). In Africa and the Middle east there was hardly any growth at all leading to a decline in income per head. In Latin America GDP per head fell by 3.7% in 1982 and by 5.7% in 1983 (Abel-Smith ibid.). These gloomy figures preempted the initiation of reform policies in developing countries.

Reforms reportedly differed considerably from country to country in terms of their pace, intensity and the mix and range of the policy instruments used. Despite this difference the underlying causes behind the reform actions are virtually the same, in particular 'severe macroeconomic imbalances' have 'triggered' the initiation of the reforms (UNCTAD 1994). The major policy reforms were the famous ' Stabilization' and 'Structural Adjustment' policies. Initially each set of policies has been distinctly associated with one of the twin organizations of the World Bank and the IMF, but later closer and direct policy coordination rendered this distinction irrelevant (Babiker 1999). Stabilization policies usually aim at removing short-term imbalances while structural adjustment policies are directed at medium and long-term structural changes in the economy. A World Bank consultant defines structural adjustment as " ...policy responses to external shocks, carried out with the objective of regaining the pre-shock growth path of the national economy. The regaining of the growth path, in turn, will necessitate improvements in the balance-of-payments following the adverse effects of external shocks, since a country's balance of payments position constrains its economic growth." (Bella Balassa 1981.)

In agreement with the above observation of the invalidity of the conventional distinction between stabilization and structural adjustment policies, Cornia (1987) labels the combined policy package as 'adjustment policies' and groups them into three categories:

1. Expenditure reducing policies aiming at curtailing demand (domestic resource use). These policies are the conventional

tools of demand management. As demand for both exportables and imports falls, the trade balance improves because imports are reduced and domestically produced goods are freed for export. Whenever domestic demand is in excess of full employment level, expenditure reduction is essential. However, in all cases in which, domestic demand is at or below full employment level, expenditure-reducing policies tend to achieve short-run equilibrium in the external balance at the expense of the internal balance; i.e. the cost of lower output, employment, capacity utilization, and incomes in the domestic economy. While the output of tradable may not decline (although in certain cases it may) since the decline in domestic demand may be offset by rising exports, in most cases output in the non-tradable sector (construction, services) will decline. Demand management policies generally include tighter money supply and reduced credit ceilings, curtailment of the public sector deficit, wage control, or more general policies aimed at restricting real incomes.

2. Expenditure-switching policies, aiming at shifting the productive resources (labor and capital) from the non-tradable to the tradable goods sector and from consumption to investment. This is normally achieved through manipulation of the relative prices of tradable versus non-tradable goods which is expected, in turn, to direct productive resources from the latter to the former sector where they can produce for exports or substitute for imports. Simultaneously, as a result of the changes, there will be a shift in domestic demand away from imports to domestically produced tradable and non-tradable goods. Under

complete switching the loss in output of non-tradable will be compensated fully by an increase in the output of tradable goods. This requires complete factor mobility which in reality is limited by technical factors, as existing capital (and to some extent labor) are often sector or activity specific and cannot be transferred between sectors or activities in the short run. Substantial investment may therefore be required to facilitate this process of conversion and to create new capacity in the tradable goods sector. Expenditure switching policies typically include policies in the area of exchange rate devaluation, trade interventions (export subsidies, import controls, tariffs, etc.), taxes, product pricing, and policies to enhance factor mobility.

3. Institutional and policy reforms: These are policies such as trade liberalization, reduced role of the state in the economy, fiscal reform, privatization, reform of the financial markets, reduced exchange controls, price reform.

These reforms, which have been initially advocated and promoted by the World Bank and the International Monetary Fund, have the general broad characteristic of being outward-oriented and market-oriented. These characteristics classifies these policies in the broad modernization school of development which sees development as more integration of the domestic economy into the international economy and the traditional subsistence sector into the modern market-oriented sector. As such little attention is given to fundamental structural changes that aim at the encouragement of sectoral inter-linkages of the domestic economy and de-linking from the international economy as advocated by the Structuralists and the dependency school.

3.3 Social dimensions of Economic Problems and policies:

At the earlier periods of the economic difficulties that faced the developing countries following the first and second oil shocks of the 1970s and the debt crises of the early eighties, their health and other social ramifications were not given priority. It was then thought that the economic manifestations of the crises are the most important. Even those were thought to be short-lived and accidental. Therefore policy emphasis were put on the removal of the most immediate causes of the crises which were understood to be excessive government spending and private consumption made possible by lax credit conditions, generous government subsidies, and inefficient tax collection capacity. However it would be too simplistic to assume that the newness of the crises is the main reason behind this understanding which overlooks the social elements. Intellectual factors had a role to play in forming such conceptualization of the causes and cure of the crisis. One such factor was the survival of the trickle down notion among the development aid donor community despite the appearance of approaches such as the "basic needs" and "redistribution with growth schools" in the 1970s. Anther intellectual factor behind the overlooking of the social and health dimensions of economic adjustment policies is the heavy involvement of the World Bank for Reconstruction and Development (IBRD) and the World Monetary Fund (IMF) in both diagnosis and prescriptions of cures for the economic malaise. It is well known that the mandate of each of these organizations at the time of their constitution has been to achieve certain " *economic policy objectives'* with no explicit reference to social objectives. Social objectives were, if

at all, implicitly assumed to hinge on the achievement of economic objectives.

Relatively recently the assessment of the social dimensions of economic variables gained increasing acceptability as use of social welfare measures alongside traditional economic performance measures in monitoring the success of policies has been advocated. The UNCTAD 1994 LDC Report page (3) states that the success and failure of economic reform policies "can best be judged in the light of the growth with equity imperatives outlined in the Paris Program Of Actions. The Report states that the yardsticks for measuring performance relate to the extent to which economic reforms accomplished the following major objectives:

(a) stabilization;
(b) Improvements in per capita GDP, gross domestic savings and investments ratios, and exports;
(c) Structural transformation (measured by using the share of the manufacturing value added as a proxy;
(d) Improved food security;
(e) Improvements in social welfare (measured by using government per capita expenditure on health and education as broad gauges of progress)." (UNCTAD 1994).

It is clear from this listing of performance indicators that social indicators started to be given some room in economic policy analysis. This shift of thinking had many underlying reasons. It started to be increasingly realized that health and social conditions are interrelated and that 'the problem of ill health in the Third World cannot be

etiologically separated from the poverty problem. Many millions of people in the developing countries die or are debilitated by diseases which (sic) are closely associated with poverty.' (MacPherson & Midgley 1987). The heightening consciousness of great international inequalities as the development gap between developed and developing countries widened and the highlighting of this in the international media especially during the African famine of the 1980s, created an influential international lobby for a more just world social order. Just a quick and random flashing of memory on the some of the popular titles in the development literature of the time, convinces the observer of the mounting international intolerance of inequality. 'Worlds Apart' (Cole and Miles 1984) and the heretic sounding ' By Bread Alone' (Lester & Eckholm 1975) suffice for supporting the previous claim.

The theory and practice of ' the relevance of social factors in economic policy analysis' was qualitatively enforced by the seminal contribution of the United Nations Children Fund (UNICEF) ' Adjustment with A Human Face' Cornia et. al. 1987'. This frequently quoted publication documented and analyzed the social and health impact of the 1980s economic difficulties and suggested alternative analytical and policy framework. The eminent success of the advocacy efforts aiming at considering the social dimensions of economic policy is best illustrated by reference to the adoption of this approach by the Bretton woods twins. Both the World Bank and the IMF started to consider the Social Dimensions of Adjustment (Cf. World Bank 1990a; 1990b; 1997; IMF Staff 1998). Social dimensions started to rank high in both the research agenda and policy debates and design of both organizations. To

illustrate this we provide the following quotation from a recent World Bank Publication:

> "The effect of growth on poverty is measured by the extent to which growth in income helps to reduce the national measure of poverty. This measure, growth elasticity, depends on the ability of the poor to take advantage of the expanded economic opportunities, afforded by growth, which in turn is governed by their access to land, credit, education, health care, markets and so on." (World Bank 1997.)

The IMF has showed no lesser concern with social objectives of economic policy. To help member countries to achieve greater equity, the IMF has advocated the following in its advice:

- Macroeconomic policies that secure low inflation and a viable balance of payments position and thus provide a framework within which growth can flourish.
- Structural policies that can enhance a country's growth potential.
- The promotion of good governance and transparency in public sector operations.
- The promotion of sound fiscal policy, including the implementation of a fair and efficient system of taxation; the reduction of unproductive public expenditures; and the reallocation of spending to activities that are most beneficial to the poor, such as providing basic health care and primary education; and:
- Well-targeted safety nets to mitigate the adverse short-term effects of, and ensure political support for, reforms designed to achieve

macroeconomic stability and remove impediments to long-term sustainable growth. (IMF Staff 1998).

One of the major intellectual factors perhaps has to do with the empirical evidence that has starkly contradicted the trickle down hypothesis. In his "Overseas Aid" Mosley (1987 P. 155) refers to evidence that despite the fact that ". Growth in 'low income economies' has been higher than in ' industrial market economies' over the period 1965-83" many people did not benefit from this growth. Another more direct factor may be the general orientation in economic model building towards a greater use of general equilibrium models for policy analysis and evaluation (Dervis et. al. 1982). General equilibrium models by their very nature probe into inter-sector linkages. Therefore the social and health impact of changes in economic sectors can no longer be overlooked in any decent academic policy analysis.

The above account described the evolution of thinking from an atmosphere of negligence of social factors in the analysis of economic crises and the policy prescriptions to counteract them, to a situation where even the most entrenched advocates of this negligence recognized the importance of these factors.

3.4 Methodologies for assessing the social Impact of Economic Variables:

Against the background of the previous section we are going to review briefly and selectively the main methodologies that have been used in assessing impact of economic reversals on the social aspects with

emphasis on the health aspect. In this review of methodologies economic aspects are perhaps given a proportionately large share. There are two justifications for this; firstly, most of the earlier investigations concentrated on the economic component of the policy impact; secondly, the economic performance indicators themselves are related to the performance of social indicators. This last remark does not contradict the critique of the trickle down hypothesis, but rather qualifies it by emphasizing that favorable movements in economic performance indicators are a necessary but not a sufficient condition for the favorable movements in the performance of social indicators. Another observation about this review is the predominance of the economic adjustment policy assessments over the studies that concentrate on the economic difficulties or crises per se. This is basically dictated by the nature of the existing literature that has been biased towards assessment of the effectiveness of policy packages.

Empirical dispute about the economic performance of Adjustment Policies emerged in the aftermath of the adjustment experience in Africa. Both World Bank researchers and some independent investigators of the issue produced evidence of better economic performance by countries that adopted adjustment programs. Challengers contested this claim: ' the statistical evidence presented by the bank is ...neither convincing nor internally consistent' (Mosley et al. 1991[1]). Much of the debate is concentrated on the appropriate of methodologies used. Whyte (1997) broadly identified the approaches

[1]Quoted in (White 1997).

used into four categories of which the first three are empirical while the fourth is theoretical:

1. Before versus after.
2. Control group approach.
3. Modeling.
4. Analysis of expected effects from economic theory alone.

Each of the listed approaches has its limitations and relative merits. The before and after study approach which shows changes before and after introduction of adjustment programs (and/or, as in our case, the appearance of economic difficulties) generally describes what has happened but can hardly tell why it happened or (in the case of adjustment policies alone) what would have happened in the absence of the program. It should be noted that this drawback of the before and after study approach is more pronounced for the economic as compared with the social impact. This is because the relation between economic variables and social indicators can easily be coached in a cause-effect frame. The control group approach suffers a similar drawback that is the assumption that factors other than the assumed explanatory variables are ignored without sufficient reason. The modeling approach has advantage over both the previous approaches in having the capacity to allow in the model building process for the "with" and "without" scenarios. The major limitation to this approach is its formidable data requirement that makes it unsuitable for the most developing countries. Further criticisms against the use of this approach have been suggested by Cornia (1987 P. 54):

"Econometric modeling -despite significant - advances is still in its infancy, particularly in developing countries; models presently available are far from capturing the reality of the economic relations involved; moreover each model itself normally makes use of implicit assumptions which themselves help determine the findings."

The fourth approach, i.e. the theoretical approach, can be used to discuss the results expected a priori from the introduction of specific policies like exchange rate devaluation, wage control, and others which are part of the stabilization program (or the changes in some variables such as decline in per capita health expenditure). It has the advantage of being applicable to discussion of both quantifiable and non-quantifiable phenomena. However, its greatest limitation stems from the difficulty in assessing a priori the over all effect of a package when this is made up of different instruments. A partial overcoming of this problem is the suggested by (Cornia 1987 P. 53) and consists in ' grouping the various policy instruments in the three broad categories presented above and inferring the effects of the program on the basis of its composition'.

Against the background of approaches presented above this study opted to making joint use of two approaches. This is a combination of the theoretical and the before and after approaches. The difficulty of collecting relevant data worked against the use of the modeling approach; similarly the control group approach has been abandoned because of lack of sufficient data at the level of state and local levels at it is based on observation of a number of cases (the study and control groups). Moreover, most of the past studies that used the case control approach were carried at country level (see e.g. Working Group on Demographic Effects on Economic and Social Reversals 1993). The

adopted approaches complement each other in the sense that causal effects that are suggested from the empirical observation based on the before and after approach are qualified and reinforced by the theoretical arguments furnished by the theoretical approach. Also the drawbacks of each approach are, as far as logically justified, corrected by appealing to the other. A more specific reason for adopting these approaches by the present study is their compatibility with the overall logic suggested by the analytical framework adopted and detailed in the following section.

3.5 Analytical Framework:

The specific framework we intend to outline here has been based on the past contributions of a number of authors. The major constituent parts of the proposed framework (see diagram 3.5.1) have been sporadically discussed in the different contributions of the seminal volume 1 of the UNICEF publication adjustment with a human face (Cornia et. al.). The framework has been elaborated on and further developed into its obvious characterization of macro-meso-micro format by the World Bank (1990a). Authors such as Genberg (1993) and Pinstrup-Andersen (1993) used a variant of this framework in their analyses. The general acceptability of the framework as a robust analytical tool to assess public policy is attested to by a recent WHO Health Economics Task force briefing note (Carrin and Politti 1997). This note consciously scrutinized the health-poverty-public policy linkages from a microeconomic "household Economy" framework as 'essential' basis for 'further macroeconomic analysis' of the 'impacts of the macroeconomic environment on poverty and health (Ibid.). Our proposed framework is a slight modification of the World Bank's.

Diagram 3.5.1 below succinctly describes the logical sequence of analytical steps followed in investigating the health effects of economic adjustment/changes. It traces the impact of economic adjustment Policies/changes from the macro level through the meso level and down to the micro level of the household and the individual.

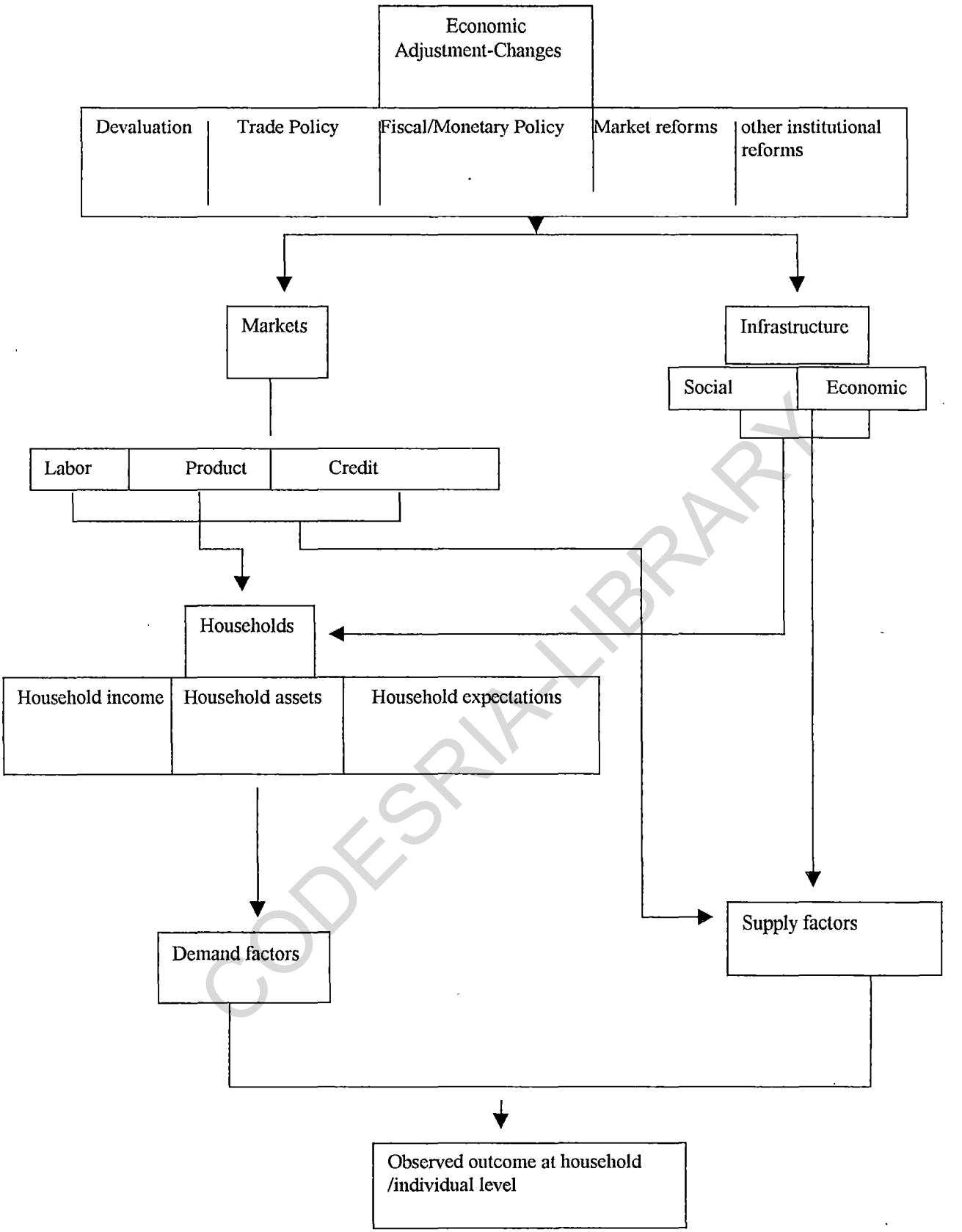
The major theoretical inter-linkages between the main variables is given below:

The Macro Level:

At the top of the diagram we have the economic policy and economic change level. Here the major concern is with the macroeconomic policy packages and variables that describe the macroeconomic changes. It should be noted that we made no a priori assumption about the interconnection between the adjustment policy and macroeconomic 'change variables'. This is deliberate, as indicated earlier because we do not want to enter into the debate about the direction of causation between the 'policy' and 'economic change' variables. Our major aim is to see how health services and health status variables have changed along with changes in these two sets of variables. Furthermore, the policies are not classified into stabilization and structural adjustment but rather grouped under four major categories. These are devaluation, trade policy, fiscal/monetary policies, market reforms, and other institutional reforms.

Policy changes can affect health inputs and health outcomes directly through macroeconomic variables or indirectly through their impact on

Diagram 3.5.1: Framework for the Impact of Economic Adjustment



the meso level variables. Direct policy effects come through such variables as per capita income, unemployment rates, the rate of inflation, and poverty rates. These traditional macroeconomic variables have a direct impact on households' control over assets and resources. The impact on health status comes through two possible channels: either households will be forced to shift spending from health services items such as drugs and consultation fees, or if the impact on household level resource availability is sufficiently high, an overall cut in all items including food and environmental items such as house and personal hygienic items will increase susceptibility to disease and the inability to resist it. In fact, only for analytic convenience we separate meso variables; otherwise it is obvious that all the variables are all inter-related. For example, per capita income is affected by the distribution of income and poverty rates that are in turn affected by meso variables like market structures, provision of social services and economic infrastructures. The same could be said about unemployment and inflation rates. In turn these macroeconomic variables are affected by all sets of policies mentioned above but some policies have more weight in affecting certain variables. Devaluation policies are more related to unemployment and inflation through their impact on relative and absolute prices of imports and exports and related production and trade sectors. Fiscal and monetary policy that reduce overall demand usually also bring about a reduction in aggregate real income and employment in the economy (Genberg Ibid.).

The Meso Level:

At the meso level, which is shown as the intermediate part of the schematic presentation of our analytical framework (Diagram 3.5.1) a number of variables, interact. Certain macro variables transmit their

impact onto the micro and individual levels through meso level. Fiscal and monetary policies that lead to cuts in government expenditures affect spending on health, social services, and economic services. These reduced expenditures reflect into weaker and less effective social and economic infrastructures. Thus, the number of health facilities, the amounts of medical supplies, availability of public help schemes, and the quantity and quality of economic infrastructures such as roads, bridges will be affected. The impact is not limited to size and magnitude but is also structural. Informal, private and new market institutions may emerge and/or expand at qualitatively different proportions, in response to declines in incomes of public employees, increased layoffs, and institutional policies such as privatization and deregulation. These meso level changes may be of a direct or indirect impact on health related variables. Direct impact on the health sector may be brought about through the emergence and/or expansion of informal health care institutions such as traditional healers and herbalists, preponderance of private health care institutions, introduction of private and/or co-financing of services offered in public health care institutions, and shifts in the quality of care. Indirect impacts on the health sector come through the health-related variables such as the availability and affordability of food, the quality of housing, poverty and unemployment rates, and educational and demographic variables.

The Micro-level:

The bottom part of the schematic representation of the proposed analytical framework captures the health outcomes. The final impact of the macro and meso variables rests at the micro level in the form of the health status of individuals and households that nurture those individuals.

Any movement in a 'policy' or 'economic change' policy variable(s) should, in the final analysis, reflect into a change in a health status indicator. For example, an economic reform policy change(s), such as a devaluation or a trade liberalization measure, may increase prices of food stuffs, affect the availability of medicines and the quality of care in public hospital institutions through the availability of imported equipment and supplies.

The linkage between the meso and micro levels is accomplished by representing supply and demand factors as mediators between these two levels in the diagram. Thus, the impact is transmitted from the meso to the household and individual levels through supply and demand factors. For example the deterioration in the quality of care in public hospitals and schools (social infrastructure) and the decaying of public roads (Economic infrastructure) are supply factors that affect effective availability of health care and hence health status. Demand factors include reduction in real income incomes, decreased purchasing power of the local currency, decreased availability of consumer credit and other traditional social safety nets.

By describing this last constituent part of the proposed analytic framework we are now in a position to turn to discussion of the variables that we will look into in our empirical investigation in the light of this framework.

The Variables used:

In this study an attempt to apply the outlined framework to the analyses of the effects of economic crises and policy adjustment on the Sudanese

health sector has been made. The following paragraphs will be devoted to a description and enumeration of the variables and indicators used in this attempt. Apart from their theoretical plausibility, two major considerations govern the number of variables introduced in this investigation. The first consideration that supports the introduction of a variable is its use in similar past studies whether in Sudan or elsewhere. This criterion is applied with a view to providing a framework for comparison of the analysis and findings adopted in this study with other studies (both previous and future ones). The second consideration for introducing a variable is the availability of data on the variable whether it is a primary or a proxy variable.

Keeping the above-mentioned considerations in mind three categories of variables (in concordance with the three-tier structure of the analytical framework) have been traced. The first category includes macro-economic health-related variables. Specifically, per capita income, government, social & health expenditure ratios, unemployment, overall and sectoral cost of living indices, and poverty rates. Along with these variables we have also considered variables relating to institutional changes such as the growth of informal and private sectors.

The second category of variables includes meso level variables related directly or indirectly to health such as health facilities, health manpower, public health infrastructures, and availability of medicines and food. This second category of variables is a category of intermediate health inputs and as such they are a logical prelude to the last category of variables.

The third category comprises outcome variables relating to health status. By necessity these outcome variables are measured at the

household/individual level and they include mortality and morbidity indicators on which we could collect reasonable data.

The above list of variables comprises the major skeleton of variables and indicators referred to by the study. However, it should be noted that this list is not exhaustive; other indicators and variables have been used. For example, variables indicating the impact of economic policy and economic reversals on the level of commitment to, and the implementation of, national health policy, have been probed. Analytic reference to other relevant variables have invariably been made. For instance, obvious interconnections exist between health, educational and nutritional status variables. Investment in any of these three areas of human capital has efficiency implications for the other two. For example an healthy individual will extract the maximum benefit from an educational program or a school-feeding program. On the other hand a well- nourished child will be more protected from the vagaries of disease and more responsive to educational programs. The same is true when we consider the positive efficiency impact of education on health and nutrition. The favorable impact of parental (especially maternal) education on child health and nutrition is well established in the literature. Reference to variables that depict and illustrate this have therefore been made in the relevant context.

CHAPTER FOUR

CHARACTERISTICS OF THE SUDAN ECONOMY, HEALTH AND THE HEALTH CARE DELIVERY SYSTEM

4.1 Introduction:

Before stepping into investigating the linkages between economic changes and health in the Sudan, the salient socio-economic features of the country, the characteristics of its health delivery system and their potential implications for the nature and extent of health problems are essential knowledge., for a sound assessment of the impact of economic events and policies of the past period on health in Sudan, this chapter tries to give a perspective of such knowledge.

The chapter is divided into four sections covering the above mentioned areas. Section 4.2 briefly reviews the history, culture, geography, and demography of the country. Section 4.3 describes the salient features of the economy indicating their significance for health, section 4.4 reviews economic policies and economic adjustment. Section 4.5 describes the major health system characteristics, evolution of the national health delivery system and health policy discussing their passive and active interactions with the economic realities of the country. Section 4.6 in lieu of a conclusion summarizes the major elements of the previous sections.

4.2 History, geography, and culture:

History, geography, and culture give the Sudanese the traits that mould their distinct character. Historically the Sudan has been a melting pot for tribes of different races. Its main inhabitants included the Sudanic races, the Nilotics,

Hamite races, and Semitic races. Although some ethnic traits predominate in certain regions and population groups, inter-tribal and inter-racial marriages are almost universal. The central zones are where the melting has reached its greatest limits and getting less and less as we move towards the fringes where inter-tribal rather than interracial mixing predominates. This ethnic structure has implications for health services delivery and consequently for health status. The positive genetic benefits of mixing are not assessed, however the presence of certain race-specific ailments might be expected to have been reduced. Apart from the prevalence of Sickle cell anemia among a particular tribe no other significant race-related ailment is reported. For example, the risk of skin cancer, which has its highest prevalence among white pigment races, is not likely to be a problem for the greatest majority of the Sudanese although many have white pigment ancestry. The ethnic diversity has also been of great importance in enriching the Sudanese traditional medical heritage. Bayoumi (1979) highlights this in the following words:

" The Sudanese people early became attuned to a variety of influences- religious ties, trade connections, and foreign administrations. These cultural, economic, and political factors left their distinctive marks on Sudanese social life and helped to interweave it with foreign cultures. The historical conditions under which this occurred were responsible for placing the country in its present unique position of a crossroads of traditional medical practices"

The benefits of diversity in medical practices are multifarious; not least among them is the fact that the survival of any tradition in such situations will hinge on the efficacy rather than on the cosmological belief in that practice as long as examples of effective alternatives are in plenty. However a holistic and balanced view of socio-cultural diversity requires that we indicate its detrimental aspects to health. The great diversity in lingual and community-specific cultural traits

could be serious barriers to equity of access to modern health services, as they reduce both the probability of contact with health providers and the efficacy of the provider-patient contact when it occurs. That Arabic is widely spread as the lingua franca among non-Arabic speakers, limits the adverse impact of the lingual barrier. However, other socio-cultural factors have a significant role to play even in more culturally homogeneous societies. Sociological studies in Britain showed the significant role that cultural differences play in reducing the use of health services and decreasing the benefits of doctor-patient encounters (Cartwright 1978, DHSS 1980).

Geographic diversity is not less important than historically inherited socio-cultural and ethnic diversity. The Sudan being the largest country in Africa extends between latitude 4-22 degrees North and longitude 22-38 degrees East and bordering eight countries. Covering this vast area the country has many climatic, vegetation, and soil variations. This geographical variability together with the low population density in many parts of the country seriously increases the economic cost of extending coverage with health services to most segments of the population. Also the extensive borders with continuous movements across the borders because of ethnic and commercial ties across borders presents a challenge for providing effective public health and preventive services measures.

As far as demography is concerned, the Sudan has the general features of the population structure of a developing country. The most recent population census of 1993 puts the total number of people in Sudan at 25.6 million; of those 21.3 million live in Northern Sudan and 4.3 million in the South. The rate of growth of population has also remained high in all population censuses and surveys. The Ministry of Manpower (1996) Migration and Labor Force Survey estimates the population growth rate to be 2.8% for the Sudan and 3.2% for Northern

Sudan. The high figure for the North is the result of the high population movements as a result of the conflict in the South. As for age structure table 4.2.1 shows that the Sudanese population is typical of a developing countries' with proportionately a large percentage of people in the young age groups (26.1%) and relatively a smaller percentage of the elderly population (3.7).

TABLE 4.2.1: AGE STRUCTURE FOR NORTHERN SUDAN BY MODE OF LIVING ACCORDING TO 1996 MLFS.

AGE GROUP	URBAN	RURAL	TOTAL
0-9	20.1	29.1	26.1
10-44	64.7	57.1	59.6
45-64	11.6	10	10.6
65+	3.5	3.8	3.7

Source: Extracted from Table 1 in Ibrahim (1996).

The urban population has a lower percentage of both age groups compared with the rural population. This age structure reflects that the magnitude of need in developing countries is higher as the younger people are the most vulnerable group. This means that the health mortality and morbidity picture will be dominated by infant and child mortality and also that the health services will be more stretched for resources as the younger population structure implies a greater magnitude of need for services and a higher dependency ratio as can be seen from table 4.2.2 below.

TABLE 4.2.2: AGE DEPENDENCY RATIO (DEPENDENTSTOWORKINGAGE POPULATION)							
1990	1991	1992	1993	1994	1995	1996	1997
0.87	0.85	0.84	0.82	0.81	0.79	0.78	0.76

Source World Tables 1997.

Another population feature of notable importance during the last two decades is the large movement of population caused by drought, civil war, tribal conflicts, and other natural and social disasters. About 8,400, 000 people are estimated to be affected by the 1980s bouts of drought and of those 1,795,000 have been displaced (Mohammed 1996). Gore (1990) stated that 3/4 of the Southern population could be considered displaced. These large population movements have aggravated the already high urban migration problems especially to the capital city. Gore (Ibid.) estimates that 44% of the war displaced live in Khartoum while the rest live in squatter quarters round the three cities of the national capital. A great stress on the health services and other related urban services has been created. As the town planning authorities did not plan for these additional numbers, and as their existing plans are disturbed by adverse economic conditions both the quantity and quality of services are expected to suffer greatly. Moreover, the fact that the causes behind these factors themselves have thrown the majority of the displaced into abject poverty has enlarged the magnitude and intensity of their health needs. Poverty, squalor, and the filthy physical environment in which the displaced live make the psychological and physical stresses and the material hazards a natural destiny for this population group. The adverse health effects of displacement spillover to the host population via increased competition over the existing economic resources and health services; moreover the host population also suffers from the negative externalities associated with the deterioration of the physical environment and the increased risk of contracting infectious and contagious diseases.

4.3 Characteristics of the Sudan Economy:

Like many previously colonized developing countries, the Sudan inherited ' from half a century of colonial administration an economy that had evolved, as well as been molded, in the process of implementing the economic policy of that administration' (Salih 1975). Thus, the Sudan Economy has many of the standard characteristics of a least developing country, here we list the major traits of the economy that have a direct and distinctive implication for the health and health services availed the population of the country.

Most observers take notice of the huge economic potential of the Sudan that does not only stem from its mere size but also from its rich natural resources. Thus it is estimated that 85.46% of its land is arable land, 40% is grazing land with rich natural pastures, 34 milliard cubic meters per year is the net water potential (Ali 1984). Besides these resources the Sudan has also sizable mineral resources including petroleum which has been partially exploited in the very recent past. Given this large economic potential there is considerable chance for the Sudanese to enjoy high standards of health maintained and promoted by a high quality health care delivery system, provided that this potential is exploited within the framework of an efficient and equitable economic and social system.

The most distinctive characteristic of the economic structure is the predominance of the agricultural sector. The agricultural sector still contributes more than one third of the GDP. Although this share has declined over the sub-periods reviewed this reflects to a great extent the volatility of agricultural production rather than policy-induced structural changes especially during the period of economic decline (See Table 4.3.1). The predominance of the agricultural sector has many links to health and nutritional status of the populace. Firstly, as the leading economic sector the agricultural sector is the

main target for economic transformation policies. Since development policies mainly concentrate on modernization, the agricultural population is exposed to many changes in diet, income, and life style, which are all related to health. The major health impact of the large irrigated agricultural schemes relates to the change in the physical environment caused by the water distribution system(s) and the use of pesticides and herbicides. The large schemes of Gezira, its Managil extension, Rahad, and the Guneid Sugar cane suffered from epidemo-endemic diseases such as malaria and schistosomiasis. For the Gezira Studies indicated that environmentally-determined health hazards came and/or multiplied with the project: ' prior to construction of the system, waterborne diseases appeared perennially and were not serious; intestinal schistosomiasis was unknown... the situation worsened seriously in the last decades...the prevalence of malaria, schistosomiasis and diarrhial diseases has increased considerably...). (Government of Sudan 1982). Despite the fact that it has been carried at an early date in the life of the scheme, the study of the Rahad irrigation project (Satti 1974) has also revealed the high prevalence of malaria and schistosomiasis. Research on the use of chemical fertilizers, herbicides, and pesticides and their health and agricultural impact is still meager. In recognition of the environmental problems that are linked to irrigated schemes the Blue Nile Health Project (BNHP) was set up to control irrigation-linked diseases in the Gezira and Rahad schemes (El gaddal 1982). The project has been commended as ' particularly interesting from an environmental point of view as it makes a clear commitment to limit the use of pesticides' (De Jong-Boon 1990). Problems related to the use of chemicals in agriculture transcend the limits of the big irrigated projects as they can be used in all types of agricultural activities and as chemical residues in agricultural food products are a health hazard to all types of consumers. However based on existing research and 'experience gained elsewhere it can be said that detrimental effects usually tend to appear at high

levels of fertilizer use' (Ibid.). As for pesticides they are said to be far more dangerous (Op. Cit.).

Another health aspect of the agricultural sector relates to development dynamics in the traditional sub-sector. Problems of drought and desertification that have faced the country during the 1980s causing food shortages, displacement, and other hardships are mainly attributed to ' over-cultivation, overgrazing, deforestation and bad irrigation (Grainger 1982[1])' which are quite related to agricultural policy and planning.

TABLE 4.3.1* : THE SHARE OF AGRICULTURE IN GDP FOR SELECTED YEARS (%)

1960	1965	1970	1975	1980	1985	1990	1992	1994	1995	1997
55.3	45.9	43.6	40.5	32.8	33.5	28.7	38.1	40	43	45

Source: Years 1960-1985: World Tables 1977; 1990-1997: Bank of Sudan Annual reports 1994,1995 and 1997.

- **Should be noted that the data in the Bank of Sudan is given in Fiscal Years while that of World Tables data is given in Calendar Years; on verification we found the figures are identical so we adopted the World Bank's method.**

Another distinctive feature of the economy is the relatively small economic contribution of the industrial sector. Despite the smallness of the industrial sector, it causes considerable health hazards for a number of reasons. First, the eagerness of national economic policy to give incentive to industrialization as part of import substitution policies, leads to less stringent environmental legislation and a more relaxed law-implementation policy. Secondly, the over-concentration of industrial plants in certain areas, especially the national capital, increases the probability of hazardous effects as tolerable limits of industrial effluents and discharges are exceeded. Thirdly, the large concentration of people

living in urban areas as a result of industrial concentration and the high rates of migration to urban areas increases the number of people at risk. These and other problems, notably the bad planning of industrial sites, affecting health have been confirmed for the Sudan in the review in De Jong-Boon (1990). Moreover an indirect health effect of a small national industrial sector is its inability to supply the health sector with inputs such as medical equipment and instruments, medical supplies and pharmaceuticals, and environmental health technology and therefore deepens the problem of dependence on scarce foreign exchange resources.

Another feature of the Sudan Economy that relates to health is the lack of inter-sectoral linkages in the national economy. Apart from the general detrimental effect on health that stems from adverse impact on economic growth and thus overall availability of resources there is a health specific impact associated with this feature. As the health sector is often marginalized on the grounds of its being unproductive, the weaker forward and backward connection with other sectors gives more reason for its marginalization. Furthermore it should be noted that the inter-linkages between the traditional and the modern sub-sectors of the health sector become weaker as the latter tends to be more related to foreign economies for its inputs. This aggravates the problem of foreign dependence and leads to loss of opportunities for mutually beneficial interaction between the two national health sub-sectors as the experience of countries such as China demonstrates.

Lack of strong inter-sectoral linkages due to the historically determined-openness of the economy deepens this openness. This makes emigration of health cadres easier due to the international standardization of training of health

[1]Quoted in De Jong-boon 1990 P. 332

professionals thus helping the drying up of expensively trained medical cadres to richer developing countries and even to industrialized countries.

Duality is one of characteristic features of developing economies that has been thoroughly investigated and its consequences for economic development assessed. The Sudan, being no exception, has taken its fair share of research that probed the extent and economic consequences of duality. Historically, past research concentrated on highlighting the duality between the traditional and modern sectors especially in Agriculture for example all the articles in Mirghani & Gad Karim (1978) discuss this aspect. Although this has been a well-advised approach in the past, and may still be somewhat justified in the present, changes in the last decade dictate consideration of other aspects of duality. In particular the dynamics of population movements to urban areas and the increased marginalization of rural areas has led to a high and rapid growth in the informal sector in urban areas (The Courier: 1992, 1995; Safi Eldin 1995). Hence and especially when we talk about human welfare, duality between the formal and informal sectors of the economy becomes the most relevant characteristic.

As a least developed country Sudan has one of the lowest per capita income levels, . This reduces the capacity of the country to realize high levels of health and other aspects of human development. The Sudan is ranked as country no 157 according to the human development index ranking and with a human index value of 0.342 it is classified as one of the 44 low human development countries being better than only 17 countries in the world (UNDP 1998 P.130).

Another feature of the Sudan economy that is relevant to our study is the high volatility of economic policy making and planning. Mainly due to lack of political stability and the change of government between often opposing

TABLE 4.3.2: DEVELOPMENT PLANS AND PROGRAMS		
Plans and programs	Planned Duration	Remarks
Ten -Year Plan	1961/62-1970/71	Terminated 1964 (Change of political Regime)
Five-Year Plan	1970/71-1974/75 1970/71-1976/77	Duration Extended
Six-Year plan	1977/78-1982/83	Terminated 1978/79
Three-Year Investment Programs	1978/79-1986/87	Terminated 1985 (Change of political Regime)
Four-Year Program for Salvation Reform & Development	1988/89-1991/92	Terminated 1988/89 (Change of political Regime)
Three Year Program of Economic Salvation	1990-1993	This program has been formulated after the debates of the National Conference on Economic Salvation 30/October-21 November 1989 following the 30 June coup d'etat. and Superceded by The First Three Year Of The National Comprehensive strategy.
The First Three Year Program Of The National Comprehensive Strategy.	1992-1994	
The Second Three Year Program of the National Comprehensive Strategy	1995-1997	
The Four-Year Program of the National Comprehensive Strategy.	1998-2002	

Source: World Bank (1992), Strategic Report 1996.

political perspectives led to great disruption in the implementation of the different development plans and programs in the country either through termination and/or change of duration (see table 4.3.2.). This instability in

planning has adverse impacts on the economy. Waste of resources arises as costs of plan preparation and other adjustment costs rise. This in turn reduces the potential growth rates in the economy and its constituent sectors including the health sector which suffers losses in the overall resources allocated to it in addition to the losses associated with the disruption of health plans.

4.4: Economic Crises and Economic Adjustment Policies:

In addition to the economic features mentioned in section 4.3 the Sudan economy has witnessed since the end of the 1970s and during the last two decades a number of economic difficulties with intensive concern to introduce economic adjustment policies. Heated debates about the appropriateness and effectiveness of the proposed and applied economic adjustment policies have been initiated between national and international economists and scholars and are still alive. This section, although could have been appended to the previous section, has been consciously separated and devoted to the discussion of these issues. It reviews the main intellectual loggerheads over the impact of these policies, especially the social dimensions because they are particularly relevant.

The adverse international developments which beset the international economy during the middle and late 1970s, particularly the 1973 and 1979 oil price hikes and the ensuing 1980s debt crisis, took their toll of the Sudan economy and furnished the ground for the difficulties and hardships that are still disturbing the welfare of the economy and society. A peculiarity of the Sudan experience is that, at the beginning, the underlying causes of the economic difficulties have been a mixed blessing. This is so because:

> "The Oil Revolution benefited the Sudan in many ways, but harmed her in some ways too. The country became a recipient of aid from the oil-rich

> Arab countries, whose disbursement of aid to the developing world increased from $1.7 billion in 1973 to $6.4 billion in 1977. Also remittances of the Sudanese working in OAPEC[2] countries became an important source of foreign exchange. But the migration of a large section of the country's professionals and skilled persons deprived the Sudan of much needed expertise. At the same time, the slackening of economic activity in the industrial world after the quadrupling of oil prices in the wake of the October War cut demand for the Sudanese exports and depressed their price, as it did to exports from most primary producing countries. The Sudan also came to be listed among the 16 African countries identified by the UN as the ones most severely affected by the rise in the prices of oil, chemical fertilizers, and foodstuffs." (Awad 1992).

Another notable feature about the experience of Sudan is that the menace of crises crept into the economy at a time when it was enjoying one of its best years of favorable indicators and resource mobilization. During the Extended Five Year Plan 1970/71-19976/77 the economy grew at a rate of 6.5% with only 3.6% inflation rate (Ibid. P. 49).

Although the external factors played an important role in the triggering of the economic crisis, the economic difficulties of the country have been deepened by other factors, both natural and man-made. Thus it has been reported that crisis situation of the end of the 1970 and the beginning of the 1980s ' . Was exacerbated by four years of drought culminating in the famine of 1984, and the resumption of civil strife in the Southern Region in 1983.' (Awad 1992). Moreover, the crisis has been aggravated by the heavy rains and flooding of

[2]OAPEC = Organization of Arab Oil Exporting Countries

1988 the limited events of flooding in the second half of 1990s, and tribal wars and conflicts.

It is agreed that the economic crisis of Sudan exhibits itself in seven interrelated phenomena (Ali 1985):

1. Slow growth
2. Worsening balance of payments.
3. Deteriorating terms of trade
4. Slow growing export
5. Mounting debts
6. Worsening budget balance,
7. Excessive monetary expansion.

Although no great differences exist between analysts regarding the timing and direct causes of the crisis, great rifts in opinion exist when the root causes and the persistence of the manifestations of the crisis are discussed. Despite the fact that differences in the fine details may be found between most of individual researchers, a perceptible polarization of opinion emerges between the position of the IMF supporters and the position of national economists. The latter is a position held by most national economists regarding the relevance of the IMF diagnosis of the Sudan Economy's problems and their prescribed cure. The IMF diagnoses the causes of the crises by noting that:

> 'over the past few years a number of domestic and external developments affecting budgetary operations, credit expansion, and cost /price relationships have resulted in structural disequilibria in the Sudanese economy; these are clearly indicated by the severe imbalances in the budget and balance of payments. In addition to taking steps to eliminate

> the causes of the imbalance, it has become necessary to take corrective action through depreciation of the Sudanese pound. A principal aim of such a reform is to accelerate the rate of growth by rationalizing the allocation of resources so as to best utilize the Sudan's present and potential comparative advantage particularly in agriculture and agro-industries" (Quoted in Ali 1984).

It needs no exceptional power of attentive reading to conclude from the above quotation that the IMF sees external factors as the key to both diagnosing and curing the economic problems of the Sudan. The implication of this is that the structural traits of the Sudan economy such as its openness are not only accepted as inevitable but bear the potential for development. Here may lie the reason behind the great difference in opinion held by the national economists and the IMF experts. Not only in Sudan, but almost in all developing countries, a general opinion that is held by the majority of national economists[3], is that the major changes in the inherited economic structures of developing countries and major reforms in the international economic order are essential prerequisites for development in these countries. This big underlying difference in perspective frames the differences in the details of the policy debates. As a matter of fact evaluations of the fund's role by Sudanese economists have been comprehensive in the sense that it covers all the theoretical, empirical, and even ideological dimensions of the Fund's position and programs. Although we can cite more works, we only need to refer the reader to the two major works by Ali (1985) and Awad (1992) which are sufficient to give him(er) a firm appreciation of the IMF's role in the Sudan.

[3]These economists belong to the major schools of thought including such as the dependency school, the new and classical Marxist, Structuralists, Kenesians, and even some new classical economists.

Although the IMF intervention in the Sudanese economic affairs dates back to the 1960s *(Awad 1997)*, the IMF started to have a visible and considerable weight in policy making in the Sudan in the late seventies. The Sudan negotiated the first Economic Reform and Financial Stabilization Program in 1978 (Awad Op.Cit. P. 49). The involvement of the IMF was so heavy that a notable national economist stated that by this date '. The IMF for all intents and purposes, assumed the macroeconomic management of the economy and as such had the chance to experiment with its views on how the crisis should be managed'. (Ali Ibid.). Not only the IMF but also the World Bank increased its involvement in policy making of the Sudan Economy. Thus ' Since the 1977 the IMF and the World Bank have negotiated various funding agreements with the Government of Sudan covering the macro-economy and some economic sectors, especially agriculture and industry' Wohlmuth (1994). The negotiated policies had their impact on the Sudanese policy making scene beyond the specific programs agreed. Here reference is not only to the intellectual clientele that that the two organizations might have created in the process of negotiating, implementing, and assessing (defending) the specific programs agreed. The influence has even survived the agreed programs in the Sudan since the National Salvation regime has closely implemented economic policies and programs very similar to the ones usually recommended by the IMF and the World Bank. After its assumption of power in June 1989 the Government of the Revolutionary Command Council for National Salvation RCCNS introduced economic measures before the formal talks which it resumed with the IMF in October 1989 seemingly with the intention of impressing the Fund (See Awad 1992 P. 123). Moreover the first adopted by the new Government (Three Year Economic Recovery Program based on debates of the NCES was welcome to the IMF ' as a suitable framework for a future agreement' (Awad Op.Cit. P.128). All the other programs that have been implemented by the new regime seem to have been prepared with the tacit objective of being acceptable by the International

Financial Institutions. The Sudan Compressive National Strategy (SCNS 1992-2002) has been adopted as reference policy document guiding the social and economic development policy of the GOS. Subsequent to its adoption a vehement liberalization and privatization policy ensued. Despite the statement of social welfare goals in the SCNS the CNS (1996) restated the social goals within the context of laying the basis for "... a new partnership for promoting economic, social and technological dimensions of people centered development in a sustainable manner". However, the three sub-programs which compose the period of the strategy do not differ much from previous programs supported or commended by the IMF. In fact judging by their content and emphasis they are hardly distinguishable from typical IMF/World Bank recipes. The importance of this last observation is the fact the country had to implement economic reform programs without any financial support at a time at a time when even the International Financial Organizations came to acknowledge their adverse social consequences (Cf. Cornia et. al. 1987, World Bank 1990a & 199b).

The content of the policy packages recommended for the Sudan by the IMF is said to be the standard recommended for developing countries. Since all the policies suggested are based on the particular diagnosis by the IMF we will be contented with presenting the IMF policy recommendations for the Sudan presented in its 1982 report (quoted in Umbadda & Shaaeldin 1985 P. 117):

1) Structural Reform of the Agricultural Sector designed to reorient production towards Sudan's most competitive crops.
2) Rehabilitation of the physical infrastructure of the public agricultural schemes.
3) Elimination of price and cost distortions.

4) Liberalization of trade and exchange transactions and fostering of an environment conducive to the inflow of Sudanese expatriate remittances and foreign capital.

The Sudanese critics of the IMF have had serious reservations regarding this package. Since we only intend to have a general framework in this chapter we will just give a brief account of their views. The Sudanese economists since the 1980s criticized the IMF on the grounds that '.. Despite its own diagnosis of the problem as supply constrained, focused on short term and price signal solutions' (sic) (Ibid.). Wohlmuth (1994) has also emphasized the position of the Sudanese and some non-Sudanese economists in the following words:

> "the recommended policies of price decontrol, elimination of over-regulation, revision of the tax structure, and reform of parastatals were emphasized all over the years from the side of the international organizations. However, critical evaluations of the policies reveal that neither design nor implementation were appropriate or successful..'

A recent evaluation of the Sudanese economists' position regarding the success Fund's programs (Awad 1997) says in a nutshell ' the Sudanese critics of the Fund-formulated adjustment programs have said more than a decade ago, these programs are inherently growth-stifling and destabilizing to economies'.

Regarding the impact of the crises on general levels of welfare: " ..the human costs of this crisis are extremely high. According to world bank estimates, in some areas of Northern Sudan around 50% of the population live under conditions of chronic and or transitory food insecurity or threatened by food insecurity.. The decrease of the access to and the quality of education, health,

water and sanitation systems as well as of the overall physical infrastructure since the 1970s is well evidenced.." (Wohlmuth 1994).

Poverty rates have been rising according to a number of recent studies (Ali 1994, Sahl 1996, Awad 1997, UNDP/ILO 1998, Salih 1999, Haleeb 1999).

As economic and social indicators are closely associated to health, this picture of the overall impact is likely to reflect into the health sector's performance indicators. Since this is the subject of the whole study we postpone the health impact for a detailed study in the following chapters however to give an idea of some effects which are directly relevant to economic reform policy, we discuss reforms in the Gezira scheme as an example. The economic reform experience in the Gezira scheme seems to have had a direct impact on the health status of the tenants and inhabitants of the Gezira. The introduction of the individual account and the land and water charge system has had direct and indirect effects. First the increased risk of vulnerability as result of doing without the joint account which provided some sort of insurance by allowing the spreading of risks among the partners (Awad 1987) reduces the overall welfare of the tenant including the health aspect. Another direct impact is the dwindling role of the social development fund which has historically played an important role in supporting health services along with other social services and which has been instrumental in the prevention and treatment effort against the endemic water-related diseases such as malaria and bilharsiasis (See Sudan Gezira Board n.d.).

4.5 The Health Care delivery system:

4.5.1: In the corridors of history:

The modern medical services in the Sudan started with the Turco-Egyptian administration 1820-1885[4]. The medical services developed in a rudimentary form, in response to the widespread outbreak of epidemics amongst the invading troops. Thus both the administration and coverage of the service was exclusively geared towards the military personnel. The first establishments were hospitals in the major garrison towns of Khartoum, Wad Medani and Elobeid and smaller medical posts in certain strategic areas. Like a typical colonial administration the indigenous population was kept out of coverage. Even when the indigenous people were taken into consideration the purpose is primarily political. It is related to Reginald Wingate to have said to a senior medical officer 'I believe that the pacification and contentment of these primitive people be obtained more by medical aid than by any other means' (Bousfield 1954 P. 70). That the medical officer who was once the director of the Sudan Medical Service abided by the advice is proved by the following quotation: ' As a medical officer, I conceived my duty as not only doing what I could to heal the sick, but also by helping the people and gaining their confidence and assist in the pacification of the country'.(Bousfield Ibid.). The narrative by Bayoumi (ibid.) suggests that the Turco-Egyptian military medical administration was primarily of a curative orientation and only at its late years it showed sporadic and highly personalized interest in public health and preventive care.

The second phase of the development of the modern medical services in Sudan started after the re-conquest. The military imperative was still the foremost. In

his 'the River War' Winston Churchill (1902) illustrated the precarious health situation of the invading army in the following eloquent quotation:

> " Death moved continually about the ranks of the army, not the death they have trained to meet unflinchingly ...but as silent, un-noticed, almost ignominious summons, scarcely less sudden and far painful than the bullet or the sword cut".

Under these circumstances all the health affairs were wholly handled by a military department which was at the time the Egyptian Army Medical Corps. However the principal medical officer and his senior staff were exclusively British officers seconded from the Royal Army Medical Corps and they were assisted by Syrian and Egyptian junior medical officers. (Bayoumi 1979). In 1904 a civil medical department was established and entrusted to a civil administrator. The activities of the Department were limited to the Central Provinces of the North while the South and the peripheral provinces were left under military control. Thus the civilian health services developed from the Medical Department 1904-1925 into the Sudan Medical Services of the Condominium Government 1925-1948 and finally into the Ministry of Health of the after constitution of the 1948 Legislative Assembly and after independence of the Sudan (See Bousfield 1954; Bayoumi 1979). The recent federalization process made health at the state level the responsibility of state ministries of health while the Federal Ministry of Health assumed overall technical support of the state ministries and responsibility for national public health issues.

Against this historical background we are now in a position to investigate the main characteristics the Sudanese health care delivery system.

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[4]The information provided in this paragraph is mostly based on Bayoumi (1978).

4.5.2 Characteristics of the health care Delivery System:

The health problems of the Sudan and the health care delivery system to deal with them are almost typical of a developing country's. In his paper titled "health and health care in Africa with special emphasis on Sudan" Vogel claimed that comparison of data he provided on health and social indicators for Africa and Sudan reveals ' how typical the Sudan really is compared to the Average African experience.' (Vogel 1977). A Ministry of Health document back in 1975 had this to say about the health problems and the health care delivery system:

> 'Communicable endemo-epidemic diseases are highly prevalent in the Sudan and affect particularly the child population. In general, diseases resulting from poor environmental sanitation constitute the bulk of the health problems which the Sudanese government has to deal with. Unfortunately, it would seem that until now the real expansion of health facilities which has taken place since the last eight to ten years was not directly and specifically related to the solution of these problems.' (Ministry of Health 1975).

The above statement about the Sudanese health care system still holds and seems to have survived the years. It is known health care delivery systems in developing countries are characterized with many features, which reflect their similar historical experiences and stage of development. The first feature is the asymmetry in the distribution of health resources between the preventive and curative levels of care. While the majority of health ills are controllable by simple measures such as environmental sanitation, health education and immunization we find the bulk of health budgets are tied to curative services. This inequity in the functional distribution looks more unbecoming when we realize that the different social groups suffer differentially from the impact of

diseases. Most diseases that are liable to control by preventive measures are those related to poverty, low income and low educational level. This means that this pattern of health resource use is not only wasteful but also a cause of deepening social inequity. That the Sudan health system spends more on cure than prevention is verified in the above-mentioned source (Ministry of Health Ibid.).

Another feature of the Sudan health care system is its urban bias. As we have seen in the historical background the system since its inception has been geared toward the service of an elite group which was at first the military personnel and then the colonial personnel and their assistants. Even after independence the concentration of health services remained in the urban areas especially the national capital. Moreover we find that inequitable distribution of services prevails even among the urban population if we look at regional (or state) level data we find an over-concentration of services in Khartoum which had more than half the work force of specialist and doctors of the country (See table 4.5.1). This skewed distribution at the regional level extends to the local level as well; the fact that even within Khartoum state services are concentrated at the center of Khartoum city. Eltayeb et. al. (1991) present data referring to the year 1980 that shows the regional bias in the distribution of services in Sudan. They further remark that ' the distribution is clearly biased towards the relatively developed regions regardless of population.' (Ibid.). This furthers the inequity of access to the services as it reflects services are not distributed according to need. That this bias is still there is supported by data provided in Chapter 6 of the present study.

TABLE 4.5.1: DISTRIBUTION OF DOCTORS: KHARTOUM VERSUS REST OF STATES 1989-1991

		1989		1991	
		Number	%	Number	%
specialists	Khartoum	369	58%	274	58.8%
	All States	263	42%	262	41.2%
	Total	632	100%	536	100%
All Doctors	Khartoum	1428	55%	1361	55%
	All States	1165	45%	1120	45%
	Total	2593	100%	2481	100%

Source: Reorganized from Table 6 of Mohammed (1992 P. 67).

Although the public sector is the major provider of health care in the Sudan, private health services started to gain an increasing role in the provision of health services. Mohamed (1992) notes the paucity of sources on the role and size of the private sector in health policy discussions and colloquia despite its mounting role. Private services were part of the health care delivery system since its inception. Private beds which offer better accommodation services to patients in public hospitals for a fee is as old as the services themselves (see Bayoumi 1979). Also the Government Medical Officers were allowed to attend private patients for a fee (Bousfield 1954). Despite this the since the late 1980s the private health care sector started to witness drastic changes both in the range of services and organization. According to Babiker (1996) the private sector started to be involved much more involved in services since the end of the 1980s decade especially in the face of deteriorating public services.

Another feature of the Health Delivery System is the inefficiency in administration. This inefficiency in administration reflects in the inefficacy of the referral system. The Sudan health care delivery system is a four-tier system. With general state level hospitals at the top, these are supposed to receive cases from the rural hospitals which in turn should receive cases from the primary health centers which in turn receive health cases referred from dispensaries, dressing stations and primary health care units. However, in practice, we find that a large number of patients directly seeks care at outpatient departments of state level hospitals (that frequently act as teaching hospitals). This instills inefficiency in the system as trivial cases that could be dealt with at lower levels of care crowd at higher care levels. As far back as 1978 complaints about the administrative system in hospitals has been questioned:

> "The complexity in major hospitals may be due to the growth of administrative structures having many sections and subsections with different specialization in routine work. Moreover, policy makers and top administrators were increasingly immersed in the details because of the lack of co-ordination." (Mahmoud 1978).

The dualism in the socio-economic structure is also reflected in the health care delivery system in Sudan. The traditional or the informal health sector has historically been important in Sudan and has gained further momentum during the last decades with the deteriorating access to the modern health services associated with economic difficulties and the general international upsurge of interest in natural remedies and the disenchantment with western medicine. The Sudanese informal health care market has large number of specialties. Mohammed (1992) has classified the practitioners in the informal health sector into seven groups viz.: Religious men, Kujours, Zar performers, bonesetters (baseers), Shallags (traditional eye surgeons) and hajjams (traditional surgeons),

Traditional midwives (Habil Dayas), herbalists with modern medical and/or pharmaceutical training.

4.6 Conclusion:

In the previous subsections we have reviewed the major elements of the socio-cultural, geographical, economic policy, and health care delivery system of the Sudan. Each of these dimensions has its implications for the analysis that follows, therefore the reader should expect that many aspects mentioned here may be referred to or elaborated on in the ensuing analysis.

Although the Sudan has its peculiarities in each of these dimensions its experience does not generally differ from that of the average developing country. This conclusion is not trivial since it influences the generalization of the country's experience to other developing countries and also it gives credence to the analyses when a research finding of another developing country can be used to supplement or support a conclusion in the case of Sudan.

CHAPTER FIVE

THE IMPACT OF ECONOMIC REVERSALS ON HEALTH-RELATED MACRO-ECONOMIC VARIABLES

5.1 Introduction

The logical structure of the analytical framework as described earlier starts from the macro level, passes through the meso, and rests at the micro level. To conform as much as possible to this structure, the main objective of this chapter will be the assessment of the effects of economic reversals, and the policies associated with them, on the health-related macroeconomic variables. These are per capita income, per capita spending on social services and per capita spending on health. These in turn will lead us to investigate variables that are closely related to them and to health such as poverty and unemployment. Although we will concentrate on these quantitative (hardware) aspects we are going to touch also upon the qualitative (software) aspects. The latter are the impact of economic crises on the institutional structures such as the emergence of the informal sector, the private health sector, and changes in policy orientations both at the general macro level and at the sectoral level. As in many parts of this study data is not as complete, as we may desire it to be for all the dimensions considered, but enough indications could still be construed.

The rest of the chapter is organized as follows: section 5.1 is devoted for a discussion of changes in macro-economic variables such as per capita income, expenditure ratios, and unemployment and inflation rates and their impact on poverty rates. Section 5.2 will discuss the emergence of

the informal sector and the likely impact of this institutional structural change on health-related variables and then on health. Section 5.3 will handle the health sector reform aspects including the emergence of the health private sector. Finally section 5.4 concludes this chapter.

5.2 Policy impact on macro-economic health related variables

5.2.1 Per Capita Gross Domestic Product:

Economists use Per capita Gross Domestic Product (PCGDP) as an indicator of the general availability of effective resources in the economy and the efficiency with which these resources are being employed. As an indicator of welfare GDP is seldom accepted as adequate although some researchers use it. GDP is a necessary but not a sufficient prerequisite for the potential existence of welfare. Actual welfare levels depend on the prevailing patterns of income distribution, equity in access to social services, the degree of social participation in policy formulation and implementation.

Bearing the above in mind and noting that Per Capita GDP as a social welfare indicator remains to be widely used because of the general availability and reliability of both national income and population statistics upon which it is based, we will start by scrutinizing the pattern of growth in GDP per capita in Sudan during the period 1986-1996.

Referring to table 5.2.1, we note that real GDP (1981/82 prices) growth rates declined and were even negative for the year 1987/88. Although growth rates became positive thereafter they were very erratic becoming fractions in the years 1989/90 and 1990/91 before the reported high rates of 11.3 and 12.3 showed up according to official statistics. A similar

growth pattern can be observed in the per capita GDP variable, which showed more frequent negative rates of growth reflecting a higher rate

Table 5.2.1: Real per Capita GDP and Actual Health Expenditures 1986/87-1993/94

Year	Real GDP *	% ChangeΔ	PCGDP	% change	Act. Health Exp. (in LS. million)	Act. .PC Health Exp.	% Change
86/87	6,369	-	279	-	32.887	1.4	-
87/88	6,275	-1.5	267	-4.3	19.933	0.8	-42.9
88/89	6,629	5.6	273	2.24	21.566	0.9	12.5
89/90	6,665	0.3	267	-2.2	17.929	0.7	-22.2
90/91	6,686	0.4	259	-3	12.264	0.5	-28.7
91/92	7,447	11.3	280	8.1	11.726	0.4	-25
92/93	8,364	12.3	335	20	4.457	0.17	-57.5
93/94	8,891	6.3	356	6.3	6.78	0.24	42.2

Source: Based on Economic Survey and Health Budget Data;

*Note: * Constant prices 1981/82.*

of population growth. Remaining at table 1, the last two columns show central government per capita health expenditure and its growth pattern. Health expenditure per capita declined sharply from Ls.1.4 in 1986/87 to Ls. 0.24 in 1993/94 i.e. a drop of 82.9%. This drop has been brought about by successive negative growth rates for all the years under consideration except 1988/89 and 1993/94. It is notable that the greatest drop occurred in 1993/94 (-57.5%) which is ironically the year that witnessed the first jump in the GDP growth rate but also the most daring economic reform measures. Closer scrutiny of these changes indicates

that health spending has disproportionately suffered from expenditure cuts. This is so since the levels of its decline are not warranted by the per capita GDP growth pattern. If the reliability of these high growth figures is not questioned, we may conclude that resource availability, as measured by PCGDP, has not been the major factor that controls government health spending. This makes the decline a byproduct of a policy implementation strategy that is practically biased against health priorities; such strategy might have been facilitated by the greater vulnerability of the health sector compared to other economic sectors.

Resorting to table 5.2.2a various ratios of central government expenditure (and its relevant components) to GDP and to each other have been calculated in percentage formats. The general trend is the consistent downwards trend of actual health spending as a percentage of the three major categories i.e. health to GDP, Social spending and total government spending with a few instances of increases in some years. We note that Government total spending as a percentage of GDP declined by 62% over the reference period from 15% in 1986/87 to 5.7% in1993/94 compared to a 62% decline for Social Services (from 0.9 % to 0.4%) and 80% for health. These figures mean that social services are relatively protected compared to other items. This fact is further confirmed by investigating the ratio of social services spending which has increased from 5% in1986 to 7.6% in 1993/94. Before drawing unwarranted conclusions we should note that the average of this ratio for the1990s is less than for 1980s which is suggestive of the negative impact of economic changes and the adjustment policies that were implemented with more force during the nineties. Furthermore it should be remembered that the share of social services is calculated from a falling overall government spending. The fact that health

spending as a ratio of GDP has been falling more than the other two ratios is telling of the vulnerability of the health services sector. This vulnerability is further confirmed by investigating the ratio of actual health spending to total government spending and to social services. As for the first ratio, it declined from 2.9 at the start of the period to 0.1 by its end and the second from 57.9 to 15.7. Although some intermediate years witnessed a rise in the said ratios, the overall trend has been a decline. The drastic decrease in central government health spending as a percentage of total spending may be better appreciated by reference to table 5.2.2b which shows its level during the period 1977-1982 which perhaps is a suitable period for comparison because it just preceded the period that witnessed the effects of economic difficulties. This additional data show that although health spending did decrease to 1.34% it never decreased below 1 during the indicated period. Also we should note that the percentage of health spending increased to 2.9% in 1986/87 and remained at a level of more than 2% during the following period until the 1990s; however we should be careful not to take this as evidence of the vulnerability of the health sector. Many factors might have played a role in raising the ratio during these years. Chief among these is the fact that the period 1985-1989 witnessed the period of multi-party rule with social organizations such as trade unions, cooperatives, and other non-governmental organizations playing an important role in defending social spending. In addition, during this period foreign NGOs were actively involved in providing a multitude of social services including health services; this means that much of government spending might have been induced as complementary spending to foreign assistance. Thus, this data is additional evidence that the decline in health spending heightened during the peak of the liberalization drive of the first half of the 1990s where the impact on health is expected to be

highest because this period was also a period of dwindling foreign assistance inflow. Moreover volatility in the ratios is by itself a hindrance to planning and management of services and is indicative of vulnerability due to the lower negotiating power of the sector and/or its marginality in the overall planning priority.

Table 5.2.2a: Central Government Spending Ratios 1986/87-1995/96

Year	Government spending /GDP (%)	Social Services /GDP (%)	Social Services/ Total Spending (%)	Actual Health /GDP (%)	Actual Health/ Social services (%)	Actual Health/ total spending (%)
86/87	15	0.9	5	0.5	57.9	2.9
87/88	15.3	1.2	7.8	0.3	26.1	2
88/89	11.3	1.1	9.5	0.3	23	2.2
89/90	12.1	0.6	4.8	0.3	47.5	2.2
90/91	7.3	0.4	5.8	0.2	45	2.2
91/92	13	0.3	2.1	0.1	51.7	1
92/93	8.8	0.4	4.7	0.1	12.9	0.6
93/94	5.7	0.4	7.6	0.1	15.7	0.1

Source: Own calculations based on Economic Survey and Health Statistics reports Data.

Table 5.2.2b: Percentage of central government Expenditure spent on health 1977-1982:

Year	1977	1978	1979	1980	1981	1982
%	1.45	1.71	1.46	1.4	-	1.34

Source: Excerpt from Table 3 of Abel-Smith (1986).

The above discussion based on the available data has shown the actual dwindling of public resources devoted to the health sector and social services in general. In this and the following paragraphs, we are going to further analyze the implications for the health sector of the movements of some of the variables reviewed. The first point that should be taken into consideration is that the single largest health care provider is the government. Almost all hospitals are fully or partially publicly owned with the private sector having a very marginal, albeit an increasing role in health service provision. This means that decreases in central government spending will have wider effects on the availability of services. This becomes truer when it is realized that the nascent federalization experience needs some time before local and state authorities can replace the central government in service provision. A further point that may need to be considered in assessing the effects of expenditure cuts on health services is the well known urban curative bias of the health care delivery systems of less developing countries of which Sudan is no exception. The curative bias concentrates on tertiary and secondary care hospital services at the expense of primary health services. This has historically caused a big share of expenditures to be spent on hospitals and curative care. Therefore it is natural if decline in spending thwarts health policy efforts that aim at generalizing and strengthening primary health care. This is so because the strength of the curative and hospital sector's professional and para-professional lobby will not allow the diversion of resources away from this sector if not calling for its further expansion. An additional obstacle is the technical consideration that capital investments in structures and equipment can not be switched to primary health care uses due to the indivisibility and immobility of both structures and giant equipment, especially, that PHC calls for a wider spatial spread of facilities to improve access to health

services. Consequent on this it becomes easy to see that it needs no stretch of imagination to say that the urban bias of services also counteracts the health policy goal of increasing coverage. Moreover, we can safely claim that the bias implied by the central government spending could be even more if we happened to collect data on private spending which is ' higher' and ' more biased' towards urban and curative services as shown by Gish (1987) for India (a perhaps more egalitarian country).

Another consideration is the fact that cuts in health budgets usually fall heavily on medical equipment, tools, supplies, and pharmaceuticals. This situation arises because of the difficulty in reducing labor costs due to the labor intensive and labor-dependent nature of health services and the general difficulty of lay-off decisions especially that there is an spontaneous deserting of health workers as we will see in the next chapter. This state of affairs tends to render the available health services institutions relatively ineffective. The insufficiency of non-labor inputs leads to apathy on the part of the health workers and the development of negative attitudes on the part of service users due to the perceptible decline in quality.

Appreciating the above mentioned considerations make it no surprise to conclude that the paucity of resources availed the health sector might have hindered adequacy of both quantity and quality of health services and thus made difficult the implementation of the nationally declared health policy. We may come closer to knowledge of the manner in which health services have been affected when the analysis approaches the changes in physical and manpower resources below.

5.2.3 Unemployment, Inflation, Income Distribution and Poverty Rates:

Poverty is increasingly being characterized as a contextual phenomenon defined and delimited by socio-economic and cultural structures and processes of a given society. The recent concept of welfare in terms of human development gave momentum to the place of poverty as a highly relevant variable. In particular the centrality of poverty to human development made it a good proxy for monitoring changes in human development indicators. This fact is duly reflected in recent writings. The Economic Commission for West Asia (ESCWA 1997) in a recent study states that "...the issue of poverty is not confined to the presence of the poor. It is rather a problem faced by governments since it is linked to weaknesses in the economic and human resources and lack of social services, as well as weaknesses in policies necessary for facing development challenges and the impact of poverty alleviation." In actual fact the tripartite Human Development Index developed by the United Nations Human Development Report (1993 & 1997) has Life Expectancy as one of its major components along with literacy and poverty indices.

Unemployment and inflation are two variables that are strongly associated with poverty; they are sensitive to changes in economic policy and economic conditions through the meso channels of labor and product markets. The impact of these variables is mediated by poverty rates and income distribution on the individuals' and households' health status. Unemployment has a direct and indirect impact on health via incomes and via its negative psychopathologic effects on the unemployed.

Available data indicates that unemployment has been increasing in the Sudan over the last two decades reaching a two-digit figure at the beginning of the nineties and staying at this level with a few up and down movements. Tables 5.2.3.1 & 5.2.3.2 indicate, an urban/rural and a gender employment gradient. However, although the gender gap is in favor of males, the urban/rural gap perhaps surprisingly is in favor of the rural areas. However, some obvious reasons for this may be the greater possibility of the presence of disguised unemployment in rural areas and the greater number of displaced and migrants in the urban centers. In general the increase in unemployment rates is not out of context in a period of economic adjustment. More lay-offs of public sector employees are caused by cuts in government spending, privatization of government enterprises, downscaling of the government regulatory functions and rigidities in adjustment to new structures and incentives.

Table 5.2.3.1:Unemployment rates by Sex for the Period 1983/1996

Year	Male	Female	Total*
1983	8.2	9.2	8.3
1990	13	28	16.5
1993	11	11.2	11.1
1994	15.1	18.5	18.5
1996	13.1	24.3	16.6

Source: Economic Survey, 1996

- Note that total is not the average of the two previous columns and this is perhaps due to the sample survey design.

Table 5.2.3.2: Unemployment rates by sex and residence For the year 1996.

Residence	Sex	
	Male	Female
Urban	15.1	33.3
Rural	12.1	21.4

Source: Economic Survey 1996.

Concerning inflationary movements, it is well known that they have distributive and output impact as they influence real incomes and their distribution among the populace. In discussing inflation we refer to the overall rate of inflation in comparison to selected sectoral rates. Referring to table 5.2.3.3, a persistent rise in the rate of inflation is discernible. During the period 1985-1990 inflation rose steeply to more than double its initial rate. It should be noted that this has happened after the adjustment programse introduced at the beginning of the eighties became both institutionally and practically in force. The inflation rate in the 1990s rose to three digits but started to decline to recommence its upward movement in 1996. The high inflation rates, which affected both high and low-income groups, have greater negative impact on households' real incomes. Moreover referring to the same table we see that the ratio of low/high CPI has been above unity for most of the period until 1992 when it started to decline below unity suggesting a more even handed inflationary effect. However this does not imply that income distribution has improved since the incomes' side is not taken into account as may be confirmed by other data. In fact in want of further data this may indicate deterioration in income distribution if we assume that inflation is demand-based as low income

groups' demand for basic goods will decline while demand for the high-income goods is expected to rise.

Table 5.2.3.3:CPI for higher and lower income groups and their ratios

Year	Low		High		Low/High	
	CPI	%	CPI	%	CPI	%
85	2060.3	-	1938.7	-	106.3	-
86	263.1	28.3	2476.4	28.4	106.2	-0.1
87	3365.7	27.3	3086.8	24	106	-0.2
88	4998.8	48.5	4526.8	46.7	110.4	4.2
89	8305.5	66.1	7883.2	74.1	105.3	-4.6
90	14225	71.3	13105.5	66.2	108.5	3.04
Avg.	5933.3	48.3	5503	47.8	106.5	-1.8
90**	137.5	-	134.3	-	102	-
91	305	121.8	295.7	120	103	1
92	650.9	113.4	666.5	125.3	98	-4.9
93	1310.7	101.4	1338.2	100.7	98	0
94	2843.2	116.9	2899.9	116.7	98	0
95	4787.5	68.4	4944.2	70.5	97	-1.02
96	11263.5	135.3	11040.0	123.3	102	5.2

Source: Ministry of Finance Economic Surveys.

**** Change of base year.**

The impact of inflation on health comes indirectly through affecting household command over health-related non-medical goods and command over goods of direct relevance to health such as medicines and utilization of medical health facilities. To compare the inflationary

pressures in the health and other sectors refer to table 5.2.3.4 below which shows the inflation rates for selected items.

Table 5.2.3.4 CPI for selected items 1991-1996.

Year	Food & Drink	% change	Housing	% change	Education	% change	H. Care	% change	General CPI	% Change	Change in Health/% change in CPI
1990	143.6	-	108.8	-	107.3	-	126.8	-	163.2	-	-
1991	309.6	115.6	300.9	176.6	262.9	145.0	278.2	119.4	303.1	85.7	1.39
1992	601.7	94.3	623.1	107.1	552.5	110.2	1036.5	272.6	664.3	119.2	2.29
1993	1263.3	110.0	1082.8	73.8	928.7	68.1	1834	76.9	1336.4	101.2	0.76
1994	2693.1	113.2	1889.2	74.5	2660.5	186.5	4547.7	148.0	2943.2	120.2	1.23
1995	4254.8	58.0	3896.8	106.3	4033	51.6	6542.6	43.9	4882.1	65.9	0.67
1996	9752	129.2	7232	85.6	8235	104.2	14549	122.4	11263.5	130.7	0.94

Source: Computed on the basis of CPI data provided in Economic Survey 1996.

The items in the table are selected because they are basic to human welfare and have both long and short-term implications for health status and human poverty rates. The data show that inflation rates for all the items have been positive over the period but at decreasing rates for some items for some years. This means that ability to purchase goods has continually declined for the segments of the population whose incomes remained the same or decreased. The last column of the table compares the rate of inflation of health goods with the general rate of inflation. It is revealed that the rate of inflation of the health sector exceeded the general rate in 3 out of the six years. Furthermore, the highest excess

was in 1992 where the ratio of Health CPI/General CPI was 2.29. This again suggests an Economic Adjustment Policy connection.

Other indicators confirm the effect of the rates of unemployment and inflation. The growth rate in the salaries of central and local government employees has been reproduced as table 5.2.3.5 below (from Babiker 1996); it shows large declines in real incomes of all government employees categories as is obvious from the negative rates of changes for the last two periods. This indicates that the differentiation between the categories has declined i.e. people are becoming more equal at a lower level of income but as a group they are all pushed down to the lower rungs of the economic ladder.

Table 5.2.3.5: Growth in salaries and wages of Central and Local Government Employees: 1985-1993

Class	Class 1		Class 2		Class 3		Class 4	
Year	Avg. Act. Sal.	% Growth	Avg. Act. Sal.	% Growth	Avg. Act. Sal.	% Growth	Avg. Act. Sal.	% Growth
1985	652	-	801	-	600	-	300	-
1988	2500	283	1020	27.3	803	34	430	43.3
1992	807	-86	544	-47	270.4	-66	205	-52
1993	684	-15.2	478	-12	258	-5	188	-8.3

Source: Babiker (1996)

Other relevant variables in this context are the declines in overall government spending and social services spending, which are likely to have adverse impact on poor and low- income groups. Decline in government spending means removal of subsidies from basic consumer goods such as food; as most of incomes of the poor are spent on food items with high subsidy incidence the removal of subsidies has a

regressive effect i.e. harming the poor more. Besides the analytical plausibility of this statement, it has been shown to be true by review of empirical studies carried out in Egypt, Sri Lank, India, Pakistan & many other countries (Cooper-Weil 1992). Expenditure declines can directly affect vertical health and nutrition programs such as supplementary feeding and immunization. Decline in spending also aggravates the impact on health because of the strong complementarity and substitution relations between health and social services such as education & social welfare.

All factors discussed in this subsection have a direct impact on poverty levels and income distribution. They all indicate an increase in poverty levels and confirm the findings of previous studies such as Ali (1994) who provided figures that confirm increases in rates to 91% in 1992. Table 5.2.3.6 below shows the increases in poverty rates and the worsening of severity measures as shown by Ali (Ibid.). Poverty is relevant to health because of the demonstrable interrelations between them. Hence we find that poverty is highly associated with ill health to the extent that some diseases are labeled poverty diseases because of the

Table 5.2.3.6: Some Poverty Measures North Sudan 1968-1992

Measure	Year	1968	1978	1986	1992
Head Count		50	53	75	91
Poverty gap		25	23	45	59
Severity		15	13	31	....

Source extracted from Ali (1994).

high correlation between their incidence and that of poverty (See chapter 6 for empirical evidence in Sudan). Ill health may relegate a person or a household to the ranks of the poor via its adverse impact on earning and asset holding capacity. Approaching the effects of economic policies on health from such an understanding is essential. Adverse economic conditions will set in force changes in economic variables that increase poverty and worsen health status via the route of less and inadequate service provision. Thus inciting the self-perpetuating down spiral between health and poverty positions.

Recent direct estimates of poverty rates in Sudan are consistent with what may be deduced from the above discussion. Absolute poverty using the headcount method has been estimated at 93% and 84% for rural and urban areas respectively giving a country ratio of 91% (ILO/UNDP, 1998). Although these absolute poverty figures suffer from methodological shortcomings they are indicative of the general trend. Fergany (1997) estimated relative poverty for the Northern Zones. He estimates that more than three quarters of the population live in poverty and of those 30% are ultra poor. Furthermore the rural areas home the bulk of the poverty population. Geographically the Western Zone has the highest levels of poverty with all its rural population being poor and of these 80% are ultra poor. Therefore poverty has been in the increase and has been unevenly distributed between rural and urban areas and between geographical zones; this differentiation has also been observed by the (ILO/UNDP, op cit.). Moreover this last study noted other dimensions. For example, for the gender dimension of poverty, households headed by females have lower proportions of poor members than male headed households. This may be due to the fact that female-headed households get support from migrant breadwinners. Sectoral

distribution of poverty reveals that the proportion of private sector employees of the total poverty population is higher (46%) than those of the public sector (34.6%). Of all public sector employees (77.9%) are poor compared to (76.5%) of private sector employees. This suggests monopsonistic behavior of public sector employers and high vulnerability of public sector employees in response to expenditure reducing policies.

5.3. Institutional Dimensions of Economic Reversals

5.3.0: Background:

In chapter 3 when the analytical framework for this study was described institutional changes were referred to as accompanying policy prescriptions. Here we emphasize that institutional changes are of two types. The economic difficulties per se may lead to the emergence of altogether new institutions and/or the strengthening of the already existing economic institutions such as new markets and economic sectors. Also the institutional changes contained in adjustment policies may either facilitate or precipitate the emergence and extinction of certain economic institutions. In the subsequent subsections some institutional changes and their implications for health will be reviewed.

5.3.1: The Informal Sector:

Despite their fairly old presence, informal sector activities received serious attention quite recently. Only during the last three decades did serious academic interest in this sub-sector arise. The ever-increasing size of this sector in the context of economic difficulties, rapid urbanization and its unmistakably important actual and potential role as

a source of coping strategies during periods of economic reversals and large-scale population movements makes its consideration a theoretical and practical necessity.

The high growth of the informal sector as an institutional change by economic crises has significant implications for health in a number of ways. Apart from the impact on health via household income the informal sector does have direct impact on household health resources. As informal sector activities that proliferated recently are mostly an extension of domestic household activities they are much connected to health. Referring to the household model outlined in chapter 2 we realize that many possible connections with health relate to informal sector developments. The time devoted to child care in the households may be reduced because mothers are forced to extend their household activity to the informal sector such as food and drink selling at the expense of child rearing. This may have a negative impact on child health in the post-adjustment period because the supplementary income which comes from these activities will go for compensating the loss in income caused by economic stringency and hence will not overweigh the negative impact of less time for child care. Also since the domestic functions of the informal sector participants (who are mostly women) are encroached upon by informal sector activities, the overall health and nutritional welfare of adult household members will suffer due to the decline in the quality of the household physical environment and the quality and quantity of food intake. Furthermore, many children's health status in both the short and long run may be negatively affected since their premature participation in the labor market as helpers in informal sector activities will increase their marginalization in the socialization process by hindering their accumulation of human capital in the form of

skills. This fact would rather sentence these young generations to life long poverty status at a time when poverty is defined as a human capability failure (Fergany 1999).

In the Sudan, an early definition of the informal sector was rendered by the ILO 1976 mission report (P.154). There the informal sector was defined in contrast to the formal sector as follows " Conversely we find the informal sector to be characterized by limited effectiveness, backward technology, relatively lower earnings, great dependence on family labor and very few organizational arrangements – in disposing of its tasks-. It is tempting to regard the informal sector, as far as employment is concerned, as a residual employer capturing the difference between the total urban labor force and its segment protected by labor legislation". In its definition of the informal sector ILO included formal sector workers who ". Can readily be dismissed without any legislative intervention". Today, we expect that sharp distinctions between the formal and informal sector have become even more difficult. This is due to the increasing inclination of present and former formal sector employees to seek safe havens in the informal sector to cope with harsh and adverse economic conditions.

Two features of the informal sector are invariably referred to in almost all definitions and discussions. These are the family orientation of informal sector activities and "operation in a fairly competitive environment" as ease of entry is the most observable characteristic of this sector. Although both features are persistent the ILO (1986) made some caveats regarding the ease of entry aspect of competitiveness. Ownership of initial capital, relevant skill, and cultural and ethnic background, are identified as the most observable barriers to entry into

the Sudanese informal sector. The role of ethnicity in even previously informal markets such as Souk Libya & Saad Gishra markets have also been observed by Dr. Ahmed Safi Eldin in his study of the informal sector (1995).

Regarding the size of the informal sector, the 1993 UNDP Human Development Report estimates that 60% of urban labor force in Sub-Saharan Africa find employment in the informal sector and that the sector witnessed an annual growth rate of 6.7% during the 1980s. These statistics are comparable to those of Sudan. It is estimated that in the 1970s the informal sector in Khartoum provided employment for a number of workers exceeding 50% of the total number employed in the modern sector at an annual growth rate of 5%-7% (ILO 1976). A more recent estimate puts the number of workers employed by the informal sector at 6 million employees representing 50% of total urban employment (Ibrahim 1996). The Department of Economic Planning 1990 Survey[1] of 1756 informal sector establishments gives the following distribution of informal sector labor force employment: 43% industrial, 18% commercial, and 12% maintenance and repairs. This same source confirms the recent high growth of the informal sector. 50% of the surveyed establishments appeared within the five years before the Survey date. Only 10% of the establishments were set up twenty years ago. It has also been reported that the industrial informal sector has lost grounds for the benefit of informal trading and services.

This transformation in the nature of the informal sector has been strengthened by the shift of the pattern of internal migration from rural-

[1]Our immediate source for this survey's data is Ibrahim (1996).

rural to rural-urban as could be verified by reference to the regional population growth rates, migration rates, and other relevant facts and statistics.

These events and changes in the informal labor market greatly marred the rosy and idealized picture drawn by the obviously enthusiastic team of the 1976 ILO mission of the Sudanese agricultural seasonal informal market. Emigration as a population variable has also played a role in informal sector transformation. The general hardships, which started to be experienced by the majority of the Sudanese since the early 1980s, made emigration an option for relief that could hardly be ignored. Although the formal labor market connection to emigration is readily conceivable the relationship to the informal market warrants some explanation. First, it is reported that unskilled rural emigrants spend a transitional period in urban centers, especially the national capital, before executing their emigration plans (ILO 1986). During this period these would-be emigrants engage in informal sector activities with the intention of making savings necessary for financing the trip and acquiring skills necessary for obtaining a job abroad. Not only do they increase the supply of informal sector services by engaging in them, but also they increase the demand for the informal sector domestic goods as usually they do not bring their families along with them. More than that as the transitory period for the would-be emigrant is a period of hardship many of the family members may enter the informal labor market for coping with this hardship. Second, repeatedly, surveys of the Sudanese working abroad displayed their interest in investing in small scale and medium enterprises (ILO ibid). This means that the savings of emigrants could potentially be a very important injection into a vital component of the informal sector. Third, the significance of emigrants to the informal

sector is furthered by the participation of returnees who are "undoubtedly contributing to production and trade in the informal sector..." (ILO Op.Cit. p. 161). This is particularly true of returnees who are unskilled or semi-skilled. The skilled and professional returnees are usually few in numbers and tend to rejoin the formal sector either as employees or investors; otherwise, they decide to re-emigrate. Casual observation suggests that this last option is taken by the majority of the returnees expelled by the gulf war and the aftermath.

Since the role of women is pivotal for their health and the health of their families their participation in the informal sector deserves a special treatment. The involvement of Sudanese women in informal market activities, perhaps to the surprise of many, dates back to the 19th century. Sayyed Mohammed Ahmed Almahdy and his Khalifa (successor) issued a circular that allows women to sell in the market place. Further orders by the Khalifa made special areas exclusively reserved for women. This is the predecessor of the existing Soug Alniswan (Salih 1989). This historical fact may explain the ease with which Sudanese women were able to enter the informal sector in response to economic reversals. However, despite this it should be noted that women work, especially in urban areas, seems to be dictated by necessity rather than being voluntary choice. This remark is corroborated by the earlier observation by the ILO (1986) that the participation of women in the labor market is weak and unstable. Women, It has been asserted, withdraw from work once family income rises, either as a matter of independent decision or for social compulsion. The role of necessity seems to have kept its virility up to date. The contribution of women to the informal sector share of Gross Domestic product was estimated at 2.9% in 1982/83 and increased to 12% in 1989/90 (Ibrahim 1996). This is not surprising in

view of the fact that women increasing labor force participation rates are expected to be higher for the informal sector due to the greater role played by women in coping with economic difficulties. A witness to this is the following table taken from a recent study of women entrepreneurs in Omdurman (Table 5.2.1). It is clear from this table that for Elthowra sub-sample of women (who are relatively better off) only 20% gave non-economic reasons for engaging in work for income while all the women in Souk Elnaga sub-sample gave exclusively economic reasons for engagement in work for income.

Table 5.2.1: Reasons for engaging in work for income:

Reasons given	**Elthowra Women %**	**Souk Elnaga Women %**
To help the family	60	52
To help Husband	6.7	0
Get money for myself	6.7	32
Get money for my children	6.7	13
Mother and grandmother's work	0	3
To be active	0	o
Free time	13.4	o
Hobby	6.7	o
Total	**100**	**100**

Source: Slightly modified table 2 taken from Sunita Pitamber (April 1999).

As mentioned in chapter 4 the Sudan has an old and growing informal health sector. Apart from the survey data furnished by Mohammed (1992) no primary information exists on the role of the informal health sector. However Babiker (1996) adduces to indirect evidence to confirm

the observed growth in the informal medical care sector. The impact of this growth on health services and health status takes a multiplicity of forms. As a substitute for the formal health care sector it offers a source of relief that lessens the suffering of the indigent irrespective of the therapeutic value as long as treatment itself is not harmful. This observation is relevant because the health service is composed of a care and cure component and even for the modern (or formal) health services a large part of the service is 'caring', especially for those ailments that have no cure such as AIDS and cancer. So the often-chanted claim that the informal medical care sector is completely useless is empty. However if we look at the expansion of the informal sector from the viewpoint of supply i.e. as an attempt on the part of practitioners to supplement their incomes or to compensate for job losses, then the risk of harmful practices increases. Since, by its very nature the informal medical care market lacks licensure and other regulatory legislation it becomes fertile ground for quackery and charlatanism and as such a great subtraction on public health levels. A third interesting point about the impact of the growing informal medical sector is its impact on changes of conventional western medical attitudes towards its operation. The increasing resort to traditional medical practices attracted to it the attention of the bastions of western medicine both through the real competition it presented and through the widely spread stories of its success and undeniable efficacy. The fact that the prices of the informal medical sector have risen appreciably attests to this; rich patients are reported to have sought help in this sub-sector (See Mohammed 1992).

From the above account it seems that the informal sector (including its medical segment) has been at the center of the stage in all the major economic, demographic and social events that affected the country

during the preceding three decades. As such the changes in the informal sector (especially, its traditional medical sub-sector) potentially have an impact on health levels. As our study design at present does not allow a dis-entanglement of this effect, we can only be contented with having a feel of its impact when health status indicators are reviewed.

5.3.2: Private Health Sector Resources:

The private sector in health care expanded considerably during the period 1985-1995. The number of private hospitals increased by 67% and 250% between 1985-90 and 1990-95, respectively (Babiker, 1996). As a matter of fact expansion that took place in the informal health sector considered above is itself part and parcel of the expansion of private health care because there is no public traditional medical care sector[2].

As mentioned earlier (Chapter 4), private medical care per se within the context of the Sudanese medical care system is not new; what is new are the changes in both magnitude, organization, and type of private medical services that took place during the last two decades. Also it should be noted that from a health policy perspective private sector expansion might add to the total availability of resources for health if it occurs within an environment of strong regulatory government capabilities. However, the private sector expansion has taken place within a context of economic adjustment which aims at reducing government sector size and functions. As noted above, the public health

[2]the recent adoption of traditional remedies such as gum-Arabic for treatment of renal failure cannot be classified as part public traditional medical practice because it is used within the context of modern medical practice.

sector suffered proportionately more expenditure cuts, therefore it is not expected to have developed a regulatory capacity enabling it to monitor the private expansion in resonance with national health policy objectives. Expectedly the pattern of private sector expansion has been mostly in the curative and secondary and not the preventive and primary health care sectors as national policy demands. This pattern of change is incompatible with the efficiency and equity goals of national health policy. The damage to the equity objective is better seen if we read this expansion in the context of increasing poverty rates, the urban nature of the private sector expansion and the very high rises in private fees. The latter were estimated to increase by 25700% and 1034% between 1985-90 and 1990-95, respectively (Babiker Op.Cit.). Therefore the size of the health sector seems to have expanded significantly. As for the changes in organizational arrangements a recent study (Shaddad 1998), using survey information, has shown that the majority of private hospitals use the services of doctors on piecemeal case-by-case contractual arrangements. Also the range of services covered is predominated by surgical operations. Similarly a change in the organizational arrangements in the functioning of private clinics seems to have occurred. Although no survey data exists there is an observable tendency for doctors to operate their outpatient clinics on full private basis. This also is a significant departure from the traditional part-time basis where publicly employed doctors used to operate their evening outpatient clinics. These changes are expected to have an impact not only on the quantity and quality of medical services provided but also on the way medicine is practiced.

5.4 Conclusions:

In this final and short section we are going to draw conclusions based on the above data review and analysis; The overall national health policy objectives and goals are theoretically adequate for handling the health problems of the country and have not been much affected by the changing policy environment. Nevertheless, the realistic pressures amounting from the impact of economic policy hurt and obstruct the implementation of health policies by imparting severe resource shortage. Also the inability to implement the declared policies will have a long term impact on the credibility of health policy and will lead to lack of appreciation of the role that well-formulated and designed policies can bear on health sector performance and welfare achievements

The above analysis has clearly demonstrated that significant changes in macro-economic factors, such as reduced government spending, rising inflation rates and skewed income distribution, have occurred and thus will be expected to negatively affect resource availability at the household and social and economic infrastructure levels.

CHAPTER SIX

HEALTH INFRASTRUCTURE AND RELATED HEALTH INPUT VARIABLES:

6.0 Introduction:

In Chapter 5 we attempted to give a general, albeit, a satisfactory survey of the main changes in the macroeconomic health-related variables over the period that witnessed the occurrence of economic reversals and the adjacent implementation of economic adjustment policies. The effect of these variables reflects into changes in the health infrastructure and other closely related health inputs. This chapter attempts to collate existing data to monitor these changes. Hence section 6.1 reviews health facilities, section 6.2 is devoted to changes in manpower, section 6.3 investigates the public health infrastructure, in section 6.4 the analysis of the availability of food and medicines is discussed while section 6.5 concludes the chapter.

6.1 Health Facilities:

Health facilities provide the major physical framework, within which health is restored, maintained and promoted and as such are of pivotal importance for achieving health policy goals of equity and efficiency. The policy goal of equity translates, in the context of health facilities, into a desire for an improvement in geographical and socio-economic coverage. On the other hand the efficiency goal calls for a more appropriate allocation of resources between tertiary, secondary, and

primary care levels of health facilities. Using available data we will discuss these points below. It should be noted, as indicated elsewhere (Babiker 1996), that we have consciously limited our reviewed data for the period following 1985 because both public and official opinion started to seriously conceptualize the different aspects of the economic crises and the adjacent corrective measures after this period; and also because the boldest steps at adjustment were carried out following this period with or without direct involvement of international lending institutions. A further justification that can be added here is that in the context of health facilities this choice of period is even more relevant. This is because of the normally longer run nature of the investment decision regarding the construction, or diversion to an alternative use, of a given health facility.

Developments in different types of hospital facilities are depicted in table 6.1.1 As shown in this table an overall increase in the number of hospitals of all types occurred during the reference period. Hospitals with specialist services increased from an almost stationary number of 45 over the period 1986-1993 to 56 and then 57 during the later periods. This pattern can lead to no conclusive evidence of a favorable or unfavorable change in terms of achieving health policy targets. To arrive at such evidence there is need for comparing the expansion in hospitals with population changes and changes in other facilities as well as changes in the demand side concerning the pattern of morbidity. It goes without saying that all these dimensions are not simultaneously available, nevertheless, it is useful to make some possible interpretations in the light of existing information and general knowledge of the health situation in the country.

Table 6.1.1 Number of Hospitals 1986-1996

Year	Hospital with Specialists		Specialized Hospitals		Other hospitals	
	No.	%	No.	%	No.	%
1986	45	-	13	-	136	-
1987	42	-6.7	16	23.1	140	2.9
1988	45	7.1	19	18.8	139	0.7
1989	45	0.0	19	0.0	151	8.6
1990	36	-20.0	19	0.0	194	28
1991	45	25.0	21	10.5	197	1.5
1992	45	0.0	23	9.5	218	10.7
1993	45	0.0	23	0.0	218	0.0
1994	56	24.4	22	-4.3	162	-25.7
1995	57	1.8	23	4.5	173	6.8
1996	57	0.0	23	0.0	181	4.6

Source: Several issues of the annual health statistics survey.

The fact that the primary health care (PHC) philosophy aims at expanding facilities at the lower and rural levels of care may suggest that the constancy of the number of hospitals at the first period is in line with policy intents. That this is likely to be so is supported by the fact that PHC policy was introduced in Sudan in 1978; and therefore it is reasonable to assume that the enthusiasm and support it received has survived to have the reported impact (i.e. constancy in the number of hospitals). If our assumption that the initial inertia in constructing new hospitals was a conscious policy response is true, then the observed subsequent expansion in hospital facilities does verify rather than contradict declared policy goals. The plausibility of this last suggestion is at stake unless we assume that the lower level facilities were planned to expand first and then be supplemented by the expansion of secondary care facilities to complete the referral system for the PHC structure. This line of argument is interruptible as will become clear when we trace the expansion in primary health care facilities below.

To evaluate the availability of hospital facilities with reference to the population dimension alone we must look at a hospital service availability indicator such as per capita hospital beds. Table 6.1.2 shows that the performance of this indicator has been negative; at the beginning the hospital bed per capita ratio declined over the period 1985-1990; then it rose scantily by 0.34% in 1991 and then finally stayed at the stationary level of 0.76 beds per thousand populations.

Another facility-related indicator of the progress towards achievement of national health policy goals is the monitoring of changes in primary health care facilities. Table 6.1.3 shows the evolution of primary health care facilities over the period 1986-1994. Health centers witnessed the

greatest expansion. They increased from 189 centers with only one incidence of a negative growth rate between 1990-1991. Dispensaries witnessed a similar expansion showing a positive and a more systematic growth rate over the period. As these are the highest referral points at primary care level, it is expected that their expansion be accompanied by a more than proportionate expansion in the lower PHC level units.

Table 6.1.2: Hospital Inpatient Beds/1000 1985-1996

Year	85	86	87	88	89	90	91	92	93	94	95	96
Inpatient bed/1000	0.84	0.81	0.80	0.79	`	0.75	0.76	0.76	0.76	0.76	0.76	0.76
% Change	-	-2.7	- 1.86	- 0.85	- 1.75	- 1.55	0.34	0	0	0	0	0

Source: Recalculated from Health Statistics Reports, Ministry of Health.

Table 6.1.3: Some health care facilities 1985-1993

Year	Health Centers		Dispensaries		Dressing Stations		Primary health Care Units	
	No	%	No	%	No	%	No	%
1985	288	-	977	-	1291	-	2725	-
1986	307	6.6	989	1.2	1226	-5	2709	-0.6
1987	330	7.5	1145	15.8	1205	-1.6	3080	13.7
1988	392	18.8	1202	4.9	1265	5	3099	0.6
1989	339	1.8	1224	1.8	1259	-0.5	3211	3.6
1990	417	4.5	1266	3.4	1299	3.2	3174	-1.6
1991	388	-7.0	1277	0.87	1347	3.7	3115	-1.9
1992	470	21.1	1344	5.2	1317	-2.2	3012	-3.3
1993	477	1.5	1346	0.15	1388	5.4	2713	-9.9

Source: extracted from Babiker (1996).

Information in table 6.1.3 indicates that dressing stations (DS) increased by 97 units lower than both dispensaries and health centers. Primary health care units (PHCUs) declined in number from 2725 to 2713. This means that the health care pyramid has been shrinking at the bottom, while expanding at the top in contra-direction to policy recipes. Moreover, the rates of growth are not adjusted for population growth suggesting that the observed growth is not only deformed but also spurious. Another factor which may be taken into consideration when reviewing table 4.3 is that most of the changes are merely a reflection of the over-grading of lower facilities to higher levels. Again, this suggests that professional power and community politics might have played a greater role in facility planning than the responsible planning authorities.

As mentioned earlier a relevant dimension of health facilities is their geographical distribution. Distribution has obvious implications for equity. From table 6.1.4 which shows the distribution of health facilities among health zones, a clear skewness in the distribution of services is observable with the Northern, Equatoria, Khartoum and the Central (in a descending order) Zones having hospital/population ratios above the national average of 0.9 Hospitals/100,000 population. On the other hand, Darfur, Upper Nile, Eastern, Kordofan, and Bahr Elghazal (in an ascending order) have ratios below the national average. The most disadvantaged zones in hospital distribution are Darfur (0.3/100000) and Bahr Elghazal (0.6/100000). A similar but not identical pattern, is also seen in the distribution of specialist hospitals, blood banks, x-ray facilities and hospital beds. Like patterns are also discernible for primary health care facilities of which the Northern, Khartoum, Equatoria, Central, Eastern and Bahr Elghazal zones have more, relative to their population than the remaining zones. Here also, we find that Darfur, Kordofan, and

Upper Nile zones are the most deprived. Some observations about this pattern of health facility distribution are in order here. Firstly, it should be observed that the depicted distribution of health facilities among zones is quite similar to the observed pattern of poverty distribution shown earlier. The fact that the health facilities are part of the poverty index should not detract from this observation because the weight they take does not overbalance the other components of the poverty index. The quality of our data and that of previous reports is more reliable in light of this interrelation between health and poverty indicators. Secondly, it should be noted that the apparent advantage of the Southern Zones vis-à-vis the other zones (with the exception of Darfur and Kordofan) is transient. Most of these states witnessed a decrease in their populations due to the high out-migration rate that has been induced by both tribal and civil war conflicts. This artificially inflates the facility/population ratios for those zones as, of course, facilities would not migrate with their clients. This possible bias is more relevant in our context because the data we use has not been adjusted for quality. The impact of this out-migration transcends southern states to the receiving states. Therefore, the Central, Khartoum, Upper Nile, Kordofan, and Darfur are the largest receivers of displaced people, which depresses their facility/population ratios. Within Southern states the distinctively high facility/population ratio position of Equatoria, cannot be explained entirely by reference to population movements. Instead, the relatively higher facility population ratios of this zone may be partially explained by its privileged position as the home state of the regional capital.

Table 6.1.4: Distribution of Health Facilities by Type and Region 1993 (# Facilities /100,000)

Region	Hosp.	Spec. Hosp.	Blood Banks	X-ray Facilities.	Hospital Beds	Health Centers	dispensaries	Dressing stations	PHC units
Khart.	37(1.1)	25	9	22	4,339(127.1)	70(2.1)	141(4.1)	84(2.5)	57(1.7)
Central	59(1.1)	59(1.1)	15	11	11	4948(91.4)	172(3.2)	778(14.3)	445(8.2)
North.	36(2.8)	8	6	8	2396(185.5)	122(9.4)	211(16.3)	162(12.5)	153(11.8)
East.	22(.7)	6	6	6	2685(88.0)	43(1.4)	162(5.3)	150(5.2)	418(13.7)
Kord.	26(.8)	5	2	5	2227(70.3)	34(1.1)	172(5.40	130(4.1)	924(29.2)
Darfur	16(.3)	5	2	3	1380(29.1)	25(0.5)	123(2.60	35(0.7)	654(13.8)
Equat.	16(1.4)	2	1	2	1102(95.8)	7(.06)	68(5.9)	39(3.4)	238(20.7)
B. Ghazal	9(.8)	1	1	1	993(83.2)	2(0.2)	55(4.6)	-	41(3.4)
U.Nile	7(.6)	1	1	1	954(75.8)	2(0.2)	40(3.2)	-	83(6.6)
Sudan	228(.9)	68	39	59	21024(82.7)	477(1.9)	1346(5.3)	1388(5.5)	3013(11.9)

Source: Health Information Center FMOH (in GOS/UNICEF 1996).

6.2 Health Manpower:

The health sector is a labor-intensive sector in both the quantitative and qualitative senses. Quantitatively the medical sector requires the employment of large numbers of medical and paramedical staff for the optimal use of other service inputs. Qualitatively with the exception of the general service staff we find that all health workers need a special and a relatively longer period of training to qualify for work in health facilities compared with most other economic sectors. This entails a high component of human capital in the health sector's capital stock. Table 6.2.1 gives the growth of manpower/1000 population for medical and paramedical personnel. The number of specialists and general doctors per 1000 population has remained approximately unchanged over the reference period. This situation may have negative implications for the goal of coverage, especially, in a situation where morbidity rates rise. However, the mere stagnancy in the doctor/population ratio is not sufficient for arriving at this conclusion. A positive interpretation may equally likely be supported by this observation. Specifically, it could be claimed that this state of affairs may be conducive to the efficiency and equity goals of re-deployment of resources, if highly and expensively trained cadres are replaced by appropriately trained lower level cadres to allow for greater coverage by PHC services. This claim may be true during the period 1986-1990 when PHC was still gaining more moral and financial support. In fact this is confirmed by investigating columns 3 and 4 of the same table (6.2.1) which show increases in the ratios of medical assistants and nurses. We find that the ratio of medical assistants/ 1000 population increased from 0.16 in 1986 to 0.2 in 1990

and thereafter declined to 0.08. On the other hand, the nurse/population ratio increased from a stationary value of 0.72 in 1985, 1986 t0 0.74 in 1987 and then decreased to 0.71 in 1988 to 0.68 in 1989 and 0.61 in 1990 to marginally increase to 0.62 for the rest of the period. Thus an overall comparison between the second half of the 1980s and the first half of the 1990s decades reveals that the nurse population/ratio has been shifting down by a whole decile as it decreased from the eighth decile to the seventh. Still pursuing shifts in manpower resources from the statistics provided, we find that a different story is told by the health visitors/population ratio. This ratio witnessed a considerable rise in 1994 and a leap in 1995. Changes in this variable are important because they reflect that at the policy level commitment to training PHC personnel has remained unshakable as a policy target. This is not in contradiction with what we have seen from changes in the ratios of other paramedical staff. The apparent conflict is explained by the uneven attrition rates from the service. It has been established that the categories of general doctors and medical assistants suffered the greatest rates of decline in their numbers during the 1985-1993/94 period (Babiker 1996). The different labor market conditions faced by each category may explain this situation well.

The assumption is even more plausible if we introduce in our analysis the demographic and socio-economic determinants of migration. The receiving countries of Sudanese migrants have high demand for general doctors, medical assistants, and nurses. These categories are lacking in the receiving countries because of their relatively long training period and high cost of training, also their greater potential for longer working lives in the receiving countries is more reason for their relative attraction.

Table 6.2.1 Health Manpower/1000 population 1985-1996

Year	Specialists	General Doctor	Medical Assis.	Nurse	Health Visitors	Dentist	Technicians
1985 *	0.02	0.09	0.16	0.72	0.02		
1986	0.02	0.08	0.16	0.72	0.02		
1987	0.02	0.11	0.18	0.74	0.02		
1988	0.02	0.11	0.19	0.71	0.02		
1989	0.02	0.10	0.20	0.68	0.02		
1990	0.02	0.09	0.20	0.61	0.02		
1991	0.02	0.09	0.08	0.62	0.02	0.01	0.05
1992	0.02	0.09	0.08	0.62	0.02	0.01	0.05
1993	0.02	0.09	0.08	0.62	0.02	0.01	0.05
1994	0.02	0.09	0.08	0.62	0.03	0.01	0.05
1995	0.02	0.09	0.08	0.62	0.32	0.01	0.05
1996	0.02	0.09	0.08	0.62	0.30	0.01	0.05

Source: Computed from health statistical survey and population data.

Moreover, the increasing economic pressures and the declining salaries of these professionals, like other public sector employees, make the push factors for migration also relevant. The tendency of the mentioned categories to exit the service at a higher frequency is also due to the fact that these categories (especially doctors) are not affected only by economic return. They are also sensitive to the deteriorating work environment that has been aggravated by lack of equipment and supplies in hospitals and other institutions. This matter tends to reduce job satisfaction. On the other hand, the category of health visitors and probably of midwives have not increased due to their lower training and educational levels and their exclusive feminine nature, which reduced their tendency to migration. Beside external migration, another attraction to health workers is the expanding private sector, which competes with

the public sector for the same pool of health workers. The private sector attracted more midwives due to the relatively greater expansion in the private maternity and delivery services. A further possible explanation for the increase in the number of health visitors and midwives is related to the nature of foreign support to health programs. International donors have shown a clear bias for family planning programs compared with other health services. This bias in the context of economic difficulties made national health services managers accept more and more family planning programs to compensate for financial deficiency. Therefore training of relatively high numbers of health visitors and midwives was made possible. Before leaving this section we should mention that relatively lower rates of attrition of specialists is explicable in a number of ways. Firstly, the high cost of employing specialists with their relatively shorter potential working life make them less attractive to foreign employers. On the pull factors side we also find that old specialists have a better economic position that allows them to establish their own private practices whether on full time or on part-time basis. Also this segment of the specialist community would be attracted to remain at home for pursuance of child education. As for the younger generation of specialists they have also a greater market niche in offering their services to the private sector which has expanded its demand for such services due to the expansion in private hospitals (see below). Thus younger specialists need not have the requisite resources to have their private practices because institutional changes made it possible for private capital to invest in the health sector.

Another important aspect of manpower is their distribution. The pattern of manpower distribution between the various geographic zones could easily be figured from a careful look at table 6.2.2 below; disparity here is

more pronounced than in health care facilities; again we find Khartoum, Central and the Northern zones have manpower/population ratios better than the others for all manpower categories; generally Kordofan has the best ratios among the disadvantaged zones while Equatoria has the worst for most of the indicators; however some deviation from this pattern exists for some indicators; the relatively disadvantaged position of southern zones is more clear here and confirms our claim that the apparent health facility advantage of these states is transient and spurious; this is so because health workers (unlike the health facilities) respond to the same push factors that affect the rest of the population. By looking at the health manpower structure also we can observe some aberrations in the proportions between the different categories. For example it is not expected that the ratios of technicians be comparable to those of specialists nor that the ratio of medical assistants is a not manifold of that of general doctors. This aberration in the manpower pyramid is reminiscent of that of the health facilities pyramid with similar bad connotations for achievement of national health policy goals of greater coverage by PHC services.

Table 6.2.2: Distribution of Health Workers by Category and Region

Region	Specialists	All doctors	Technicians	Med. Assts.	Nurses
Khartoum	286(8.4)	1,149(33.7)	991(29.0)	1,258(36.9)	3,308 (96.9)
Central	106(2.0)	391(7.2)	206(3.8)	1,005(18.6)	4,173(77.0)
Northern	30(2.3)	129(10.0)	83(6.4)	423(32.8)	1,629(126.1)
Eastern	64(2.1)	224(7.3)	93(3.0)	572(18.7)	1,274(41.7)
Kordofan	24(0.8)	93(2.9)	85(2.7)	524(16.6)	1,642(51.9)
Darfur	18(0.4)	65(1.4)	116(2.4)	463(9.8)	1,009(21.3)
Equatoria*	1(0.1)	18(1.6)	59(5.1)	65(5.7)	1,247(108.4)
B. el Ghazal*	1(0.1)	18(0.9)	27(1.4)	249 (13.0)	1,013(52.9)

Source : UNICEF/GOS 1996.

To sum up, it is obvious that both health manpower expansion and geographic and occupational distribution have not been commensurate to the ambitions of health policy. However this may not be simply explained by saying that policy makers were not conscious of the appropriate instruments for achieving their policy goals. It is rather more convincing to assume, as our analysis suggests, that the socio-economic factors via their impact on work relations and work environment coupled with the demographic characteristics of the health labor force and the labor market conditions are the main factors behind the observed changes.

6.3 Public Health Infrastructures:

Public health factors are instrumental to health conditions of any countries but are of added importance for less developed countries like the Sudan.

Access to sanitary facilities: Access to sanitary facilities is vital component of the public health system. Table 6.3.1 shows the proportion of the population with no access to sanitary facilities by region and mode of living; generally there is a clear rural-urban gap for the Northern Zones, which have complete data sets. Across regions disparities are also found; the pattern of this variation is different from what has been reviewed; for instance Darfur is relatively in a good position regarding its urban population of whom only 10% have no access to sanitary facilities. Similarly its rural population is in a better position with only 35% of them having no access to sanitary facilities. Another observable feature of this indicator is the large rural and urban proportion of people in the central zone with no access to sanitary facilities in contrast to its

favorable standing in other indicators. The Southern Zones have large proportions of their urban population with no access to sanitary facilities and data on the rural population is not available.

Table 6.3.1: Percentage Population with no access to Sanitary Facilities

Region	Total	Urban	Rural
Northern States			
Northern	31	14	37
Eastern	53	34	68
Khartoum	15	15	18
Central	50	31	57
Kordofan	39	28	42
Darfur	32	10	35
Southern States			
Upper Nile	N/A	52	N/A
Bahr El Ghazal	N/A	46	N/A
Equatoria	N/A	57	N/A

Source: GOS/UNICEF (1996)

Water supply: Water supply is another important component of the public health infrastructure. Table 6.3.2 gives the % of people covered with water supply by region; while the % covered is low for the country as a whole (39%), differences between regions exist. Khartoum, Northern and Central zones have the largest coverage rates while Kordofan, the Eastern and Southern zones are the least served of the Northern zones. No breakdown of the % covered of southern zones is given but the reported estimate of 16% for all zones is far below the national average.

Table 6.3.2: Demand for Water

Region	3 Capacity (M /day)	Population	3 Demand(M /day)	% Coverage
Khartoum	350,000	2,919,773	700,000	50
Northern	30,000	296,684	64,000	47
Eastern	48,000	1,030,198	205,000	20
Central	80,000	1,280,761	184,800	39
Kordofan	23,000	649,962	114,400	17
Darfur	14,000	652,523	74,000	20
Southern	20,000	674,210	103,000	16
Total	565,000	7,504,111	1,445,400	39

Source: GOS/UNICEF (1996)

Public health manpower: Public health manpower is an important dimension of the public system. As is clear from table 6.3.3 all categories of personal witnessed an increase, especially during the period 1990-1993. This indicates a very appropriate policy orientation, as the morbidity and mortality pattern in the country requires that public health measures be strengthened. This is very relevant given the conditions of economic retrenchment and public budget shrinkage. Apart from its efficiency aspect, public health expansion has a more equitable nature, as its public good nature does not allow complete exclusion of the poor. The fact that the public health manpower has increased in number further confirms the observation that economic and economic policy conditions, rather than health policy dictates, have defined the expansion of curative health care resources. The major reason behind the obvious increase in public health personnel is the scantiness of migration opportunities and the narrow domestic labor market outlets. The observed decline in health inspectors and bilharziasis workers should not detract from this analysis for a number of considerations. First, the decline in the number of health inspectors may constitute a positive sign in that it can reflect an

improvement in administrative capacity, as they mostly hold administrative positions. Secondly, for bilharziasis workers, the decline may reflect a change in control technology rather than low policy prioritization. Third, the decline in the number of night soil workers is perhaps a reflection of use of alternative waste disposal methods and increasing dislike for the job.

Table 6.3.3: Environmental and Public Health Personnel:

Year	Health Inspectors		Health Officers		Health Overseers		Malaria Workers		Bilharsias is Workers		General Cleaners		Night Soil Workers	
	No.	%	No	%	No	%	No	%	No	%	No	%	N0	%
1989	52	-	108	-	690	-	3255	-	281	-	7859	-	1951	0
1990	63	21.1	108	0.0	690	0.0	3212	-1.3	298	-1.3	7859	0	1951	0
1991	63	0.0	134	24	690	0.0	3209	-0.1	311	4.4	7859	0	1629	-16.5
1992	53	-16	139	4	838	21.4	2886	-10	289	-8	8144	4	1806	1.9
1093	59	11.3	161	16	1006	20	3361	16.5	296	3.5	8263	1.5	1806	0
% change 90-93	-6.3	-	49.1	-	45.8	-	4.9	-	-0.7	-	5.1	-	7.4	-5.6
Avg. % change 90-93	-2.1	-	16.4	-	15.3	-	1.5	-	-0.2	-	1.7	-	2.4	-1.9

Source: Babiker (1996)

Immunization: Immunization has proved to be one of the most effective health measures in combating the health hazards inflicting children in developing countries. Accordingly, it has been given a highly acclaimed position in national and international policy agenda. Immunization is very sensitive to changes in economic conditions due to its high logistic

management requirements. Therefore, it is a relevant measure of progress in the health interventions in the context of a liberalized economy.

Table 6.3.4: Immunization Coverage in the Northern Health Areas

Vaccine	1987	1988	1989	1990	1991	1992	1993
Triple Antigen	36	52	52	81	81	67	52
OPV	36	52	52	81	80	67	52
Measles	27	44	43	71	73	66	46
BCG	55	69	65	94	84	76	62
Tetanus 2	15	22	32	* 18	17	15	10

Source: GOS/UNICEF (1993)

*Note: * Denominator changed from # of pregnant women to # of women in child bearing age.*

Table 6.3.4 indicates that, for almost all vaccines, coverage was consistently increasing in an upward trend peaking in 1991 and declining thereafter. This temporal pattern of change suggests that economic and financial difficulties are very effective in reducing coverage. Table 6.3.5 which contains more recent data suggests a slight improvement in coverage of measles and OPV vaccines with 49.5% coverage for measles and 47% complete dose coverage for OPV in the Northern zones. The corresponding rates for southern health zones are 41.2 and 32.8%; thus the downward trend in immunization coverage seems to have persisted under the assumption that the coverage rates for these two vaccines is representative of the overall coverage rates of disparities among zones.

Table 6.3.5: Vaccination coverage of children 12-23 months

Region	OPV	Measles		
	Dose 1	Dose2	Dose 3	
Northern	86.4%	75.6%	67.1%	65.9%
Khartoum	83.2%	79.7%	64.9%	70.9%
Central	74.8%	68.7%	62.6%	58.9%
Eastern	50.8%	44.4%	41.6%	40.8%
Kordofan	59.2%	48.1%	32.5%	40.5%
Darfur	51.3%	41.6%	28.6%	32.3%
Norhern Zones	65.5%	57.9%	47.8%	49.5%
Southern Zones	57.8%	46.9%	32.8%	41.2%

Source: GOS/UNICEF (1996)

6.4 Supply of Food and Medicines:

Of the wide spectrum of health-related goods medicines and food supply take a leading position. The role of pharmaceutical products in modern health services can hardly be overstated. In addition to their proven therapeutic and life-saving benefits, medicines play another important role in promoting health services effectiveness and efficiency. People's perception of quality is often coached in terms of the drug and medical supply availability, a thing that gives pharmaceuticals a central place as a determinant of service utilization levels and hence their availability becomes an important policy variable that can hardly be overlooked. Therefore, the optimal use of other service inputs hinges, to a great extent, on drugs. This factual statement should not be taken as a call for abandoning drug rationalization policies. In fact, a rational national drug policy, by its reduction of drug stock-out rates at health facility level, is a direct derivative of such a statement.

We have neither enough information on drug prices, nor direct information on availability. Price and quantity data are essential for drawing conclusions on accessibility with its concomitant impact on health status. The economic and health sector reform efforts have liberalized importation of medicines. The availability of medicines has improved greatly due to removal of deterring import barriers. This can be seen by referring to table 6.4.1 below which shows that the volatility in drug imports has been lessened in later years; since the values given are expressed in terms of the US dollar, which is relatively immune to the volatility in value of the national currency, they can also indicate increased availability. These policies are coupled with changes in public-sector drug procurement practices to further improve availability. This gain in availability has been at the cost of very steep price rises. Again, we have no hard data on price changes, but the inflation rates and the removal of subsidies give credence to the loud public outcries of drug cost inflation. On the policy side, attempts at containing price rises, have been made. In the public health sector, the people's pharmacies have been more organized and better stocked, at least in Khartoum and the major towns. This created a slight relief as these pharmacies sell at prices, although very high compared with previous subsidized levels, that are below current market prices. Other attempts included financing mechanisms such as revolving funds for drugs and cost-recovery mechanisms in general. The coverage of these services has been very limited as a council of ministers study indicates (Council of Ministers, 1992). A long-term policy of national industrialization in the pharmaceuticals sector has also been pursued leading to notable increases in local supply with a perceptible positive impact on prices. Therefore, as far as the impact of drug policy and drug availability is concerned, we

cannot have a definitive conclusion, given data constraints. Yet indicative evidence suggests that drug availability has increased but at the expense of affordability because of the escalating drug price levels despite the policy attempts to arrest the rise. It should be noted here that the high costs of drugs inflate the overall treatment costs and as such tend to discourage utilization of modern health services thus depriving patients from enjoying the benefits associated with medical consultation. If the discouraged patients substituted health care utilization by self-medication or referral to traditional practitioners for ailments that were known to be curable by modern medical interventions, they will suffer a clear loss in welfare.

Table 6.4.1:Value of Imported medicines 1990-1995

Year	Value in US$	%
1990	15,000,000	-
1991	4,465,574	-70
1992	18,311,285	310
1993	14,942,463	-3.4
1994	23,762,699	59
1995	* 26,117,189	10

Source: Babiker (1996); *Note: Own Estimation*

Like drugs, the essentiality of food for health is self-evident. Moreover, the synergy between health and nutritional status has efficiency implications for both sub-sectors.

As far as the availability and affordability of food and nutrients are concerned, we have some indicators of availability at the national level

but no price data apart from the general trends deduced from more non-specific information. Table 6.4.2 shows that per capita output for the two indigenous cereal crops has not improved significantly over the years and has been very volatile reflecting their proneness to the vagaries of the weather as they are mainly grown in rain-fed agricultural lands. As for wheat, which is grown in irrigated areas, its production has been more stable and improved significantly in the 1990s, mainly as a response to the policy emphasis on self-sufficiency. This policy brought more land under wheat cultivation. The impact is evident from the high per capita output in 1990/91 & 1991/92 (0.03 tons) seasons when the wheat production policy was at its peak. Later years have witnessed the decline of the ratio to 0.02 tons/capita (still higher than the 1980s ratios). In discussing food availability, as one of the determinants of nutritional and health status, the regional distribution of output is important, as well as the distribution of purchasing power among population groups. As such data is not directly available, we can only refer to the general indicators of increasing poverty rates and skewed income distribution discussed in above. Removal of food subsidies, as part of the economic adjustment policy package, has definitely put an upward pressure on prices causing an adverse effect on food accessibility. Food availability have also been threatened by the high rate of growth of the urban population which mainly feeds on wheat which is not an indigenous crop and thus further increasing prices and thus severing the increases of other factors such as removal of subsidies (Refer to figure 6.2.1 below). However, the impact must have been less than what could otherwise be expected due to several considerations. First, among these consideration is the government policy of cereal crop distribution at low prices to government employees. Second, the activation of the Zakat Chambre that also distributes cereals must have had some impact. Third, the deeply ingrained non-market

(social) distribution mechanisms for indigenous cereals might have had a favorable impact. The smallness of the proportion of Government employees, the increase in poverty rates and the recent emergence of Zakat as an Islamic institution must have limited the efficacy of these factors.

Furthering our discussion on availability, it appears from table 6.4.3 that per capita calorie supply has been growing negatively for the entire period shown in the table. However, the pace of decline slowed for the last three years confirming the positive policy impact on availability noted earlier.

Salih & Affan (1986) have suggested that this dwindling in calorie supply be related to economic difficulties and perhaps policy changes. In their study they referred to the Food and Agriculture Organization which provided figures indicating improvement in the daily availability of calorie supply per capita. The average daily calorie supply per capita increased from 1970 calories for the years 1966-68 to 2104 for the years 1972-74 and then to 2250 for the years 1975-77 (Ibid.). The significance of these figures for our study stems from the fact that they refer to the period just preceding the economic crises.

Table 6.4.2Cereal Foods Production 1982/83-1993/94 (000s tons)

CROP	SORGHUM			MILLET			WHEAT		
Year	Tot. Prod.	%	PC Prod.	Tot. Prod.	%	PC Prod.	Tot. Prod.	%	PC Prod
82/83	1938	-	0.1	341	-	0.02	141	-	0.01
83/84	11129	474	0.5	314	-8	0.02	169	20	0.01
84/85	1110	-90	0.1	168	-46	0.01	79	-53	0.004
85/86	3524	217	0.2	417	148	0.02	199	152	0.01
86/87	3277	-7	0.14	285	-32	0.01	157	-21	0.01
87/88	1363	-58	0.1	153	-46	0.01	181	12	0.01
88/89	4425	225	0.2	415	224	0.02	274	51	0.01
89/90	1601	-64	0.1	167	-67	0.01	420	53	0.02
90/91	1200	-25	0.1	88	-47	0.003	670	60	0.03
91/92	3540	192	0.14	308	250	0.01	895	34	0.03
92/93	4042	14	0.2	449	46	0.02	453	-49	0.02
93/94	23401	-42	0.1	319	-29	0.01	509	12	0.02
94/95	3648	55.9	0.13	989	210	0.03	662	30.1	0.02
95/96	2786	-23.6	0.10	608	38.5	0.03	709	7.1	0.02
96/97	4180	50	0.15	545	-10.4	0.01	782	10.3	0.02

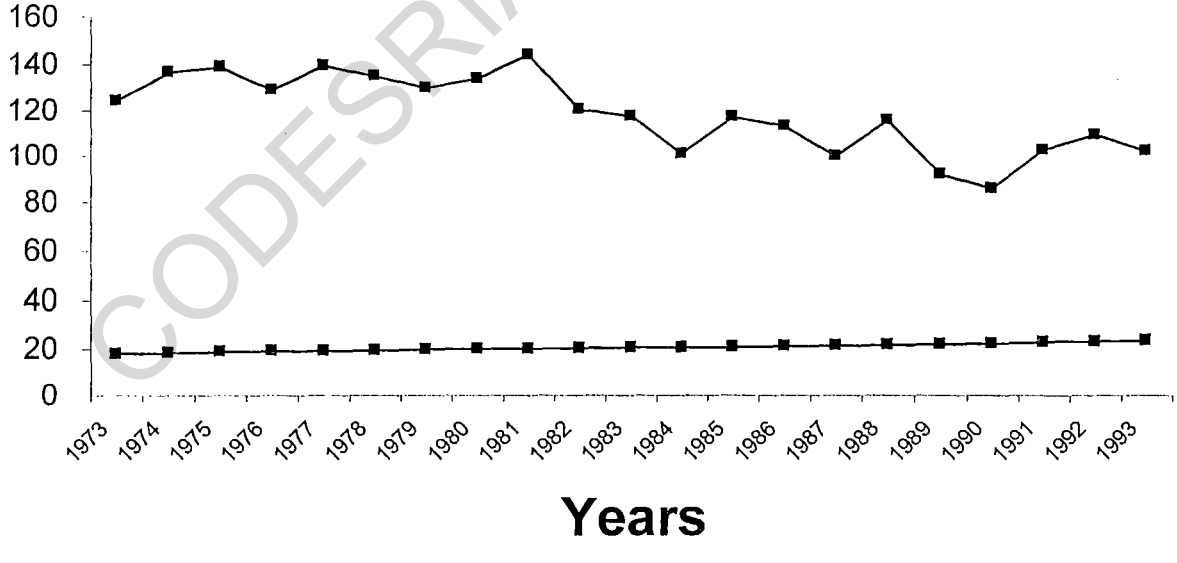
Source: Several Issues of the Economic Survey, Ministry of Finance.

Table 6.4.2: Daily Calorie Supply Per Capita 1980-1993

Years	P.C. Daily Calorie Supply	% Change *
1980	2364	-
1985	2147	-9.2
1989	1974	-8.1
1990	1933	-2.1
1991	1908	-1.3
1992	1875	-1.7
1993	1851	-1.3

Source: The African Development Bank (1994);
□□Author's computations.

Figure 6.2.1.:Growth of Food Production a
Urban Population (%):1973-1993



Source: Drawn on the Basis of data taken from world tables (1997).

6.5: Conclusions:

In this chapter we reviewed the changes in the basic health infrastructures and the related health-input variables. The review revealed that some variables, such as hospitals, some paramedical categories, public health personnel and food and medicines availability, witnessed changes that are apparently favorable to the achievement of national health objectives. Looking at these changes in isolation of the context of changing and without further analysis may suggest that the performance of the health input indicators have, at least, not been hindered by the economic and adjustment changes that took place during the reference period. However further analysis showed this conclusion is untenable. The constancy in the number of hospitals could have been favorable to attainment of health policy objectives if not for the non-conducive changes in other categories of health care facilities. The favorable changes in public health personnel seem to be explained by the economic factors that govern turnover rate of this category of personnel compared with the other categories; this is supported by the observed deterioration in the other public health inputs such as the declining immunization coverage and the scanty provisions of water supply and sanitation facilities. Likewise the increases in the number of midwives and health visitors is attributable to economic factors and the socio-demographic characteristics of these categories. Regarding the availability of food and medicines it should be noted that the distributive aspects seem to have overweighed the availability aspect as is confirmed by data such as the declining per capita calorie supply and casual evidence regarding the affordability of purchasing medicines. Moreover the persistence of the skewed distribution of health resources suggest that the economic difficulties and the accompanying conditions have paralyzed the attainment of the policy goal of equal geographic coverage despite its being a national priority.

In conclusion it is shown by the foregoing analysis that the overall changes in health infrastructures and related input variables during the study period were not favorable and are negatively affected by the economic adjustment changes observed over the period. This conclusion is in line with the observed movements in the health related macroeconomic inputs reviewed in Chapter 5.

CHAPTER SEVEN

THE HEALTH STATUS MANIFESTATIONS OF ECONOMIC ADVERSITY

7.1 Introduction:

Despite the significance of changes in economic, social and health infrastructures in the assessment of the impact of adverse economic events on health, such assessment will remain incomplete unless changes in health status are monitored and somehow related to the economic happenings over the reference study period. The need to carry out such an exercise is not merely felt and "perceived " but is real and "conceived". The uncertainty that envelops the correlation between health and the mentioned intermediate variables, is the main basis of the analytic logic behind this need. Hence unless a one to one correspondence between the intermediate variables and health status variables exists or health status variables (indicators) are completely unavailable, no logical justification for using the former as proxies for the latter is tolerable. Therefore since some statistics on morbidity and mortality are available it is assumed that the present study will benefit from the consideration of changes in health status as measured by these statistics.

The present chapter is organized as follows: in section 7.2 morbidity statistics are reviewed and analyzed, section 7.3 is devoted to the review and analysis of mortality statistics with some digression on their comparative merits, section 7.4 discusses life expectancy while section 7.5 considers changes in nutritional status variables that are closely related to health status. Finally, section 7.6 concludes this chapter with an assessment of the likely impact of economic difficulties on health status in the light of data and analysis of the preceding sections.

7.2 Morbidity Indicators:

Morbidity statistics are of great importance in portraying the general health status of a population. Both the extent and variability of disease in a particular country and/or community are telling of that country's state of health. In turn a country's state of health is a function of many variables which are sensitive to changes in economic variables as shown elaborately in the opening chapters of this thesis. In this subsection we are going to monitor the changes in health status of the Sudanese people as may be construed from available morbidity statistics. We have tried as far as possible to exhaust every possibility of obtaining data that covers the reference period 1978-1997 and/or sub-periods within it. The paucity of sources makes hospital statistics a major source for our investigation, this may help explain our frequent reference to hospital and institutional statistics provided by the records and reports of the Ministry of Health. It can hardly be needed to state here that we are aware of the fact that such statistics carry a number of biases. These biases result from the fact that modern health institutions are more liable to utilization by population groups with certain characteristics, such as proximity to health facilities, urban residence, high educational status and cultural traits favorable to use of modern health services. It goes without saying that despite the high significance of these biases in other contexts, they are not harmful to our analysis, which is indicative and informative rather than definitive and prescriptive and hence can do without reference to fine detail. To further explain this, let us assume that a particular disease has claimed a greater share of hospital inpatients. This will indicate that this particular disease is becoming more prevalent not only among the population group with the high propensity for hospital utilization, but also amongst the whole population. In other words changes in hospital statistics, despite their bias of over-representation of particular population subgroups, indicate

changes in the overall disease picture of the studied community. This is so because shifts in attitude favoring more hospital utilization are highly unlikely to be restricted to a single disease. Also when an increase in the relative weight of a particular disease is observed in hospital statistics, it is more likely to be a reflection of a general increase in the share of this disease in the overall disease burden amongst the community at large.

In addition to institutional statistics, we have also resorted to data furnished by other sources such as national surveys, study reports, census data, and other secondary and tertiary national and international sources. Survey data are sporadic and lack completeness both in their extent of coverage and the existence of continuous systematic time series. International and national organizational data are often too aggregated save a limited number of in-depth studies and surveys.

The above caveats notwithstanding, the ensuing discussion tries as best as possible to portray a realistic picture of the Sudanese health conditions using the existing sources of information described above. This painting will be performed against the background of the economic reversals and adversaries described earlier. We hope to show how the dim shades of economic downturns have obstructed the appearance of a brighter morbidity outlook.

The most outstanding feature that can be spotted from the existing data is that Sudan, like many other Developing Countries, has a morbidity pattern in which socio-economic conditions play a major role. Infectious, parasitic and poverty-related diseases are predominant. Table 7.2.1 gives the major cases treated in health units for 1994-1996. Malaria, diarrhea diseases and dysentery head the list. These diseases are controllable given availability of resources to improve services and general socio-economic status.

Malaria has always been problematic, but the intensity of its impact has greatly multiplied during the years of economic difficulties. The impact of Malaria reached an extent that justifies its labeling as having become the major public health problem in Sudan (GOS/UNICEF 1996 P. 55). Bilharsiasis and Lishmaniasis are two tropical diseases that still have a remarkable place in our morbidity map. A poignant reminder of our poverty-ridden situation is the appearance of diseases strongly associated with poverty, such as tuberculosis, malnutrition, and anemia among the major causes of health services utilization.

Table 7.2.1: Major cases of diseases Treated in Health Units 1994-1996

Disease	1994		1995		1996	
	Cases (000)	%	Cases (000)	%	Cases (000)	%
Malaria	333	41.5	239	35.5	164	29.7
Diarrheas D.	195	24.3	190	28.4	146	26.4
Dysentery	107	13.4	91.8	13.6	100	18.0
Bilharzaisis	5	0.7	5.4	0.8	4.6	0.8
Lishmaniasis	0.04	0.01	0.02	0.0	0.07	0.01
TB	2.4	0.31	0.7	0.11	0.7	0.12
Typhoid	2.4	0.32	0.5	0.10	0.5	0.09
Viral Hepatitis	0.8	0.10	0.4	0.06	0.4	0.07
Pneumonia	36	4.5	36.1	5.4	36	6.5
Nutritional Deficiency	95	11.8	85.5	12.7	81	14.7
Anemia	24	3.1	22.1	3.3	3.6	20.1

Source: Annual Health Statistics Reports.

Note: cases per 1000 population.

A major unbecoming feature of the morbidity picture scarring the health situation in the Sudan is the existence of such diseases as dracunculiasis (guinea worm), a disease that is related to quantity and quality of water. Sudan is the only country in the Middle East and North African region and one of the 19 African countries where this disease is still endemic. High case prevalence has been reported in recent surveys. The active guinea worm village case search undertaken in 1991-1992 by the UNICEF (Sudan) Health and Water & Environmental Sanitation sections in collaboration with the National Guinea Worm Eradication program, has revealed the results reported in Table 7.2.2 below. To be able to relate this data to coverage by clean water we annexed the coverage data column of Table 5.1.2 to form the last column of Table 7.2.2. Despite the hazy quality of the data due to incompleteness a clear indication of the general association between clean water supply and the level of guinea worm infection emerges. Thus we find Khartoum which has the highest rate of coverage with clean water supply (50%) to have the lowest infection rates (0.5% endemicity of surveyed villages and 5.4 cases /100000 population). Likewise we find Kordofan with only 17% coverage having higher infection rates (using both morbidity measures) compared with Darfur which has a 20% coverage rate. The remarkable divergence of the Central zone from this general trend begs a special comment. The data reveals that this zone is the third best-endowed zone as far as coverage with clean water supply is concerned. This is adequately reflected in the low rate of village endemicty (1.1%). However, the fact that this zone has the highest number of cases per 100,000 population of infected villages indicates the great disparity in coverage with clean water supply. Moreover, this suggests that the infected villages in this zone are the worst endowed not only compared with areas within the zone but with areas in other zones at the national level. The similarity in the figures of village endemicity for the Eastern and the Northern zones despite their

Table 7.2.2: Distribution Of Guinea Worm Cases As Revealed By The Active Case Search:

Health Zone	#cases found	%Total cases	#villages surveyed	#endemic villages	% Endemic Villages	Infected villages population	#Cases/100,000 infected village Population	% coverage w clean water +
Central	1532	58.2	4188	48	1.1	194,494	787.7	
Bahr Elghazal	455	17.5	37	26	70	73,018	623.1	
Kordofan	317	12.2	3131	60	1.9	104,913	302.2	
Darfur	132	5.1	3563	48	1.3	98,537	134	
Khartoum	11	0.4	587	3	0.5	203,716	5.4	
Upper Nile	149	5.7		16				
Northern	5	0.2		2				
Eastern	3	0.2		3				
Equatoria								1
Total	2604	100	11506	206		674,678		

Source: Based on a table published by (GOS/UNICEF 1993 p.39)

***Data for Southern zones is incomplete due to armed conflict in the Southern zones.**

****This figure is the average for the three southern states.** + **This Column is extracted from Table 6.3.2.**

remarkably differing endowments requires explanation. In fact, if we assume that the Northern zone is expected to have the mentioned low figure due to its high endowment, we find it almost impossible to explain the low figure for the Eastern zone. This conclusion becomes even more warranted given the realities of our existing data, especially in the face of its incompleteness for these two zones.

Beside the above mentioned morbidity statistics, researchers in the field of health give child morbidity indicators a special place for two interrelated reasons. The first reason for their prominence is conceptual; in particular, children are the biologically and socially more vulnerable segment of any community and as such their health status is most sensitive to changes in the physical and social environments. As the latter are the important mediator variables between health status and the economic and social infrastructures, child morbidity can claim a duly worthy role in studies like ours. The second reason behind the significance of child health statistics is more of a practical nature, though it is dependent on the first. Specifically, we find that a wealth of child health statistics has accumulated in Developing Countries because of the great international concern with children health as could be readily seen from the preponderance of programs and organizations concerned with child health.

Reviewing existing child health statistics we again find that diarrheas, acute respiratory infections and malaria, are the leading causes of child morbidity. Ali & Homeida (1988) conducted a study covering 12 major diseases in three peripheral areas of rural Khartoum using a more or less longitudinal cohort design. The number of patients included in the study amounted to 13949, comprising 21% of the total number of people living in the study area(s). They found four major diseases heading the list. These are malaria (23.8%), respiratory tract diseases (18.2%),

gastrointestinal tract diseases (12.1%) and eye diseases (12.1%)(ibid. P. 1). Further analyses of these major disease categories showed that children under two years of age (<2) are the most vulnerable as portrayed by their relatively high incidence rates for all the diseases. It is worth noting that although malaria is not a particularly childhood disease its impact on children is shown to be proportionately more severe, further increasing the reliability of childhood morbidity as an indicator of the overall disease burden. In this regard it is appropriate to quote the authors: ". The incidence of malaria was significantly higher in the < 2 years age group (46%) than in the 3-14 (24%) > 15 (29.4%) age groups i.e. small children and infants were simply more infected) (Op. Cit. 31). These authors verified this finding by considering the data for each month of their four-month survey and found this pattern of morbidity to be unchanged. Despite the limited geographical coverage of this survey its findings are highly informative especially in the face of the overall paucity of data. It also claims added significance by providing a frame of reference for cross-checking data furnished by the official institutional sources cited earlier. The disease pattern shown by these findings is concordant with that shown by the above-mentioned sources (See table 7.2.1). These findings further show that the Sudanese morbidity pattern is predominated by diseases related to poverty as defined in terms of the quality of the environment, poor economic and social infrastructure, low income, and low rates of investment in human capital. More recent data on child morbidity suggests that no major change in the disease pattern has occurred. The Situation Analysis of Children and Women in the Sudan (GOS/UNICEF 1996) gave a recent account of the major diseases affecting children. According to this source the prevalence of diseases among children aged 0-14 years is as follows: Malaria (39%), respiratory infections (20%), diarrheas (16%), amoebiasis (8%), burns, injuries, accidents & poisoning (5%), anemia (4%), fever of undiagnosed origin (4%), other nutritional diseases (3%),

and other diseases of the digestive system (1%) (PP.54-55). Simple regrouping of these statistics according to the categories of Ali & Homeida (1988) gives the following pattern of morbidity: Malaria (39%), gastrointestinal diseases 29%, and respiratory infections (20%), which is sufficient to show the similarity of the disease pattern despite the flow of years. Other sources on childhood morbidity present a similar outlook. The Pap Child Survey (1993) shows that 30% of male and 29% of female children had diarrhea (a proxy for gastrointestinal tract diseases) during the two weeks immediately preceding the survey. The same source indicates that 29% of surveyed children had cough (a proxy for respiratory tract diseases) during the same period.

The above review of morbidity statistics makes it clear that the major pattern of diseases has remained virtually unchanged for the years under study. It could have been possible to attribute this permanence of the morbidity pattern to the formulation of inappropriate health policies and plans due to unawareness, on the part of policy makers, of the appropriate health policy package. However, the overwhelming evidence to the contrary blocks this avenue of explanation. In fact as mentioned earlier (See chapter 4) the Sudanese health authorities are accredited with a pioneering role in appropriate policy making. Even during the era of Condominium rule health authorities recognized the role of preventive and cost effective basic (primary) health care services for the health of the populace. The integrated policy approach adopted by the early health authorities made Squires to describe the emergence of the Sudan Medical Service as an "Experiment in Social Medicine" (Squires 1958). A relatively recent medical historian confirms this judgment by emphasizing that: "In following the evolution of the Sudan Medical Service, one must be impressed with its outstanding performance and its unique and steady growth as a full-time government service.' (Bayoumi 1979). The Sudanese

National Health Plan (Ministry of Health 1975) and Primary Health Care programs (Ministry of Health 1977a and 1977b) have contained a number of methodologies and policy objectives that are highly relevant to the country's health problems and needs. These documents stand witness to early awareness and high technical dexterity on the part of national health planners. This also means that the health planning authorities realized the need for rationalization of the health care delivery system. The expansions of the primary health care facilities during the 1970s (years of relative plenty) further attest to the latent implementation capability of national health policy in pursuance of the health planing objectives. In the face of this evidence of appropriate policies and prompt implementation whenever feasible, an alternative explanation for the grim performance in health status achievements should be sought. In our previous discussion (see Chapters 5 & 6 above) we have shown how the economic difficulties with their multiple facets of manifestation in the health sector are the major culprit in thwarting the implementation of policy objectives. The dwindling budgets have resulted in inability to expand health facilities and personnel along desired policy lines and have resulted in both quantitative and qualitative shortages in all aspects of service provision. Therefore it is not farfetched to assume that the observed stagnation in heath status as measured by morbidity statistics is an outcome of the non-conducive economic conditions during the study period. Along with the direct impact on health services and facilities the economic difficulties have contributed to deterioration of health status through the erosion of existing social infrastructures. Careful investigation of the data at our disposal points at the validity of this hypothesis. Table 7.2.3 which has been constructed from the published Sudan Mother and Child Health Survey (SMCHS or the Pap-child Survey) gives the distribution of the occurrence of diarrhea according to selected environmental variables, severity of the attack and by mode of living. The sources of water are ranked in a decreasing order.

Presumably water networks supply water with a high degree of cleanliness (i.e. low probability of contamination), followed by well water (piped or not) and the other sources which are in the Sudan either running open water surfaces like rivers and irrigation canals or still water yards such as Fulas & hafirs. Referring to the mentioned table bearing in mind this ranking a clear negative association between the source of water and the prevalence of diarrhea emerges in both urban and rural settings. The fact that well water in rural areas is associated with higher diarrhea prevalence compared with the *other source* category is explicable by the realization that many wells in such areas are uncovered and thus can be added to the open yard category. The type of sewerage disposal system seems to have a similar effect but the prevalence rates are not as smoothly changing along the different types. Again we note that water-washed sewerage systems are more effective in reducing diarrhea prevalence compared with pit latrines and open space systems but less effective than bucket systems in urban areas. In rural areas the use of water-washed systems is superior to all others. However the use of water-washed systems in both urban and rural areas is associated with high-income status and therefore its observed superiority may not be purely a reflection of technical efficacy. In both rural and urban use of open space as sewerage outlet is most associated with high diarrhea prevalence. This again may not be a pure reflection of technical inferiority but an indicator of the impact of low income and low awareness of the importance of personal hygiene for health. The two last categories of environmental variables have greater affinity to economic reversals and economic status. The type of house floor is an indicator of economic ability of the owner/occupier. The data indicates that children living in houses with unpaved floors are at higher risk (27.2% prevalence) compared with those living in houses paved with cement floors (17% prevalence). The category of others, which is associated with the highest diarrhea prevalence, needs further splitting up to have any meaningful

relevance to our analysis; however, this is not feasible given the available data. Nevertheless, the observed difference in prevalence indicated by the

Table 7.2.3: The Distribution Of Children Who Had Diarrhea By Mode Of Living And Environmental Variables:

	Urban		Rural	
Environmental Variables	% of Children with		% of Children with	
	Diarrhea.	Acute Diarrhea.	Diarrhea.	Acute Diarrhea.
1. Source of water				
Water Supply network	٢٢	51.3	28.4	41.1
Well water	25.3	52.3	31	59.5
Other Source	36.7	56.1	36	49
2. Type of latrine				
Water-washed (Siphon)	19.9	52.8	20	4.7
Pit latrine	24.4	51.1	31	52.3
Bucket	19.1	22.2	36	42.9
In open space	35.9	60.6	34.3	57.6
3. Type of House floor				
Unpaved	27.2	54	32.4	54.4
Cement pavement	17	47	21.1	68.4
Other	48.8	22.5	31.5	31.5
4. Availability of Soap				
Available	23.1	53.4	31.4	52.9
Not available	32.1	48.7	34	58.1

Source: Based on data in table 8/5 SCHMS Pp. 71-72.

other categories is sufficient to suggest that the quality of housing (which could be a proxy of economic status) is an essential determinant of child health. The availability of soap has equally made a difference regarding diarrhea prevalence (See Table 7.2.3)

Drawing on the same source of data table 7.2.4, shows the proportions of children whose mothers didn't consult a doctor by educational status and reasons for failing to consult. The importance of such data stems from their indicating the role of service utilization in determining child health. From the table we see that the highest percentage of women who did not consult a doctor for the diarrhea episode of their children were those who did not go to school (63.2%). This may indicate the prevalence of a negative attitude towards health services on the part of this subgroup. Apart from this the data does not display any clear direction for the association between maternal educational status and the consultation of a doctor (or health provider). Before one arrives at the easy but not careful conclusion that, beyond mere literacy, there is no educational gradient for health service utilization, a contemplative pause is useful. First it must be taken into account that a higher percentage of children not to taken to the doctor is not indicative of low educational status; the converse may be true i.e. the higher percentage may be associated with higher educational status. Current policy encourages home treatment of diarrhea with oral re-hydration salts. The ability to make a correct diagnosis and understand the right formula for preparing the salts is expected to be higher for higher educational status. Therefore an in-built tendency for educated mothers to provide home treatment for their children is instilled. The data we have does support such an expectation. The fact that the greatest proportions of mothers in the highest educational status categories (intermediate & secondary) gave "light diarrhea" as the main reasons for taking their children to the doctor verifies this. Furthermore only 15.8% & 2.6 %

of mothers with intermediate education gave lack of time and unavailability of services as reasons for not taking their children to the doctor while the corresponding proportions for the "secondary & higher" category of mothers are 17.1% & 2.9% respectively.

Table 7.2.4: The Proportion Of Children Who Had Diarrhea But Their Mothers Did Not Consult A Doctor By Educational Status Of The Mother:

Maternal Education	% of children	Light Diarrhea.	didn't have time	Services Not Available
Not enrolled	63.2	24.6	26.7	21.1
Incomplete Primary.	48.5	39.9	28.6	8.3
Primary Education	53.4	35.2	15.5	15.5
Intermediate Education	48.1	60.5	15.8	2.6
Secondary & higher	52.2	57.1	17.1	2.9

Source: Based on Table 8/5 of the SCMHS Pp. 71/72.

The clear connections observed between environmental and other social infrastructure variables and health status as exemplified here by diarrhea prevalence is welcome micro level confirmation of a connection long speculated on at the macro level. The previous paragraphs do not only show the possibility that economic adversity may have a negative impact on health status but also confirm the plausibility of the assumption that such an impact works via different routes.

7.3 : The Mortality Dimension of the Impact:

7.3.1 Mortality versus Morbidity as a Health Status Indicator:

In analyzing the impact of medical care programs, or the impact of other relevant variables, on health status, mortality claims a central place. Health care researchers have mixed feelings regarding the use of mortality in assessing changes in the health status of a particular population. On the one hand, mortality is definitely a more exact and reliable measure of impact, that the occurrence of death is a definite and uncontroversial event. On the other hand, mortality can not be taken as an unquestionable comprehensive indicator of the health status of a community or a country for the simple reason that a large number of non-fatal but crippling and discomforting diseases exist. In Developing Countries where vital statistics registration systems are either non-existent or are extremely deficient, reliability itself is at stake. This state of affairs makes reporting of deaths by mothers, sisters or other relatives the major means of generating mortality information. Despite this caveat, mortality data enjoy a comparative edge of reliability especially in the context of Developing Countries. This is so because morbidity measures in these countries are also subject to factors that reduce reliability such as inadequate disease notification systems, asymmetry in access to and utilization of health care institutions by population groups with similar socio-economic and health characteristics. Therefore, as long as the analysis is restricted to a single domain (i.e. developed or Developing Countries) the relative merits of morbidity and mortality measures remain unchanged. It might be argued that morbidity measures are sufficient for assessing the health situation at any particular time and place since mortality usually follows morbidity. Despite the ostensible plausibility of this line of reasoning, its shallowness is readily apparent. Specifically, the differences in the disability, debility and mortality impact of diseases makes

temporal and geographical comparisons infeasible. In pursuance of overcoming these defects researchers adopted a number of strategies. Some researchers showed ingenuity in assessing overall health status by using morbidity and mortality statistics jointly in such a way as to minimize the limitations of single measures. The most ambitious and scientifically path-breaking efforts have been exerted in developing composite measures of morbidity and mortality (Kind, Rosser and Williams 1982). Earlier successes were achieved in Developed Countries where the concept and operational measure of quality adjusted life years was introduced. Their further modification and use certify to the conceptual and practical success of these concepts. The World Bank (1993) used quality adjusted life years (Qalys) and disability adjusted life years (a concept developed by the bank) in assessing the economic and health burden of disease in Developing Countries.

The above review is an inevitable background for the following discussion of the mortality and morbidity impact of the changing socio-economic context of health in Sudan during the study period 1978-1996. This study chose the strategy of using mortality and morbidity statistics jointly. The reasons behind this choice of analytical strategy are practical more than conceptual. Chief among these reasons is that data is mostly available in separate formats of morbidity and mortality statistics while composite statistical health indicators are virtually non-existent. Moreover, even if such data is made available their recent nature makes them inadequate for our purposes because of the length of the time period covered by this study. It goes without saying that neither economic nor technical resources are available for us to attempt reconstruction of composite mortality/morbidity measures from separate mortality and morbidity statistics. In what follows we review the changes in three types of mortality indicators. These will be adult mortality, under-five mortality

and infant mortality rates. Using all three types of indicators, besides enhancing reliability of the available data, has the additional utility of fine sweeping all possible causative factors underlying changes in the population health status over the reference period. Available data on Life Expectancy, a mortality-related (dependent?) indicator, will be made. Although life expectancy could be estimated at different ages, it is more common to use life expectancy at birth. This is more justifiable in Developing Countries because of the high impact of childhood diseases. The use of life expectancy enhances the vision of the health landscape of a country by its measurement of longevity which is a universally run-after health objective. In what follows we will review available types of mortality indicators.

7.3.2 Adult Mortality:

Adult mortality has recently claimed a place in the minds and works of health researchers. Previously it was not given priority in mortality statistics for a long period of time. The presumption was that physical vulnerability is usually highest at young ages, especially in Developing Countries and therefore child rather than adult mortality is more relevant. Moreover, the statistical instruments of life tables have consistently shown that life expectancy in Developing Countries is extremely sensitive to child mortality. Also the gap in life expectancy between Developed and Developing Countries will be severely reduced if the statistic is estimated at ages later than the childhood years. A number of underlying analytical and practical reasons behind the change of attitude towards adult mortality could be identified. First among these, and probably the most stark, is the mortality toll of the AIDS pandemic, which distressed the world in the 1980s decade. Since adults are the main victims of AIDS, and simultaneously its major precipitators via their sexual behavior, adult mortality started to claim a significant share in the global overall mortality

toll in both developed and Developing Countries. A second reason that perhaps had special significance for Developed Countries is the virtual elimination of diseases that claim children's lives. This made the major threats to human life relate to diseases caused by life style "the so called diseases of affluence" and degenerative diseases caused by increased aging. It is obvious that both types of disease groups are related to adult mortality. A third factor behind the significance of adult mortality is essentially of an analytical nature. This is the economic importance of adults as the repository of human capital and the main segment of the productive labor force when we are talking about the productive age group. However, post-productive age mortality is equally of special importance in Developed Countries for its implications for their extensive social security systems. A final and perhaps not often recognized reason behind the resurgence of interest in adult mortality is the increasing influence of feminist concepts on scientific analysis. This is well illustrated by the added[1] emphases on gender in mortality and other health statistics.

Adult mortality statistics in Sudan are not complete. However the existing information does indicate in a non-exact manner the general trends and differentials in mortality both over time and space. Despite the deficiency of mortality statistics the type of analyses we are adopting may benefit from their use (in conjunction with other statistics) in investigating the likelihood of the interrelations between the socio-economic and health

[1]In fact gender analysis in medical and biological sciences is old but their emphasis has been on the purely biological aspects; emphasis the socio-economic aspects of gender is more recent.

Table 7.3.2.1: Adult Mortality For Selected Years: 1970-1995:

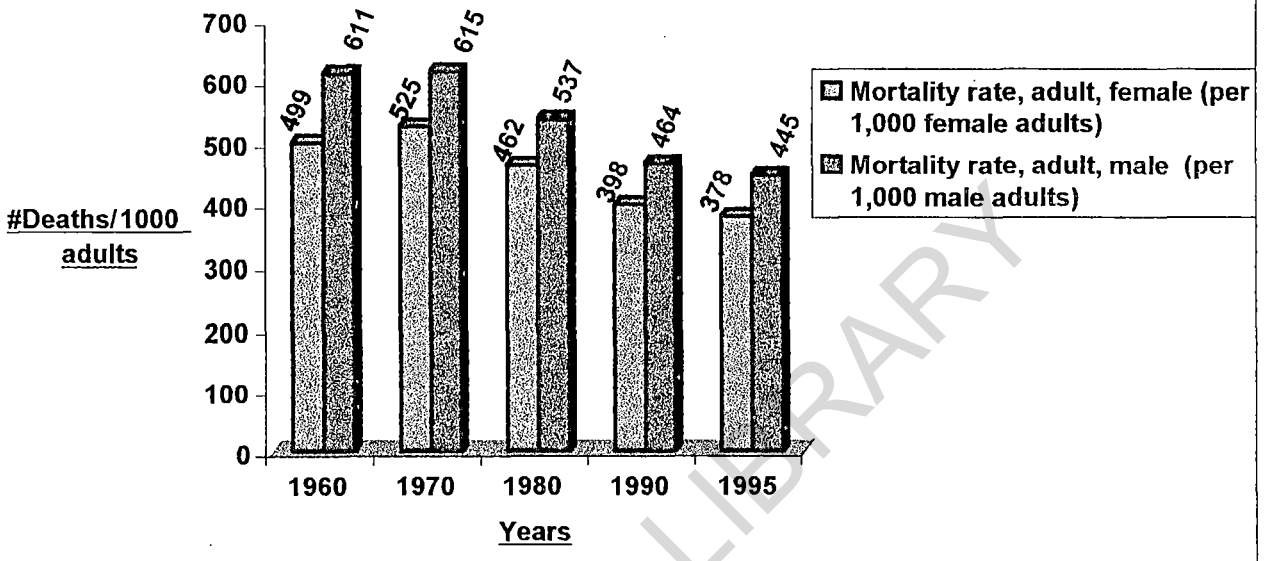
Year	Male	Change	Female	Change	Excess male deaths
1960	611	-	499	-	110
1970	615	+4	525	+26	90
1980	537	-78	462	-63	75
1990	464	-93	398	-64	66
1995	445	-19	378	-20	67

Source: Based on World Tables 1997.

variables. Figures in table 7.2.2.1 indicate that both male and female mortality rates have improved slightly between the beginning and the end of the period covered by our data with some fluctuations in the intervening periods. Male deaths declined from 611/1000 adults in 1960 to 445 in 1995 i.e. by 166 deaths/ 1000 adults. During the same period female deaths declined by 121/1000 adults from 499 to 378 per 1000 adults. This gender gap in survival gains can be explained in different ways. First the fact that the female mortality situation was much better at the starting period will naturally lead to less gains for females due to the operation of the law of diminishing returns. That means the marginal returns for investments in life-saving medical care and other health care goods will be less for women compared with men. This is corroborated by the data in columns 3 and 5 of table 7.3.2.1 that show changes in the deaths/1000 adults. We observe that the decline is relatively high for men compared with women at the earlier sub-periods but the trend is reversed for later periods suggesting that as the mortality rates for men approach those of women the law of diminishing returns operates more evenly for both sexes (see figure 7.3.2.1 for a visual idea). An alternative explanation may rest

on the assumption that the increased labor market participation rates for women may increase their exposure to risk factors that comprise their mortality advantage over men. This argument may gain more credence in the context of the earlier conservatism of Sudanese society and the increase in informal sector activities, which is mainly dominated by women (refer to Chapter 5). Another possible explanation may go in contrast with the last as it rests on an opposing assumption. In particular, it may be argued that the conservatism of the society that restricts women mobility reduces their access to improved health services. This is especially plausible when the urban concentration of health services and facilities is considered. However it should be mentioned that the determination of the relative robustness of any of these competing hypotheses needs further research based on data that permits a more thorough statistical analyses. Another observation from table 7.3.2.1 is the increase in mortality during the period 1960-1970. An obvious explanation for this observation does not exist. However, since this period immediately followed independence it is expected that population changes would have had an impact due to departure of low risk groups and increased urbanization and probably a more hazardous life due to the accelerated pace of development during this period. Elaborating on the last possibility, it should be mentioned that the 1960-1970 period witnessed the first large public investments in manufacturing, infrastructure, and agricultural projects. Such projects carry additional direct health risks in terms of more road and industrial accidents and more incidence of water related diseases

Figure 7.3.2.1 :Adult Mortality for selected years



Source: Based on world tables data

(Malaria, schistosomiasis etc.) and indirect health risks due to changes in diet and life style associated with developmental changes.

More relevant to our investigation is the assessment of the relative changes in adult mortality in the light of economic crises. A first observation is the declining gain in mortality reductions over the period for both sexes. Although the earlier arguments concerning the working of the law of diminishing returns could also be used here as an explanatory factor its plausibility is much reduced. In particular we cannot claim that declining marginal gains in mortality reduction is due to diminishing returns to investments for both sexes due to the fact that the biological potential in terms of survival probabilities has not been reached. This is so because average life expectancy for both sexes is far less than those levels attained by some Developing Countries not mentioning those of developed Countries.

7.3.3: Child Mortality:

As previously mentioned child mortality is a sensitive measure of health status. In fact it is considered a good proxy for health service program performance. This particular trait is the main argument behind its use by UNICEF as a proxy for human development (see below). Table 7.3.3.1 gives censal and inter-censal estimates of infant mortality rates. According to census data an overall improvement has occurred as IMR decreased from 1955/56-census level of 134/1000 infant deaths to 110-120/1000 and 108/1000 infant deaths according to 1973 and 1983 censuses. Estimates for 1983-85 put the figure at 116/1000, the rise being obviously associated with the famine during the period. Estimates for 1985-90 and 1990 indicate a downward trend of 108 and 104 per 1000, respectively. The

1993 census estimates indicate that the rate has started to rise putting it at 110/1000.

Table 7.3.3.1: Infant Mortality Rate (IMR)

Source	IMR value
Census 1955/56	134
Census 1973	110-120
Census 1983	108
UN Estimates, 1980-85	116
UN Estimates, 1985-90	106
UN Estimates, 1990	104
Census 1993	110

Source: GOS/ UNICEF (1996)

Diagram 7.3.3.1, which is based on a World Bank data source on infant mortality, gives the results depicted below. According to this source infant mortality has shown a declining trend for the years indicated in the diagram. It should however be remembered that this data series might probably be biased as it covers a long period in a country where estimates rather than routine production of information is the major source. This is especially likely to be so given the great divergence of these mortality figures from the census figures, which are more likely to be reliable. In particular, one's doubts about this data source may be more confirmed by the divergence of the mortality figure from that of the 1993 census which is the most recent. This recentness would be expected to raise the reliability of this census results through benefiting from possible advances in statistical methods and data collection technology.

Yet another way to judge the performance of Sudan during the last decade is to see its ranking by UNICEF according to the Under 5 Mortality rate measure. This ranking has been introduced by UNICEF, to judge human development and to replace the World's Bank ranking which is based on the per capita income. This human development index is the precursor of the human development index introduced by the United Nations Development Program later on. Measuring the position of a country depends on the number of countries included and the number of countries sharing the same mortality figures; hence it is essential to include the highest rank in each year along with the rank of the country of interest. This is needed to compare the achievement of a particular country over time. In table 7.3.3.2 the ranking of Sudan has been considered. As the country 's rank increases somewhat in proportion with the increase in the highest attained rank it is plausible to assume that the relative progress in the value of the rank is more or less conspicuous. This conclusion is supported by the stagnancy in the values of male and female mortality rates during the same years referred to as may be confirmed by reference to the previous table (i.e. Table 7.3.3.1).

Table 7.3.3.2: The Ranking Of Sudan According To <5 Mortality In Selected Years:

Year of the Mortality Figure	Sudan's Rank	Highest rank
1990	25	129
1992	29	145
1995	40	149
1996	42	189

Source: UNICEF The State of the World Children 1992,1994,1997,1998.

Beside the temporal aspect of mortality, the pattern of its distribution by urban-rural, gender, disease, and geographic characteristics is equally

important. Table 7.3.3.3 below gives estimates of IMR from census and pap child sources. The considerable disagreement between the two sources sheds doubt on the reliability of both data sets unless further clarification is offered. The gap between the two estimates is smaller for the U5MR. At any rate the purpose for which we inserted this table is not much affected by this observation. Specifically this table indicates that a rural-urban and a gender-gap exist for both indicators by both sources except that for the U5MR the census shows a rural urban advantage. For both indicators, a female advantage is reported by both sources.

Table 7.3.3.3: IMR And U5MR From The 1993 Census And The Pap. Child Survey.

Mortality	Total	Urban	Rural	Male	Female
IMR					
Census	110	109	110	116	103
Pap. Child	69.5	75.2	78.5	84.6	64.2
U5MR					
Census		147	145	149	142
Pap Child		109.5	132.9	135.6	113.6

Source: GOS/ UNICEF (1996)

The disease pattern of mortality is perceptible from table **7.3.3.4**, which gives the leading causes of death in hospitals. Again the same set of poverty and environmentally determined diseases are predominant among the leading causes of death. Malaria, diarrheas, pneumonia, dehydration, malnutrition, anemia, and tuberculosis figure as the most important killers of inpatients. Also, we note that the shares of malaria, malnutrition, anemia, and tuberculosis in total deaths have been rising over the years. The degree of loss in human welfare resulting from these diseases is more appreciable if we take into account that these diseases should not be a health hazard given the current technical feasibility levels of curative and preventive medical technologies. The analogy of the high death toll of

these ailments within the context of technical ability to control them is the existence of mass starvation amidst food plenty. The observed viciousness of these diseases is more related to changes in economic variables than to lack of technical skill. The decline in public expenditure for the prevention and treatment of malaria helped not only greater incidence and prevalence of the disease but even increased the probability of failure to control it. This last side effect results from the fact that when morbidity with disease increases within the context of economic reforms inside and outside the health sector, the accessibility to adequate treatment and prevention is reduced greatly. It follows that the increased inability of malaria victims to take sufficient curative and preventive measures increases resistance of both parasites and the vector to anti-malarial drugs and to insecticides respectively. The economic loss due to the associated morbidity and mortality further undermines any control efforts. Diarrheas, malnutrition, anemia and tuberculosis are all related to the increased incidence of poverty which affects both the quantity and quality of food intake, housing, and environmental infrastructures such as clean water supply and safe disposal of waste.

Table 7.3.3.4: The Leading Causes of Death for Selected Years

	Malaria		Pneumonia		Diarrheas		Dehydration		Malnutrition		Anemia		T.B	
Year	deaths	%	deaths	%	deaths	%	deaths	%	deaths	%	deaths	%	deaths	%
1986	4464	13.3	1573	11	1928	13.5	-	-	467	3.3	-	-	717	5%
1988	1610	12.7	1130	8.9	766	6	-	-	-	-	426	3.3	347	2.7
1989	1948	19	1078	10.5	-	-	-	-	360	3.5	364	3.6	208	2
1990	1434	13.3	1421	13.3	1029	9.5	-	-	359	3.3	278	2.6	408	3.7
1996	1944	18.5	705	6.7	593	5.6	487.6	4.6	586	5.5	468	4.4	475	4.5

Source: Annual Statistical Reports, Ministry of Health.

In the absence of directly relevant data, information on the geographical pattern of mortality rates could provide quite an illumination in the context of analyzing the impact of policy and economic variables on health status. Table 7.2.3.5 below gives changes in infant mortality rates by health zone for the inter-censal period (1983-1993), as reported by the two censuses undertaken within the study period. The data confirms that an overall deterioration in mortality has occurred as noted above. All regions have witnessed an increase in mortality rates. The additional mortality burden has not been evenly distributed between regions. The least rises in IMR rates have occurred in the Central, Khartoum and Northern zones. The greatest mortality toll occurred in Darfur, the Eastern and Kordofan regions. Again, it is notable that the distribution of mortality burden is consistent with the distribution of poverty rates and health resources between the regions as noted earlier. It must also be noted that the IMR reported for the Northern Zone is not quite in order with the resource endowment data reviewed earlier. In particular, the IMR is higher than might be expected from the resource base of this zone. This may be related to the fact that most of the health institutions located in this region are the result of self-help efforts. As the communities provide the basic capital for construction of health facilities, the government shoulders the burden of recurrent cost. However, increased economic difficulties have reduced government spending on health greatly and therefore recurrent expenditures on health are expected to have deteriorated greatly. This must have reduced the operating capacity and the quality of care provided at these facilities and thus the effectiveness of the services provided in controlling mortality. Another explanation of this observed impotency of health resources may be the lack of supportive social and economic infrastructures. In the absence of data on quality and supportive infrastructures these two observations remain as mere speculation.

Nevertheless we hope that we have contributed by highlighting the need for more informed investigation of this issue.

Table 7.3.3.5: Census Estimates of Infant Mortality Rates By Health Zone

Region	1983	1993	% Increase
Khartoum	89	94	5.6
Northern	94	102	8.5
Central	101	106	5.0
Darfur	98	113	15.0
Kordofan	104	118	13.5
Eastern	104	119	14.4

Source: GOS/UNICEF (1996)

7.4: Life Expectancy:

Life expectancy is an important variable for measuring health status. Longevity has for long been considered as a desirable goal in almost all human societies. The place it occupies in modern man's conception of the basic constituents of human welfare is brightly reflected in its consideration as one of the three components of the Human Development Index.

Table 7.4.1 below gives life expectancy at birth for the Sudan and African countries. Life expectancy at birth for the Sudan is one of the shortest in Africa as is seen from the gap between the Sudan and the African average for the selected years for both sexes. The life of the Sudanese has in general remained three years short of that of the average African irrespective of sex. Recent statistics indicate the closing of this gap during the last years shown in the table. Since no further data is available no

further analysis is possible. However it should be mentioned that the trends in infant and underfive mortality are the critical determinants of life expectancy and since we have seen that the trend of these has been on the rise in the intercensal period, it is hardly advisable to take these figures at face value. Moreover, and as touched upon earlier the quality of years lived is an essential element of general welfare and therefore the gained years should be discounted for quality. This means that whether a real gain or loss in welfare has been realized is dependent upon the changes in quality of life. Since by definition economic difficulties are a general inconvenience it is unlikely that quality adjusted life years have increased during our reference period. This means that at best we may consider longevity unchanged in our analysis and therefore no direct mortality data is subsumed in the analysis.

Table 7.4.1: Life Expectancy at Birth for Sudan and African Countries (Selected years):

Year	Value			
	Sudan		Africa	
	Male	Female	Male	Female
1970	41	43	44	46
1975	43	45	46	48
1980	45	48	48	50
1985	47	50	50	53
1989	49	51	52	55
1990	51	53	52	55
1991	51	53	52	55
1992	51	54	52	55
1993	52	54	52	56
1995	53	55	52	55

Source: African Development Reports 1994,1997.

7.5 Nutritional status:

The most prevalent condition of mal-nourishment is protein-energy malnutrition (PEM). In fact this has been identified as the major nutritional problem in Developing Countries since the early 1970s (Berg 1973 P. 15). Deficiencies in micro-nutrients such as A-vitaminosis, iodine deficiency (IDD), and iron deficiency are also notable. Availability and accessibility of food within a particular socio-cultural setting (Babiker 1998) mainly determine nutritional status. The significance of nutritional deficiencies as public health problems is indicated in the following discussion. Along with the morbidity and mortality impact of nutrition-related diseases, more confirmation of the high prevalence of malnutrition is provided.

In table 7.5.1, moderate malnutrition (<80%) is significantly prevalent in all zones. Kordofan, Eastern, Equatoria and Upper Nile zones have the highest prevalence of moderate and the severest type of malnutrition (<70%), which is uniquely reported in these zones. This temporal and geographic distribution of malnutrition is not unexpected, given the corresponding pattern of resource distribution. Other data sources confirm it. Table 7.5.2 gives the percentage of underweight children as reported by their mothers.

There is a clear consistency between this data and the nutritional survey data of the previous table. This is further clarified by reference to figure 7.2.5..1, which shows the variation of birth-weight by health zone. Khartoum, Central and the Northern zones have the lowest reported proportion of births, while Kordofan and Darfur have the highest. Although data is cross-sectional it is quite informative of the

interrelationships between availability of economic resources in general and nutritional status. Therefore it does have a role to play whenever we find this interrelationship in time series data.

Table 7.5.1: Malnutrition Average Prevalence Rates by Health Zone 1990-1993. (Measured by Weight for Height as % of W.H of the reference Population)

Region	1990	1991	1992	1993
Khartoum				
<80%	15.2	15.8	16.3	-
<70%	-	-	-	-
# Surveys	2	2	-	-
Darfur				
<80%	18.7	22.9	6.2	-
<70%	-	-		
# Surveys	4	4	2	-
Kordofan				
<80%	13.3	16.8	10.4	
<70%	-	-	1.3	
# Surveys	2	4	3	
Eastern				
<80%	31	18.3	15.1	-
<70%	-	-	5.3	-
# Surveys	1	2	2	
Central				
<80%	-	-	10.9	-
<70%	-	-	-	-
# Surveys	-	-	1	-

Source: Based on UNICEF (1993).

Table 7.5.2: % Of Underweight Children As Reported By Mothers, By Health Zone

Health Zone	%underweight Children
Kahrtoum	13.8
Eastern	15.2
Central	11.7
Darfur	18.2
Kordofan	18.4
Northern	8.8

Source: Based on table 26/10 of SMCHS (1993).

The role of social infrastructure is also significant for changes in nutritional variables. Based on data extracted from table 26/10 of SCMHS (1993) Figure 7.5.1 with table 7.5.3 indicate in a very clear way the impact of maternal education on nutritional status. A clear negative association between maternal education and underweight births is perceptible. The positive impact of maternal education on nutritional status may be either quantitative or qualitative. As regards the quantitative impact it is possible if the mother's educational status is taken as a proxy for economic status ; thus a more educated mother is expected to live in a high income household that is capable to provide more food. However an educated mother is also expected to be more skillful in optimizing the nutritional value of a given purchasing capability and thus provides herself and children with more nutrients for a given expenditure.

Besides the impact of education on nutritional status as depicted by the proportion of underweight births an urban rural gap concerning this indicator has also been reported by the 1993 SCMHS data. The percentage of underweight births to rural mothers is 14.1% compared to a percentage of 13.7% for their urban counterparts.

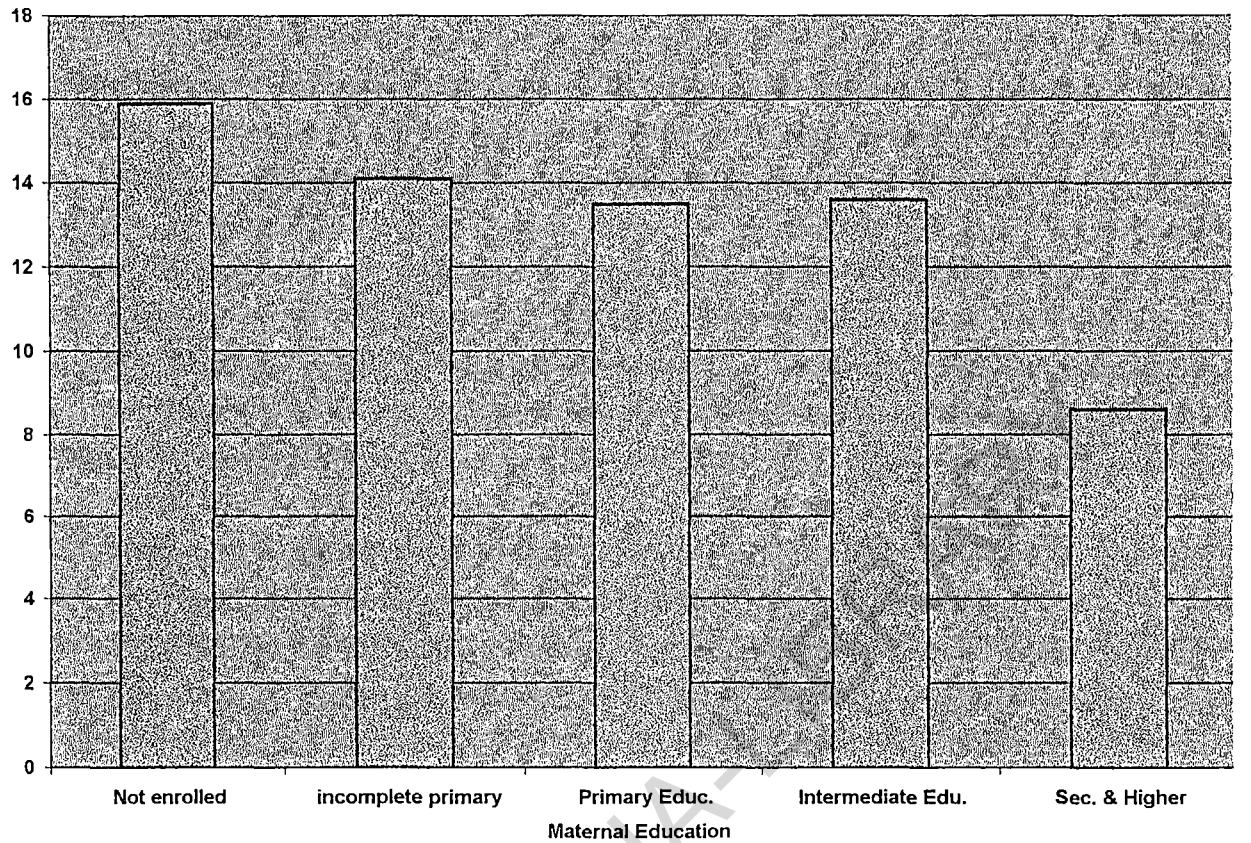
Table 7. 5.3. The Educational Gradient of Child Nutrition

Maternal Educational Status	Underweight Births %
Not enrolled to school	15.9
Incomplete primary Education	14.1
Primary Education.	13.5
Intermediate Education.	13.6
Secondary. & Higher	8.6

Source: Sudan Mother and Child Health Survey 1993

We can conclude that the nutritional status of both mothers and children has been negatively affected during the period of study. The available data has clearly indicated a deficiency in food supply as the calorie supply as a percentage of required has at best remained constant. This in itself is not a good sign even if the food distribution has been egalitarian. This is so because of the loss of potential welfare gains that are expected from the wishful policy makers in a country of underutilized resources. However, knowing that skewed distribution has increased, as has been demonstrated by data reviewed in previous chapters, deteriorated nutritional status is a plain consequence. The fact that some social infrastructure factors such as maternal education has been demonstrated by the foregoing analyses emphasizes the likely role of economic reform policies in bringing about the grim performance in nutritional status. The observed direction of change in nutritional status further enhances the reliability of our economic and health data. This is due to the synergistic relationships between health, nutritional and economic variables.

Figure 7.5.1 The Educational Gradient of Maternal Nutrition



Source: Based on data of table 7.5.3

7.6: Conclusions:

This chapter reviewed the changes in health status indicators during the study period. The indicators used included morbidity, mortality, life expectancy, and nutritional status statistics. The review was interspersed by analyses of the probable underlying causes of changes in the direction and magnitudes of these indicators with a special emphasis on the economic adjustment context. As these indicators are presumably sensitive to changes in the input indicators of chapters 5 and 6, they are more or less the outcome of changes in economic and health systems.

Movements in the health status indicators and the related variables that we have reviewed in this chapter were not uniform. However the analysis in more than one instance pointed at deterioration in the levels of health and nutritional status. In qualitative terms the pattern of disease prevalence, infectious and parasitic diseases still dominate the scene. Some poverty related diseases such as tuberculosis, malnutrition, and anemia contribute to the disease burden and have assumed a dominant role as causes of health facility utilization. This indicates the part played by economic adjustment variables in contributing to the appearance of the gloomy health picture. The virtual sustenance of the same patterns of morbidity and causes of death, especially in the context of a theoretically sound health policy, reaffirms the role of economic reversals witnessed by the country in braking the wheels of progress towards the realization of the health policy objectives of controlling and reducing the impact of diseases. The partial analysis of the interrelations of socio-economic and socio-economic related variables such as environmental and educational variables on the basis of national survey data gives clear empirical proof of the centrality of these variables in determining health status in Sudan.

In a nutshell the decline in the level of inputs that has been shown within the study period in the previous two chapters, has been amply reflected in the observed changes in the health status variables of this chapter. Thus it can be said that the economic reversals and policy changes that affected the country during the previous two decades are highly likely to have had a sufficiently high share in bringing about and sustaining the low health levels of the Sudanese population.

CHAPTER EIGHT
SUMMARY & CONCLUSIONS

8.1: Introduction:

In this concluding chapter section 8.2 gives a summary of the whole study in terms of its objectives, methodology, and overall analytic set up. Section 8.3 gives concluding remarks based on the major findings.

8.2 Summary:

This study aimed at investigating, in a somewhat generalized manner, the impact of the economic crises on health. This has - hopefully- been accomplished by eliciting a suitable analytical framework on the basis of a comprehensive review of the literature on the interrelationships between health and economic variables, especially during periods of economic adversity & adjustment, and applying this framework to the available and accessible data on the case of Sudan.

Specifically, the study started by reviewing the major models used in the analysis of economic aspects of health. Out of the numerous existing medical and economic models, the Household Model has been singled out for an elaborate consideration. The Household Model has been chosen for its comprehensiveness in the treatment of all medical and economic variables that affect health; it also covers both health and economic production and consumption decisions in a single analytical entity, thus overcoming, at least at the analytical level, the indirect treatment of health via the health services route.

The next step taken was a review of the economic adjustment experience and its social effects followed by a focused review of the literature dealing with these issues. On the basis of the focused review and the discussion it inspired, the study adopted a methodology of analyses that combines the theoretical approach and the before and after approach in analyzing the impact of economic changes and economic policies on health in the Sudan. The analysis was carried out within a specific analytical framework which, in effect, is a slight modification of the framework that has been suggested by the World Bank (World Bank 1990a). The adopted framework traces the effects from the macro through the meso to the micro economic levels.

To empirically monitor the impact of economic variables on health the study selected certain variables to act as its main variables of focus. The criteria on which variables have been selected dictated that any selected variable had to be either used in similar past studies -whether in Sudan or elsewhere- or had enjoyed a reasonable degree of data availability status. Accordingly, the following variables -the first three sets of which correspond to the three levels of the analytical framework were considered:

- Macro-economic health-related variables such as per capita income, government, social & health expenditure ratios, unemployment, overall and sectoral cost of living indices, poverty rates and variables relating to institutional changes such as the growth of the informal and the private sectors.

- Meso level variables related to health such as health facilities, health manpower, public health infrastructures, and availability of medicines and food.

- Outcome variables relating to health status which include mortality and morbidity indicators on which we could collect reasonable data.

- Other indicators and variables, for example, variables indicating the impact of economic policy and economic reversals on the level of commitment to, and the implementation of, national health policy, have been probed.

The study attempted to apply the above described analytical framework to available data on the chosen variables and indicators over the entire economic adjustment period 1978-1997 in the Sudan or any sub-period within this time frame. In fact data was not consistently available for the entire period; however the study resorted to qualitative analyses and circumstantial evidence whenever a logical argument could be advanced to bridge the data deficiency gap. This practice proved to be very useful and has been a great reassurance of the wisdom of using a methodology that combines qualitative analysis (the theoretical approach) and empirical analysis (the before and after approach). The study traced by analysis of the empirical evidence and critical qualitative review of supplementary material, the likely impact of economic adversity and policy changes on health-related macroeconomic inputs, health inputs and related infrastructure, and finally health status. The data used was based on secondary and tertiary sources. Knowing the data

limitation frequent comments on their quality and comparison of their different sources have been made. This would hopefully increase confidence in the conclusions drawn.

8.3: Concluding Remarks:

The major concluding remarks that have been drawn on the basis of the analysis of the study described in the previous section are given below:

- Although national health policy objectives and goals are theoretically adequate for handling the health problems of the country and have remained virtually intact despite the changing policy environment, the realistic pressures due to severe resource shortage resulting from the economic and economic policy changes hurt and obstructed the implementation of these policies.

- The inability to implement declared health policies would have long term effects on their credibility and will generate apathetic attitudes towards well-formulated and designed future policies that may improve future health sector performance and welfare achievements.

- Significant changes in macro-economic factors, such as reduced government spending, rising inflation rates and skewed income distribution, have occurred and negatively affected resource availability at the household

and social and economic infrastructure levels as is confirmed by the observed declining trends of the availability of these inputs.

♦ During the studied period virtually all health inputs such as facilities and manpower and related resources remained either stagnant or declined; an exception to this is the slight improvement in the availability (not the distribution) of public health manpower and to some extent food and medicines availability.

♦ In most parts of this study the analysis has consistently indicated that the unfavorable economic environment has created obstacles that hindered the achievement of the declared health goals.

♦ The review and analysis of the available data indicated the existence of very clear connections between health status and socio-economic variables related to health. Thus environmental variables such as access to clean water and sewerage disposal and even the availability of soap have been shown to be related to health status. Other social infrastructure variables such as the educational status of mothers also proved to be of relevance to explaining changes in health variables such as the proportion of underweight children and health-utilization variables such as seeing a doctor in the event of child diarrhea.

♦ In considering the above mentioned associations between socio-economic variables and health status on the basis of the available Sudanese data the study demonstrated the need to go beyond the received views in interpreting the apparent associations. For example more maternal education is not always a positive factor on child health; if more education increases the probability of maternal employment, other things remaining equal, child health will be negatively affected.

♦ The demonstrated connections between socio-economic variables related to social infrastructure which is amenable to economic adversity and policy changes is a strong micro level confirmation of a connection that is postulated to exist at the macro level. This strengthens the plausibility of the finding that economic adversity have had a negative impact on health status and that the impact worked via different routes.

♦ The observed consistency in the direction and speed of changes in economic variables at the macro, meso and micro level is an empirical verification of the viability of the adopted analytical framework.

♦ The fact that the changes in health status, which were analyzed independently in chapter 7, could be explained by the observed macroeconomic input and institutional changes of chapter 5 and the health input changes of chapter 6 increases the confidence in the conclusion that economic adversity and policy changes did have a negative impact on the health of the Sudanese populace.

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