Indicators of social development: conceptual and methodological considerations in monitoring the health sector

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Indicators of social development: Conceptual and methodological considerations in monitoring the health sector

by

John Oliver Callaghan

A Dissertation Submitted to the Graduate Faculty in Partial Fulfillment of The Requirements for the Degree of DOCTOR OF PHILOSOPHY

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I. INDICATORS OF SOCIAL DEVELOPMENT

A. Statement of the Problem

The interest of national planners in aspects of society other than economic exchanges has been rapidly expanding. There is developing a keener awareness in development planning of other social concerns, and an appreciation of the part played by many societal sectors in social and economic development. The provision of public facilities, health care, education, food and nutrition, reasonable working conditions, and a chance to share in the distribution of all aspects of well-being are seen as part of the development process. Developing nations are questioning their goals of growth. Quality of life has become a much used concept embodying new ideas about the state of the environment, the provision of health and educational services, better working conditions, security in employment, public safety, legal justice and many other issues. Development concern is now directed at a wide range of social needs and inequities, and the message is presented more clearly that aggregate economic expansion does not necessarily abolish poverty or bring an end to social inequity. In fact, economic expansion may be accompanied by greater relative deprivation for certain groups in societies, especially in less developed countries (LDCs).

Reliable information about social and economic conditions is essential in formulating realistic development policies, and in mounting effective programs to deal with the multiple problems of social, economic and human
development. It is of central importance in developing realistic planning recommendations that accurately reflect the needs of nations, and subunits of nations, at various stages of development.

Both the requirements and the opportunities of development planning have enlarged enormously in the last decade, and there is much confusion among planners and statisticians as to what constitutes useful social and economic information. This study explores some aspects of that question. It focuses on health as an area of social concern and on the health aspects of an information required for what is often referred to as "improving human welfare" (human well-being) and "social development."

Widespread efforts have been undertaken in recent years to improve the information base for social policy and social planning. Proposals have been made for the improvement of social intelligence by means of social reporting, social accounting, societal monitoring and social information systems (Shiskin, 1973; Novak, 1973; OECD, 1973a; Stone, 1971). Basic to these proposals is an emphasis on the generation of systems of social indicators to measure and monitor social change.

Recent interest in construction of social indicators is a response to two types of information need (Sheldon and Land, 1972; Girardeau, 1972; Zapf, 1972). The primary focus of interest is viewed as an expression of the efforts of planners and research workers to reconstruct the unity and the complexity of the problems with which they are faced. Concern with social indicator research is, however, also a result of the need to summarize an increasing volume of statistical information into a set of key indicators. To a great extent, current social indicator research
seeks to improve the scientific knowledge of social reality and its
development through utilization and improvement of existing social
statistics.

Social indicator research, to date, has been undertaken largely
within the more modernized urban-industrial societies, and is focused
primarily on the assessment of policy issues and social change character-
istic of technologically advanced societies. Far less effort has been
expended in research to devise and implement social indicators that are
uniquely adapted to the development needs of the less economically
developed nations of the "third world."

The complexity of the task confronting the nations of the third
world in formulating realistic development policies, and in mounting an
effective attack on the multiple problems they are facing, makes the
information needs for development planning especially acute in these
countries. In turn, the task of devising and implementing social
indicators that may be of use to nations of the third world is often
rendered more difficult due to the absence, in many countries, of basic
social statistics and technical skills necessary for the construction of
social indicators on par with those currently under construction in more
technologically advanced countries.

This study explores some of the information needs of less developed
countries. The primary purpose is to outline a strategy or methodology
which may assist less developed countries to improve the information base
for social planning through generation and implementation of their own set
of indicators of social development.
1. Sociological Implications

Social indicators research is suggesting new directions for sociological inquiry which constitutes an open invitation for sociologists to concern themselves with the applied issues of societal functioning.

Recent interest in social indicators has already placed an onus on sociological theory to provide conceptual guidelines for their development. In many respects these demands have exceeded the capability of existing sociological theories. The theoretical needs of indicator research are largely those of providing a perspective of social change. But despite a long history of intellectual effort, social change in the opinion of many reviewers remains a relatively poorly articulated area in terms of both theory and measurement.

In the quest for understanding of social change, many different partial theories have been proposed which give prime emphasis to such factors as economic conditions, technology, cultural interaction, conflict, adaptation and mainintegration. Such theories are generally framed at highly abstract levels and hence are far removed from the applied problems of development planning.

While there continues to be a great need for basic research and the development of general theoretical perspectives in sociology, the interest of sociologists in social planning and social development represents an effort to develop understandings that are immediately applicable to real world problems. In turn sociological interest in the development of social indicators represents an effort to improve the capacity to measure change in society.
This theoretical and empirical reorientation demands a reassessment of methodological techniques which dictate that more attention be devoted to the development of basic statistical series in the key areas of development planning.

This study attempts to outline a conceptual framework for the health sector together with data generating strategies that are intended to assist in the development of an information system for health planners.

Realistically, the first task of social indicators is that of description, a task which includes the identification of problems and the monitoring of trends. However, in the long run the more ambitious goal is the development of theories and models linking together the series in the descriptive statistical system.

Except in select areas, the required basic statistical series are not currently available for model building. This is especially true for LDCs. Because of such inadequacy the priority task at this time is to develop a strategy for the provision of those statistical series capable of describing change as well as generating the type of data necessary for model building at the applied level of development planning. Clearly the approach advocated in this study is inductive rather than deductive and is concerned with the generation of key statistical series rather than the generation and testing of hypotheses.

B. Description of Study

Approximately 100 nations in the world fall under the classification of less developed or underdeveloped. All are poor in money income and in
the services and facilities which are taken for granted in more developed societies. In addition, whatever wealth or amenities are available are unevenly distributed among the population. It could be justifiably claimed that underdevelopment is the only characteristic these nations share. In terms of such other characteristics as culture, social and political structures, economic conditions, and historical experiences, a great diversity exists. Each nation represents a unique combination of these characteristics. However, the phenomenon of underdevelopment, which these nations share, is essentially made up of similar components. These generally include rapid population growth, poor health, malnutrition, lack of educational opportunities, subsistence agriculture, unemployment, and underemployment, among others.

The perspective underlying this study is built upon the belief that a society's development and progress must meet goals of that society (goals which have been formulated by that society and which are consistent with its values). The goal formulation process, therefore, is not something that can be done for a country by outsiders, but must be done by competent scholars and officials of each country for that country.

It is believed, however, that social indicator research may be able to assist countries to improve the development of reliable information for social planning by (a) identifying methodological approaches and measurement processes which can be applied to any developing country, (i) to make more explicit that country's goals and (ii) to measure progress towards the achievement of their goals; (b) identifying indicators applicable to development of particular development sectors (i.e.,
education, population, agriculture, health, nutrition, etc.), where these have been selected as particularly strategic by national developers; and (c) apply these concepts, methodologies, and measurements to operational phases in the management process of development and technical assistance.

The objectives of this study are limited largely to the health sector and to points (a) and (b). The specific methodological approach suggested in this dissertation seeks to view health—a component of social development—within the framework of the priority problems confronting development planning. The major objectives of this methodological perspective are:

1. To identify the principal dimensions or priority social concerns within the health sector.

2. To identify priority information needs, the provision of which may facilitate rational decision making relative to specified health concerns.

3. To identify available statistical series that constitute quantitative measures for each dimension.

4. To identify methodologies to bring these series together into sets of indicators for analysis of each dimension.

5. To suggest a reporting system to monitor the change in each dimension over time.

Since this study is ultimately concerned with the development of a methodology which will assist LDCs to improve the health component of their own social information system, we are concerned with first evaluating the feasibility of some development planning models and assumptions; the data gathering procedures currently employed; the information content which different sources yield; the manner in which such information is made available; and how it is used in the LDC situation.

Careful attention must be given to the information needs of development planning in assessing the applicability of methodological
approaches and measurement procedures to the planning and management processes of development in less developed countries.

1. The production and use of social statistics

Little progress has been made in any country towards developing a consensus between the producers and users of social statistics. Existing statistics fall far short of the requirements of either policy makers or researchers as they attempt to monitor and analyze social conditions and social change. A basic reason is that most of the established statistical systems were set up to address different concerns than those with which policy makers are now attempting to deal. But since the gap between users and producers has not been effectively bridged, repetition and precedent rather than need has tended to dictate the content of statistical data produced. This may be due to the nonresponsiveness of producers to users' needs or, on the other hand, it may be a result of the passive acceptance by users of whatever statistics happen to be available (Terleckyji, 1970:36).

Whatever the reason, the available statistics lag seriously behind requirements. "Requirements" here should be qualified in the sense that the need is present but there may not be in existence the proper channels through which to make these needs known. Furthermore even where such a message is transmitted the time lag in producing the appropriate information may be so great as to render it useless for policy decision making.

In the development planning process the drawing up of national plans often tends to be completely divorced from the operations of planning
Analogously, the production of statistics is generally a function of an agency of the national government. While the users may include other national government agencies, they will also include individuals and agencies whose affiliations and planning domains are regional or local. These are the individuals at the grass roots of development planning and programming. The effectiveness of their operations and the appropriateness of their programs and policies is strongly dependent on available knowledge of ongoing and changing conditions in the well-being of the population of their planning constituencies.

2. Social indicators: components in a social information system

Social indicators are perceived as the components in a social information system which provides feedback for development planners. The degree of sophistication or complexity to be incorporated in the development of an information system can vary quite widely from a system which attempts to incorporate great detail and assembles and disseminates information in the form of complex indices, synthetic indicators and graphical procedures to a system of more simple descriptive and analytical indicators. Considerations of operationability and feasibility for LDC usage dictate that the more simple types of system be attempted initially.

In the precise scientific sense, the term "social information system" is really a misnomer since in most countries the production coordination and use of the various social statistical series is organized, at best, rather loosely. To date little success has been attendant on the efforts to effectively integrate the various social statistical series (censuses,
vital records, institutional records, and household and other various specialized surveys) into a coherent body of usable information (Shiskin, 1973; Moser, 1973).

The notion of an information system as used in this dissertation refers to a relatively integrated set of available social statistics which are selected and organized on the basis of potential relevance to social policy decision-making in development planning. Social statistics can be considered as social indicators if they provide the information on the state and, over time, change in the state of social phenomena of interest to the development planner or student of change. Thus the construction of social indicators may in some cases be merely a matter of selecting from existing statistics, quantified data that reflects the state or change in the state of social phenomena for which information is desired. Ideally social indicators are viewed as measuring the state or change over time of key dimensions of social well-being and conditions that effect well-being which have been compiled for use in relation to the achievement of social policy goals.

The orientation of this study is that of providing development planners and the producers of social statistics with potential descriptive and analytical tools for decision making in relation to social problems or concerns. Identification of these problems is seen as a priority and integral component of the development planning process. The initial work on social indicators will mainly concern itself with some of the operational questions that developers of social statistics for use by LDCs
must confront if they are to eventually construct an integrated set of indicators of social development.

Social indicators from the point of view of these uses in development planning may be classified under two main headings: (1) those indicators that are directly problem or policy oriented and are designed to serve directly in policy decision making and (2) those indicators which are indirectly problem or policy oriented but which nevertheless have an important part to play in development planning (Sheldon and Land, 1972:140). These latter indicators are composed of descriptive and analytic types. Descriptive indicators are used to report the state and changes in the state of society or some segment of society. Analytic indicators are used in an articulation and explanatory capacity in conceptualization and modeling. These indicator types all share the same basic characteristics (e.g., they can be calculated over time, they can be disaggregated, they pertain to social well-being, etc.) and depending on the particular planning focus, what is a direct policy-oriented indicator in one situation may become an indirect policy-oriented indicator in another situation.

Viewed in its simplest form, social indicator research in the context of development planning uses predominantly descriptive and comparative perspective. Comparisons may be (Sheldon and Land, 1972:140):

"... (1) in relation to some standard or goal; (2) in relation to an earlier point in time; (3) in relation to subgroups of the population or areal differences."
The major aim of several efforts in the area of social information is to construct a system in which the many statistics bearing on social conditions, human and societal resources, and flows of people through various activities and institutions are brought together coherently. The eventual aim is a system of social statistics which is fully integrated and captures the important variable interrelationships. Whether such an objective is ever fully achieved may not be of great importance. But, in striving for such an objective the gaps in current information, as well as the deficiencies in conceptualization and measurement, are likely to be subjected to more diligent scrutiny. The development of an eventual fully integrated system may be more important for statistical and information theory than for the short and intermediate term operational requirements of policymakers.

3. Social information and social theory

The systematic interrelation of concepts is predicated on the development of theory but theory and operationalism are not sequential in their contribution to knowledge; rather they are likely to develop side by side. In order to have the theoretical system emerge through systematic research, we are likely to have to content ourselves with pieces of information which in a particular societal context appear relevant to the current and persisting social concerns, and to build theories as the relationship between statistical series become more clearly understood.

In effect, what is being advocated is that information which is people, policy, and issue oriented must be given priority over the elusive
pursuit for the mythical integrated system which in reality does not exist at this time except as an organizing perspective for the theoretician.

The ultimate aim of social indicator research should be to develop methodologies capable of articulating and monitoring the complex structural and processual aspects of macro-systems. However, if the methodologies developed are to be of assistance in development planning efforts of LDCs in the immediate future, they must of necessity be less grandiose and focused first on the development of simple descriptive referents or indicators, while keeping an eye towards organizing these into models capable of describing and explaining existing conditions and predicting future states. In other words, we believe the inductive approach, from measurement to theory building, should go on alongside the pragmatic development of information immediately applicable for planning purposes.

4. Simple and synthetic indicators

A distinction is sometimes made between simple and synthetic indicators (Stone, 1971; D'Agostino, 1972; Girardeau, 1972). Simple indicators are quantified data that are often presented as means, medians, ratios, rates or proportions that reflect the state or condition of society of interest. A comprehensive system of simple indicators is of value in the sense that it provides a descriptive inventory or profile of the characteristics of a society or social group along with the disparities and tensions that may exist. Most of the social indicators currently in use fall into this category.
Simple indicators provide the basis of social reporting. In turn, when used for comparative purposes, simple indicators can provide the basic statistical information to establish a typology of situations in the different areas of social concern, revealing fields in which comparisons can be made and similarities or differences observed between social groups or categories at different periods of time.

A comprehensive set of simple descriptive indicators can rarely be found (even in technologically advanced countries) in any area of social concern in development. In LDCs, the lack of an adequate statistical basis for rational decision making has been noted in nearly every administrative sector of development planning (Shryock and Siegel, 1973; Novak, 1973). Clearly, therefore, one of the critical needs to be filled through social indicator research must be the improvement of both the scope and quality of descriptive reporting in social areas of concern in development planning.

Synthetic indicators are coefficients that summarize, integrate, or synthesize existing statistics. Synthetic indicators are usually formed through extensive research and analysis of the interrelationship between simple descriptive indicators and include:

1. Time series analysis

2. Composites such as factors formed through factor analysis, scales (i.e., F scale) and index numbers (i.e., GNP), etc.

3. Models such as input-output, explanatory or causal and policy models.

There is a brief discussion in Appendix B of some other research uses which may be made of simple descriptive and analytic social indicators.
Clearly, progress toward the construction of synthetic indicators is highly dependent on the success with which a comprehensive system of descriptive indicators is developed. Without an adequate statistical base from which to work little can be accomplished by way of modeling and the development of composite indicators. The primary focus of a methodology to assist LDCs to devise and implement their own set of social indicators must, therefore, center upon the problem of generating an adequate social information or social reporting system that provides this requisite statistical basis. This statistical basis, in turn, must be developed in terms of a realistic assessment of current and future information needs of LDCs. The critical focus of the methodology should attempt to identify a typology of information needs that provides a guideline for identifying the range of information required for rational scientific decision making in areas of social concern. A well developed system of descriptive statistics will greatly enhance the ability to construct models, composites and time-series indicators.

C. Methodological Emphasis

1. Substantive focus

The methodology will address some of the development problems or barriers most LDCs face. It will be argued that countries may differ to a greater or lesser degree on the areas they consider to be of development concern. However, it is likely that those broad areas (sectors) chosen for priority consideration will be rather similar from country to country. These sectors, social goal areas or areas of social concern act as an
organizing framework for our methodology since they cover in a generalized sense human and societal concerns which are reflected in societal institutions and public policies. The research of which this dissertation is a part will be focusing mainly on five sectors or areas of social concern: health, nutrition, agriculture and rural development, education and population. Specific social concerns within these general social goal areas are more likely to vary between countries and it is these concerns which social indicator researchers seek to identify and measure.

2. Types of information

The information system devised for any country should be capable of producing a wide variety of objective statistical data. In theory, an efficient statistical system will produce for an area of social concern regular and timely information representative of six indicator types. These indicator types include: output components; output distribution components; policy instrument components; nonmanipulatable descriptive components; impact components; and response components (Wilcox et al, 1973:24-30).

The development of output indicators is especially critical. Up to the present time input measures have been given most attention with perhaps

1 The focus on just five areas of social concern or sectors should not be construed as an attempt to limit the development of indicators to these only. It is hoped that the work of the overall project on these five areas will provide a basis for further work to include other areas such as housing, environmental conditions, income and social welfare. In fact information on these additional factors is of great importance in the research and analysis of the goal areas chosen as well as the interrelationship between sectors.
the assumption that if inputs are taken care of then satisfactory outputs should follow. In the area of education, for example, it is relatively easy to find measures of enrollments, number of teachers, facilities and expenditures, and teacher-student ratios but there is almost a complete absence of measures of learning or evaluations of particular educational experiences or of how well the educational system is achieving its objectives.

A central theme of social indicator work is that of determining access to and benefit from the goods, services, and values of society which different subgroups of that society enjoy. A comprehensive range of sociodemographic data is necessary in order to analyze such questions.

The utility of the multiple indicator types—including output measures—outlined above lies in their policy modeling, theory building and theory testing potential. If such potential is to be realized the available, social statistics must include data series representative of all these indicator types.

3. Sources of statistics for social information system

Social indicator work in the U.S. and Europe suggest that sample surveys using subjective measures are an important data source for quality of life measures. Since the focus of attention of this study is on some priority human problems common to many less developed countries rather than the more abstract aspects of well-being, objective measurements are more likely to prove useful than subjective measurements and provide the bulk of required information for social indicator development for LDCs in the immediate future.
A major source of social and economic data for most countries is the census of population. Generally speaking, this source produces a large body of basic socioeconomic data with good geographic detail and quality. However, in relation to the requirements for current information regarding social conditions and trends, the census is not generally directed by current social concerns. Therefore, the amount of information yielded on policy and research related areas is meager and the statistics, when assembled, are usually made available in an aggregated form that does not lend itself to analysis or the development of explanatory models of social and economic behavior.

The use of existing secondary data sources such as censuses, registers of vital events, and survey, as well as the improvement of these both in content and procedures of data assembly, collation and dissemination of results, appears to provide the most promising immediate departure. These existing monitoring apparatuses are presently limited in their inputs to planning but the capabilities of censuses, registers, and surveys will continue to be developed and refined in order to facilitate more comprehensive and timely planning.

The great variety of information required in development planning dictates that several different data sources be utilized and combined. Any one of these data sources is insufficient in relation to even more limited components of planning. For example, census data will yield a range of sociodemographic information which on its own is of limited value but in combination with other series it becomes the denominator in the construction of simple indicators for several areas of sectoral
planning. For health planning vital records, records of medical facilities
and practitioners and health survey data, provide the actual health data
but they will generally lack the "... demographic and socioeconomic
foundations necessary to relate them to population groupings" (U.S. Bureau
of Census, 1969:2).

It may be possible to identify on the basis of census data alone the
social groups or geographic areas where problems such as poverty are most
prevalent, or where for example certain types of ill health predisposing
factors are in evidence. But generally, in order to identify the types
of resources and services required to meet specific needs, specialized
data collected in studies specially designed to collect appropriate infor­
mation are required. Each source, whether census, vital records,
institutional records or survey data, is capable of providing specific
types of information. Where these sources can be linked or combined a
much greater information yield is produced.

To fill existing data gaps the use of probability sampling in con­
junction with reliable statistical frames appears promising. From the
policymaking perspective the relatively lower cost of surveys permits
them to be conducted with greater frequency so their design, content, and
results have high potential in matching information demand with policy
priorities. However, there must be constant effort exerted to avoid over­
lap in such studies and to insure that each data series produced on a
regular basis is complementary to the others so they can be coordinated
and integrated to yield the information that planners need.
Many less comprehensive statistical series are developed as part of the activities of administering government programs. The norm has been for those agencies charged with operation of the programs in functional areas of society to also produce the related statistics. Since the skills to design and conduct statistical surveys are scarce, as are the skills at identifying and articulating statistical needs, the quality of many of these surveys may be deficient. Furthermore, basic statistical series may tend to overlap.

Program analysis and evaluation requires timely, accurate and objective statistical data. The timeliness and accuracy will reflect available skills and resources for the task of evaluation while objectivity may be difficult to attain when each department or office both operates and evaluates its own programs. Objectivity is much more likely if data collection and evaluation is performed by some agency or agencies specializing in this function.

In many countries the number of agencies gathering statistical information is often quite large. As a result data is inconsistent, varies in its quality, and the domains of study tend to overlap. In reorganizing the societal information system it appears that the goal should not be to maintain decentralization in the planning of statistical needs in the policymaking and programming agencies but to centralize the collection and processing of statistical information in a small number of specialized statistical centers (Shiskin, 1973:63; Novak, 1973:11).
D. Procedures to be Followed

In the attempt to identify methodologies and measurement procedures that can be implemented in the management process of development planning in less developed countries, two sources of information will be considered: (1) social indicator research currently underway in the U.S. and elsewhere; and (2) the current design, collection, and production of basic information in selected LDCs.

1. Monitoring, evaluation, and integration

Over the past four or five years considerable momentum has been generated (primarily in the U.S., but increasingly in other parts of the world) by scholars and government agencies to systematically develop social indicators and improve the social information base for policy planning. Even though this work pertains largely to the information needs of more developed countries, it does provide a rich source of scientific work that may be adapted for use in LDCs.

Three fundamental research procedures, therefore, provide the basic framework of activities for this dissertation:

1. The monitoring of current social indicator research, in the United States and elsewhere, to identify methodologies and indicators that are especially applicable to development planning and the management processes of development of the health sector in less developed countries.

2. The evaluation of the relevance, adaptability and implementability of such methodologies and indicators to the information needs of development planning in less developed countries.
3. The integration of indicators and measurement procedures into a general framework that may assist the generation and implementation of the health aspects of a social information system capable of monitoring a nation's social development.

2. Design of information systems in LDCs

In developing social statistical information aimed specifically at prevailing social concerns, it is proposed that some redirection will be needed in the design, collection, and production of the basic information from censuses, vital records, special purpose surveys, and surveys of individuals and households, as well as administrative and institutional records. Various international organizations are devoting considerable effort towards identifying, reconceptualizing, and operationalizing these "new" concerns. In addition, it is felt that there is need of a concerted effort to be devoted towards the structuring of basic information. In the case of LDCs, we are proposing that such efforts are likely to be most advantageously devoted to evaluating existing data and attempting to structure it to yield information addressing social policy areas and goals, the status of the population in relation to such policy areas, and hence performance in relation to goals set as well as the distribuLional aspects of well-being.

Official records and statistics in existence have largely an administrative purpose. Over time such records reflect considerable inflexibility and time lags in data production. Of late the advocacy of stronger consumer orientation and closer communication between social scient'ists, statisticians, and individuals with decision-making responsibility both in
the preparation and analysis of censuses, surveys, and recording procedures has been increasingly vocalized.

It is known that vital records are of poor quality in many LDCs and that censuses are often less than complete. It is also known that the officials of government in most LDCs are aware that the status of their populations in relation to many needs is less than satisfactory. Whatever information is available must be organized in such a way as to allow both description and analysis that can aid the identification of needy population groups, and positive action taken to assist these groups within the limits imposed by scarce resources and other constraining sociodemographic, economic, and environmental factors.

Statistical information on health as a component of well-being to be dealt with in a sectoral context will be classified into three broad categories:

1. **Statistics related to the health status of persons and population categories.** Five different health status concerns will be examined and their related data outlined. These concerns are: mortality, life expectancy, morbidity, disability, and malnutrition.

2. **Statistics related to facilities, services, and personnel as well as those activities directed towards the improvement of the status or condition in relation to the identified components of well-being.**

3. **Statistics related to factors of a physical, environmental, social or economic nature which have a direct or indirect bearing on the well-being status of the population.** Included among these are population (size, growth, density and distribution), education, agriculture and food production, environmental quality and natural resources (including water supply), income and level of consumption, housing and shelter, and health.
3. Sources of social statistics

The sources of social statistics may be classified into several categories:

1. National data collection systems which (a) operate such programs as vital records, national registers and censuses of population, housing, and agriculture; (b) collect information continuously on such programs as registration and notification of diseases; and (c) conduct national surveys.

2. Facilities such as hospitals, clinics and dispensaries, maternal and child health centers, diagnostic laboratories, mass immunization and treatment programs, health insurance and social welfare programs, places of employment and educational institutions, to name a few. Such sources may provide information on admissions and discharges for health facilities, and records of diagnosis and services provided as well as their duration and cost, as well as a variety of information on employment, education, and other activities of interest. Records of physicians also fit under this category.

3. Data is also available from surveys which are undertaken sometimes in an ad hoc manner in order to obtain information on a nationwide, regional, or local level in regard to some problem of immediate interest, for example, health or nutrition surveys.

4. Various information may be available on need-related factors of an environmental social or economic nature. These are very important in the analysis of social problems.

It is felt that at this stage in the development of a social statistical information system from which it will be possible to generate simple

It will be pointed out that where they are available in LDCs, these data generally are descriptive of very selective population groups. This is due to problems of population distribution in relation to location of facilities and services, and problems of access related to such variables as socioeconomic status, cultural background (including religious beliefs), level of education, etc.
indicators and later composite and synthetic indicators and constructs, a number of tasks must be undertaken.

1. Based on work currently under way internationally, we can draw up an inventory of possible social statistics using census, vital statistics, institutional records and surveys assuming a reasonable level of completeness in coverage, accuracy in recording, and detail in information elicited.

2. The data collecting procedures for any specific country must then be evaluated against international standards for both completeness of coverage and content. For the former it may be necessary to depend on expert opinion, while the latter is an empirical exercise assuming copies of the schedules, certificates, and registration forms can be obtained.

3. Based on such evaluation of data and data collection procedures as they presently exist and operate, a series of simple social indicators will be compiled, keeping in mind the requirements of planners. Where serious gaps exist either in procedure (completeness or representativeness of coverage or content), this will be indicated and suggestions made as to how such inadequacy might be rectified, keeping in mind the feasibility of such recommendations in light of LDC resources and capabilities.

A plan for development of a methodology for social indicator construction must be mindful of the usage already being made of descriptive statistics and should have identified the potential worth of modifying what is already being measured. There may be considerable discrepancy between what is measured and what is reported in the sense that through aggregation much information is lost. Thus considerable research is needed to determine the usage currently made of descriptive social statistics and to investigate the potential for modifying what is measured, what is reported, how it is measured and reported, how it is communicated, who has access to it, who has a need for it, and of those, who is capable of understanding it or using it.
Chapter II sets these questions in an appropriate context by outlining some of the common conceptual, theoretical and operational issues of social development and social development planning. In addition a rationale is proposed for the development and use of society specific simple descriptive and analytic indicators as management tools in social development planning.
II. SOCIAL DEVELOPMENT AND SOCIAL DEVELOPMENT PLANNING

International development strategists have reached an impasse. Marshall Plan type thinking appears to pervade the development planning concepts still in vogue. There is a tendency to overlook the fact that during the Marshall Plan years (1948-52), the needs of Western Europe were primarily for material resources. Recipients of Marshall aid had already the motivation and know-how to effectively use new technology. However, technological developments and innovations have progressed much more speedily than corresponding social structures and innovations. There is a lack of effective social institutions to harness technological innovations for social development and in a broader sense to harness in a mutually beneficial way the interdependencies of societies and sub-societal groups. The imposition or relocation of western ideas and technology has failed to improve the relative--and in many cases the absolute--development status of the so-called economically less developed countries. For example, the population growth problem has attained crisis proportions, and continues to get worse despite the greater technical understanding of the problem and the impressive array of usable potential corrective techniques and devices. As a result the story of the great development efforts so far is one of "... unfulfilled plans, naive theories and intransigent social structures" (Hudson, 1974:518).

The political instability of less well off nations, their recurring revolutionary potential, and the status quo ideology of their economic and political elites which yields, in many cases, repressive forms of government, promise little success for conventional development planning
models. Such political troubles and their associated belligerent expres-
sions continue to divert attention and much needed capital and human
resources from the fundamental development tasks of alleviating poverty,
ignorance, hunger and suffering. Many LDCs have the additional problem
of lack of motivation by any unified national drive to develop. Loyalties
more commonly run to other institutions like family, clan, tribe or
village.

There are claims of progress in economic development, but there is
no sign of the gap closing between rich and poor nations. There is waning
support in the traditional aid-donor countries and there is scant evidence
that any progress has been made in bringing about social development.
There appears to be a growing appreciation that economic and social
development are not necessarily concomitants unless they are actively
pursued as such and that the procedures of technical assistance for purely
economic growth may be incompatible with those required for the broader
and much more complex processes of social development. As a result
several official recommendations have been made regarding the reorgani-
zation of the structural and processual requirements of technical assis-
tance for social development (United Nations, 1969; Commission on

In a more positive vein there is the realization that social develop-
ment and social development planning are very new concepts and in the more
recent past the social sciences have for the first time united on a world
scale in an effort to grapple with the social and economic inequities
that pervade the international and intranational scene. Perhaps this in
itself should be considered the major outcome of the first development
decade—an outcome which will eventually bear fruit as the plans and
theories are adapted to the realities and complexities of underdevelopment.
In fact, the shifts in orientation and emphasis have already been noted
with a trend "... away from the preparation of vast plan documents
towards greater concern for execution and a lowering of the priority
given to economic growth, as against social objectives" (Faber and Seers,

The continued expansion of government and the proliferation of its
programs have been instrumental in generating in many countries a con­siderable pool of information whose primary substance is governmental
and administrative. However, the objectives of government in relation
to areas of social concern and the programs or measures designed to reach
these objectives have of necessity operated in a somewhat haphazard
fashion. In fact the ends, while often eloquently articulated in the
form of elaborate plans in many cases, remain little more than empty
rhetoric partly because of insufficient information to match ends and
means. With the call for development programs becoming more vocal and the
increasing ability of deprived groups or segments of society in making
their plight more visible, limitations to devisible resources and expendi­tures dictate that judgments be of a more calculated nature so that
means and ends may be objectively evaluated and more effectively matched.
It is evident that "the policy centered aspects of the social indicator
movement represent urgent concerns, first with the objectives and
effectiveness of governmental programs and second, with the performance of the political system as a whole" (David, 1973:240).

Rational decision making requires the statistical input provided by social information and data systems and their functional linkages into an integrated set. Social statistics, if they are to realize their potential must be sufficiently well attuned to social development concerns to be relevant to the purposes of development planning. They must be capable of monitoring specific key concerns of the planning sectors to which they refer as well as aspects of the greater societal system which provides both the planning resources and constraints.

In this chapter an attempt is made to define social development and social development planning and to briefly evaluate some conventional development planning models. A problem oriented approach to planning is then reviewed and outlined and its compatibilities with the political, economic, cultural, and social contexts of LDCs and with a system of descriptive and analytic social indicators is examined.

A. National Development Plans

Governments have always engaged to a greater or lesser degree in the practice of planning and decision making. But planning in the broader sense--that of seeking to identify the values of the community and the goals which flow from them; of trying to envision the shape of society in the future and the trends which should be shaped or sharpened or blunted; of trying to translate social goals and community problems into alternative policy measures to achieve or to meet them; and of seeking
to order the broad priorities to be accorded the policies which emerge from this process—planning of this order is rather newer in government (Johnson, 1973:24).

Since World War II almost every country in the world, regardless of continent or level of development has been involved in some form of national development planning (Waterston, 1969a; Faber and Seers, 1972). The successes experienced by these countries has varied greatly throughout the world. While some countries have found national development planning to be an effective tool in national development efforts, others have had less observable success in implementing national development through centralized planning.

Several efforts have been undertaken in recent years to analyze the varied results of national development planning. One notable example is the study conducted by the Economic Development Institute of the International Bank for Reconstruction and Development (Waterston, 1969a). This study involved a survey and analysis of national planning activities in more than one hundred countries. The study revealed that similar problems are encountered by most countries and in many cases the same mistakes are made.

One of the more common pitfalls has been the tendency to confuse the preparation or writing of a development plan with development planning. The latter is a complex process which requires identification of the priority development concerns; and in relation to these the making of rational choices among economically, politically, culturally and socially feasible courses of action; putting these choices into operation; and
identifying the criteria or objectives against which ongoing performance may be evaluated. The planning process in addition includes the evaluation and the redirection of programs and policies in light of such evaluations.

Whereas some countries have reached relatively advanced states of development without "official" national plans, these countries have engaged in planning (Livingstone, 1969; Waterston, 1969a; Pananek, 1968). Development has occurred as a result of systematic rational programs of activities geared towards specified development goals. It is this operational-planning process, rather than a formal plan, that constitutes the necessary precondition in the implementation of effective development policies.

Plans and planning are not new to LDCs, but the trends of the past two decades represent an overall fresh approach to national development planning. While the results have been uneven and in many cases disappointing, several new emphases are apparent (Livingstone, 1969:94):

The emphasis on time in plan programmes, which provides a focus of attention to what achievement is expected in a given period and allows a continuous appraisal of progress.

A more systematic and more comprehensive analysis of current potential resources.

The direct application of external aid to a country's development objectives.

The reorganization of administrative structures and administrative procedures for planning purposes, involving changes at national, regional and local government levels.

The education and training of people qualified to fulfill the specialized tasks of development programmes.
B. Social Development

The concept of social development as we will use it, embodies, in addition to economic development, a multidimensional and somewhat less quantitative aspect often referred to as "quality of life" or "social well-being." Development plans and policies continue to exhibit major emphasis on economic growth, industrialization, favorable balance of payments, and the like. However, the recent interest in many countries in the development of social indicators reflects a search for a broader concept of development. It has become quite obvious that traditional concepts of development bear little sensitivity to the needs of people, especially those belonging to the marginal majority category. In fact, there is some evidence that in countries where nationwide social security programs are not available—as in the case in most LDCs—preoccupation with economic growth has helped to accentuate the relative deprivation in many aspects of human need for those groups already deprived (McNamara, 1973; Blaisdell, 1970; Chandavarkar, 1972). Even countries showing considerable rates of economic growth—as measured by gross national product or per capita income—are experiencing increasing rates of unemployment, and hence more people are being denied a share in the fruits of growth (Chandavarkar, 1972; Singer, 1971; Friedman and Sullivan, 1974; The Commission on International Development, 1969). For example, economic growth in Venezuela averaged approximately 8 percent per annum between 1950 and 1960, yet unemployment was higher at the end of the decade than at the beginning (Chandavarkar, 1972:29).
Evidence of this type may indicate that development theorists and planners are failing to comprehend and articulate in development planning the broader goals of social development. The fault may lie in the tendency to apply to less developed nations those analytical categories and techniques which are laden with western cultural biases. As a result, the problems and the interacting characteristics of these problems (e.g., poverty, unemployment, sickness, ignorance, hunger, and lack of access to services) are given only indirect consideration. These problems and related characteristics are too often perceived to be merely impediments to or unavoidable consequences of economic growth. In other words, the goal of economic growth is given precedence over various people-centered problems or concerns that are of fundamental importance to the concept of social development.

Existing developmental theories and perspectives have given little consideration to social inequities or questions of social well-being. As a result the appropriate issues are too often not addressed in development plans, and the right questions are often not asked in the assessment of development needs. Neither are appropriate social data available to answer such questions. Hence social development in many countries continues to be largely a subject for academic debate rather than the operational focus of development planning.

Our concept of social development emerges from these considerations and is grounded on a human need and social value foundation. This definition of development assumes: (1) that unless all individuals in society have a reasonable chance to share in the fruits of that society's economic
growth then social development is less than adequate; (2) that however
successful attempts have been at involving a broad representation of the
people in political decision making, the development of such participation
should remain a fundamental goal; (3) that there are many alternative
forms of social and political communities, and it is highly unlikely that
any one form will be acceptable to all societies; (4) that the quality of
well-being should be emphasized equally with quantity of growth. The
competition between nations in comparing growth of GNP tends to blind out
the real issues of development. It is unlikely that economic growth will
be replaced as a major empirical dimension of national progress--nor
should it--but international comparisons and stocktaking should focus on
the upgrading of the human resources of each nation and give greater
emphasis to quality of living dimensions; (5) development programs must
operate as creative responses to the situation rather than prepackaged
impositions of western systems of life, of education, of industry, of
professional standards, prerogatives, and reward systems.

Social development is defined as "... the continuing process whereby
the people of a nation learn how to use effectively the available human
and material resources in order to upgrade the capacity of the societies'
institutions to more equitably fulfill basic viability needs and social
values of persons throughout society" (Wilcox, et al. 1973). Our concept
of development planning is consistent with this definition.

C. Development Planning

There are a number of theories of national planning which vie
for recognition as offering the best model for development. Two of the
better known of these types are the Rationality models and the Economic Growth models.

1. Rationality models

Rationality models attempt to maximize gains and minimize losses within the context of social, political, economic, and cultural constraints. This procedure generally implies a form of comprehensive national planning (Tinbergen, 1967) which is highly centralized and takes account of economic and social needs in the long and short term at national and local level. Friedmann (1967), however, points out that based on his experiences in LDCs, several preconditions are necessary before a rationality model is feasible in such contexts. These preconditions include (a) greater stability in external conditions, (b) better administration, (c) improvement in communication between interest groups, and (d) making more and better information available to planners.

2. Economic growth models

In economic growth models, economic development is viewed as the major goal of national planning. The fruits of this economic growth can theoretically be redistributed through whatever programs are deemed suitable. However, greater economic growth may not be compatible with more equitable distribution of well-being. Local participation in development programs is necessary if these are to succeed.

Based on the study of national planning in a number of countries at different stages of economic development, it has been proposed that such
planning should adopt a problem-oriented approach selecting only problems which are perceived as serious and are capable of being solved (Rodwin, 1970). The rationale for such a proposal is first that a "problem" may have to reach a certain level of seriousness before it is defined as a problem by the people whom it most directly affects. Secondly, unless a solution is perceived possible by the administration or the people—or both—little effort is likely to be exerted toward alleviating the problem. In addition to Rodwin (1970), several social scientists including Friedmann (1967, 1971, and 1973) Hirschman (1963), Waterston (1972), Johansson (1973), Dunn (1973), Etzioni (1968), and Lindblom (1959 and 1965) among others are advocates of planning approaches which direct resources through operational programs towards solvable social problems.

3. A problem-oriented approach

We are in agreement with this latter (problem-oriented) conceptualization of development planning in the context of prevailing LDC political, economic, cultural, and social environment. A problem-oriented approach may be embodied within the framework of a conventional global multiannual planning perspective. It should be pointed out that this perspective is essentially a mix of many planning models whose exact makeup is subject to situational variation and choice.

Development planning in such a perspective may be defined as a process involving a number of interrelated phases, the initial sequencing and priorities of which are important:

Identification of key areas of social concern

Examination of these in relation to available resources
Choosing within the feasibility of available resources those policies which will alleviate the concerns and problems

Devising plans incorporating the chosen policies and procedures for solving the problems

Setting specific development targets including time limits

Choosing overall or global multi-annual objectives, based on the profile of concerns and problems as well as judgment of available resources (facilities, personnel, finances)

The more common of the several approaches to development planning presently in use—referred to as conventional planning—sets out specific objectives and through rational processes selects those means deemed to produce the greatest benefits. The major emphasis is given to the objectives. This type of planning approach is generally structured in a package which incorporates the total society and sets its main targets several years in the future.

In many cases dissatisfaction is expressed at the amount of success which conventional economic planning has had. Waterston (1969b:38) claims that the chief reason for lower than expected performance is

... that conventional planning is incompatible with existing political and economic environment in most low income countries. This is because there is implicit in that planning approach an assumption that, although change is inevitable, it occurs in a generally stable environment. But the fact is that change, sudden, frequently unforeseeable, and great, in political and economic conditions of countries, particularly in the less developed world, has become characteristic of the modern age.

As a concrete manifestation there has been a very large number of coups d'etat in the past two decades. These political changes have a deleterious impact on planning in that the planning emphasis may be quite drastically changed by successive political power groups, and development
assistance may be predicted on the perceived ideology of the party in power. Leys (1972:62) commenting on the incompatibilities between the assumptions of conventional planning and the conflict laden realities of politics states that "the underlying concept of planning contradicts the basic concept of politics. Its ideal type belongs to a social system from which political competition has been completely eliminated."

Long or medium term development plans are also at the mercy of sudden fluctuations in the economic situation. These fluctuations may result from one or many of a variety of determinants including a poor harvest (where agricultural produce constitutes a primary export component) or a drop in the world price for a major export commodity. Conventional, medium or long term planning also assumes a certain administrative expertise which may be lacking in many low income countries.

Meguid (1972:116-117), like Leys (1972) and Waterston (1969b), sees the failure of conventional economic planning as due to the fact that the assumptions of such planning models are quite the contrary to what underdevelopment is all about. There is little point—except for the academic exercise—in assuming as such models tend to do, that LDCs have adequate or almost adequate levels of service infrastructure, market outlets, management ability, favorable investment opportunity, a financial situation which encourages saving, or the human financial or technological resources to carry out development programs. In fact, the absence of these is the very essence of underdevelopment. Seers (1972:25) is led to conclude that based on the assumptions they make, many conventional
economists are totally indifferent to social development problems and are much more interested in the elegance of their models than the relevance.

A basic weakness in development planning has been the lack of attention to the human factors such as beliefs, attitudes, and values. This in addition to political instability, economic uncertainty, and lack of resource (including administrative, human, financial, and technical) capability, and the inability of conventional planning models to take these into account have impeded planning.

Evaluation of various planning procedures which had been attempted in Africa, Asia and Latin America led Waterston (1969a and 1972) to conclude that within the structure of, and in conjunction with medium to long term global planning, short term and more definitive sectoral planning would be much more likely to effect improvements. The emphasis here is on "planning-from-below." This framework envisages annual (or short term sector plans as linking specific projects of different agencies with the medium to long term sectoral and global plans, and in so doing, linking the operational aspects of planning more closely with the political-theoretical.

4. Short term plans

It is precisely in the preparation of annual or short term plans that less economically developed countries are least proficient. As a result, medium to long term plans are not translated into specific items of policy in relation to which resources may be allocated (mainly through the annual government budget). The incorporation of development programs
in the annual budget is a crucial step in operationalizing development plans. After their first year, medium or long term plans are in effect outdated unless the annual budget is used as a framework for analyzing development programs since goal setting becomes mainly a political function and planning, in the operational\(^1\) sense, becomes a separate or unrelated technical function. Effective planning requires that provision be made to bridge or link the two—a task requiring detailed knowledge of determinants and constraints operating in specific situational, sectoral, and societal contexts.

The short term or annual planning components introduce a potentially large degree of flexibility in that it is up-to-date on the specific concerns requiring attention, and thus, allows a more effective and timely reallocation of resources where such is needed.

However, annual planning per se is of limited value for several reasons. Firstly, one year is too short a time span for any appreciable amount of change to occur in the state of any dimension of social well-being. Secondly, resources to devote to some aspect of policy concern cannot be generated in so short a period. Resources will normally be earmarked over a longer time period and context, and their planning and allocation can only be dealt with in longer-term perspectives. Thirdly,

\(^1\)The attractiveness of an operational emphasis in planning may not be great unless it is made a condition of eligibility for foreign aid—a none too attractive strategy. It is probably true to say that the worldwide popularity of the sometimes rather academic act of preparing elaborate national plans has in many cases been a result of their being viewed as a criterion of eligibility for foreign development aid.
if there is any means of ascertaining the effects of specific policy decisions, it is more likely that these will develop in the context provided by a comprehensive plan covering several years. Fourthly, intersectoral linkages and side effects are easier to articulate and monitor in long term comprehensive plans. However, in combination, the multiannual comprehensive planning and the annual (or short term) problem-oriented planning provides both flexibility and a planning perspective so that short term specific programs may be integrated in a larger planning perspective.

An added element of flexibility is required where uncertainties and instabilities may realistically be expected. It is possible to provide this added flexibility through the development of alternative short term plans together with the procedures and contingency resource allocations that these would involve.

5. Macro and micro aspects of planning

The macro aspects of economic and social planning are generally much better articulated by planners. A general concept of what quantity or rate of growth of the components of well-being would constitute "progress" is not too difficult to spell out. However, the specific operational procedures needed to achieve these objectives are much more difficult to specify. But whether or not a plan succeeds, or for that matter whether it merits being called a plan, is highly dependent on the means chosen or proposed to attain the valued ends. In this sense the marriage of multiannual sector plans with annual plans insures a greater element of reality
and underscores the fact that conventional planning models and operational models are mutually complementary.

The development planning concept outlined here proposes that within the context of economic, political, administrative, social and cultural realities of an LDC, optimal exploitation of development possibilities must be sought in people-centered, problem-oriented operational programs which are integrated towards national development goals. This concept gives greater prominence to regional and local concerns. It is more flexible in that it incorporates annual sector programs within the context of the multi-annual plans and, in addition, proposes that alternative development strategies be worked out. Different components are essentially separable thus complementing the flexibility aspect. It also carried part of the planning responsibilities into sectoral and regional constituencies so that the planning function—often merely a process of national goal setting—as such ceases to be the exclusive domain of an elite corps of national politicians, planners, or specialist consultants.

Many of the so-called "successes" of conventional planning have been in relation to the meeting of global growth targets (McNamara, 1973); de Vries, 1972; Commission on International Development, 1969). The problems of chronic unemployment, income differentials, ill health and malnutrition, poor housing conditions and the combined effects of these and other deprivations for large proportions of national populations are in many cases little affected. It is obvious that a global approach to planning is insensitive to the needs of other than the mythical national average individual, household, or family. What we are suggesting is that
planning objectives and the means of achieving these objectives cannot be mandated globally by a central political authority. In addition, whereas conventional global multi-annual planning generally specifies indirect approaches to ameliorating social concerns and hence there is a tendency to identify only those needs that correspond to predetermined goals, the problem-oriented approach directs planning at specific needs.

Thus the planning process involves a scanning of all pertinent available information to determine the key social concerns or problems to be dealt with. The specific means which are selected for solving these problems are based on resources available and constraints identifiable. It is only when means and constraints are known that realistic time-bound objectives can be set.

This approach to planning, then, starts with the identification of the main social concerns and seeks to establish feasible development planning targets. The process of identification of social problems or concerns in this fashion involves measuring differential statuses on dimensions of social well-being for specific regions, ethnic or socioeconomic groups. The relative priority status of a particular problem may vary by region or group as will the available development resources and constraints. The programs and policies devised to deal with these subnational problems must be incorporated into long and short term sector plans, and further, into sector and comprehensive plans for the total society.

While these latter tasks require a centralized coordinating agency, much of the problem-oriented planning process assumes a flexible decentralized structure which is sensitive to regional and group specificity for
various social concerns or problems. It also assumes the capability to implement plans and requires regional and local participation in development programs.

It is evident that the development process is anything but an orderly transformation. The same combination of factors are not to be found in any two countries. Hence general models embracing a variety of situations tend to diverge from the realities of any real situation. Nevertheless, there appears to be a continuing obsession with the attainment of a global applicability and generality if one is to judge from the work of the United Nations Development Planning Committee as outlined by Tinbergen (1972:157-65). If generality is to prevail, then it would appear more appropriate for LDCs to attempt to emulate the successes of those countries within less developed blocs which have shown improvements in their social and economic development situations. For example, the lessons of Japan, Taiwan, South Korea and China might prove much more advantageous for other Asian countries than the models and related values of Western nations. It is important to keep in mind, however, that generalizations about Asia may also tend to be somewhat simplistic representations of a complex societal mix (Prasad, 1972) which goes to make up that continent. Many critics of Asian Drama, for example, feel that Myrdal (1968) was guilty of overlooking a variety of country-specific factors in this renowned study, tending to attribute to several countries those characteristics found in India.
D. Areas of Social Concern in Development Planning

The task undertaken in this study is to develop a methodology which will hopefully be useful to a number of LDCs in evolving a set of health indicators as part of an integrated set of indicators of social development. We are not immediately interested in the development of composite indices of well-being which all societies might use as standardized gauges of their social development. Neither are we interested in identifying broad national goals. Johansson (1973:213-214) relates how the OECD working party on social indicators (made up of representatives from member states) reached a deadlock in their attempt to select goal statements to be used as the framework for their social indicator research. There was unanimous agreement on some of the proposed goal statements while on others the working party was divided in its opinions. What emerged as a result was a List of Social Concerns Common to Most OECD Countries (OECD, 1973a) rather than a list of goal statements. While one would concede that the choice of areas of social concern is a value laden exercise which is contingent on some--at least implicit--assumption of valued goal or end states, this example is consistent with the belief that the setting of national goals should not be the first (explicit) step in the process of development planning. If the setting of broad macro or national goals is taken as the first step, the probability is high that goal setting will become a political function distinct and divorced from the operational aspects of development planning. Analogously, the usefulness of global multidimensional indices of well-being is likely to be minimal in the sphere of operational social planning.
On the other hand, a problem-oriented or social concern oriented approach incorporates potentially greater flexibility in that, rather than mandating the goal states to be planned towards and for which social indicators might be developed, the process of development and the construction and use of social indicators are themselves viewed as dynamic ongoing processes subject to many contingency considerations. These latter contingencies in the LDC context will include, as has already been pointed out, questions of economic, political and cultural feasibility, each in its own right a complex and vital area to take into account.

The statement of intention to focus on areas of social concern begs the question: Which social concerns? There are two main criteria by which a society might choose the focal component concerns of its social development research and planning. An area of concern is a realistic goal area of development planning only if it is possible for such an area to be manipulated (influenced or changed) within the context of ongoing--or likely future--political, economic, and cultural circumstances. A second and closely related condition is that an area of concern is chosen for development planning purposes only if there are in existence, or it is feasible to set up, the required social and political institutions through which needed resources could be channeled to bring about change. If we were to propose that the development of social indicators should be governed by similar criteria, we may then state the following proposition: A social indicator system should include only those components that yield information which is relevant for action in the areas of social concern
where implementation of programs can realistically be undertaken in light of present or future societal capabilities--especially political mechanisms and resource availability.

The reason for these qualifications is based on the experiences of some countries where social problems or inequities were highlighted as information became widely available but where the political mechanism was either unwilling and/or unable to alleviate the situation (Johansson, 1973; von Otter, 1973). For example, if it becomes widely known--and especially if substantiated by statistics--that some areal, ethnic, or other group in society is relatively more deprived in one, many, or all of the dimensions of social well-being, and, if at the same time the political institution in existence does not have at its disposal the willingness or the resources to rectify the situation, such disclosure may be more destructive in its consequence than constructive. It could be argued, of course, that the good of such disclosure must in the long run outweigh the disadvantages and that the information becomes a potential catalyst in the initiation of ameliorative programs and a redistribution of societal resources and benefits. However, the proposed methodological solution is that of a compromise, in which the inclusion of problem areas in plans and the development of indicators to monitor the problems should be assigned priorities in terms of both the intent and ability to implement corrective programs.

Since the ultimate purpose of development is the raising of levels of well-being, an evaluation of existing levels and trends is needed in order to guide and assess policies and performances. From the economists'
perspective, the per capita consumption component of national accounts provides the best indicator of level of living. Such a measure has several defects of which the most critical are that it is a broad aggregate index which includes components which are only marginally related to human well-being. In addition, since it is a simple average, it does not articulate the problem of distribution which is fundamental to the concept of level of well-being. This latter distribution issue is especially critical in LDCs which tend to be characterized by dual economies exhibiting acute differences between the exchange and subsistence sectors with their respective "modern" and "traditional" forms of organization. It is thus relatively meaningless to calculate a unitary measure of level of well-being such as a per capita average. Furthermore, the tendency to work with highly aggregative functions serves to conceal rather than reveal inequities which accompany underdevelopment. And since there is sufficient evidence to prove that different sociodemographic categories of a population do not benefit equally from economic growth, there appears little point in making the implicit assumption that they do.

It appears much more valuable to develop a series of key indicators which refer to several specific components of well-being, aggregating these to the most meaningful level and foregoing the more academic exercise of combining them into some composite index to be applied internationally. The development of key simple descriptive and analytic indicators is doubly important in that each more specifically refer to the objects of programs and policies and hence may be used in the guidance and direction of these development procedures and tools. Each country could also
aggregate component indicators for its own specific context, ascribing weights reflective of situational priority.

Before embarking on the more concrete measurement considerations in developing health indicators for LDCs, a brief outline will be given (in Chapter III) of some of the pertinent conceptual and theoretical issues in defining health and health care.
III. CONCEPTUAL AND THEORETICAL CONSIDERATIONS IN MONITORING HEALTH

In this chapter a number of definitional criteria for health are classified into several overlapping categories. Working definitions of health and health care are then outlined and the health sector is briefly discussed in a structural-functional and systemic perspective.

A. Complexity of Health

The concept of individual health as a positive state is elusive and difficult to measure. Moriyama (1968:396) stated: "a major problem in the development of a health index is the lack of a satisfactory conceptual definition of health capable of being translated into operational terms."

Health criteria can be classified somewhat arbitrarily into several broad, overlapping categories (Kim, 1973; Dolfman, 1973):

1. An integrative and abstract concept of well-being

As defined by the World Health Organization (WHO), "health is the state of complete physical, mental, and social well-being and not merely the absence of diseases and infirmity" (WHO, 1958:459). Recently, Lerner (1973:7) suggested that one more dimension—that of "moral well-being"—be added to the previous WHO health definition. A similar definition was given also by Sigerist (1961:100): "Health is, therefore, not simply the absence of disease; it is something positive, a joyful attitude toward life, and a cheerful acceptance of the responsibilities that life puts on the individual."
These definitions of health seem to emphasize the integration of well-being in a positive concept. When we discuss health in a generalized and relative way, we define it to include not only freedom from disease and pain, but also social well-being (Lee, 1967).

2. Equilibrium perspective

Romano (1950:409) defines health as consisting of "... the capacity of the organism to maintain a balance in which it may be reasonably free of undue pain, discomfort, disability or limitation of action including social capacity." Blum (1971:22-23) offered a somewhat modified version of this definition: "Health consists of the capacity of the organism to maintain a balance appropriate to its age and social needs ... and to behave in ways which promote the survival of the species as well as enjoyment of the individual." Lewis (1953:113) explicitly defined health as "a state of physiological and psychological equilibrium" whereas he viewed disease as "the organism's reaction to a disturbance of its inner equilibrium."

3. Environmental adjustment or adaptation

The environmental perspective is extended to the external equilibrium of an organism as well as its inner equilibrium. Health is viewed (Hilleboe and Jacobson, 1966:788) as "a quality of life involving dynamic interaction and interdependence between an individual's physical well-being, his mental and his emotional reactions, and social complex." In another version of health from this perspective Wylie (1970:103) states: "Health is the perfect, continuing adjustment of an organism to its
environment; conversely, disease would be an imperfect continuing adjustment."

4. An attitudinal perspective

Baumann (1961:39-40) attempted to explain health in terms of underlying attitudes, identifying three orientations toward health: first, "feeling state oriented (general feeling of well-being)"; second, "symptom oriented (the absence of general or specific symptoms of illness)"; and, thirdly, "performance oriented (physical capability to perform)." The attitudinal approach to the concept of health is thought to be based upon empirically differential attitudes of individuals which are influenced by various factors such as age, education, religion, and socioeconomic status. It represents mainly the subjective aspects of health and illness.

5. Function and normality

Parsons (1958) considered the sociocultural definition of health and illness with reference to the social role-performance of the individual. He first divided health into two kinds: mental and somatic. Mental health and illness are "states of the personality defined in terms of their relevance to the capacity of the personality to perform institutionalized roles" (Parsons, 1958:166). "Somatic health is, functionally defined, the state of optimum capacity for the effective performance of valued tasks" (Parsons, 1958:168). Integrating both these ideas, health is restated as "the state of optimum capacity of an individual for the effective performance of the roles and tasks for which he has been socialized, with reference to the individual's participation in the social system"
(Parsons, 1958:176). Although illness is also a socially institutionalized role, it is viewed in the Parsonian scheme as a deviant behavior in terms of role-performance.

Normality is also a criterion for defining health. In cultural terms, normal refers to what is usual, expected, understood in its frame of reference, and generally regarded as desirable (Maclachlan, 1958).

Lewis (1953) sought the criterion for the definition of health from Erich Fromm's two ways of normality: from the standpoint of functioning society normality is the fulfillment of the social roles taken, and from the standpoint of the individual, normality is the optimum growth and happiness of the individual. He rejects the Parsonian notion of illness as deviant behavior and the common dichotomy between health and ill-health approach. To him, health is a simple concept and its criteria are "adequate performance of physiological and psychological functions in addition to subjective feeling and total efficiency" (Lewis, 1953:124).

6. Health as a component of well-being

The five categorical concepts of health listed above are not necessarily selected on the basis of theoretical concern; rather they are outlined as a basis for understanding the nature, scope, and complexity of health. Sorochan (1968:673) summarized the concept of health, identifying it as a central component of the concept of well-being:

1. Health is a relative and an abstract term . . . health should be conceived as an idea, a symbol or a model. The term "well-being" should be used instead of health.

2. Health is made up of many kinds of personal well-being--emotional, spiritual, social, and physiological.
3. There are many levels of personal, family, and community well-being; each level is probably influenced by the many kinds of personal well-being and one's environment.

4. A high degree of ever-expanding wellness is essential if one is to function at an optimal level of well-being.

5. Well-being is not static, but instead is a continuously ever-changing, dynamic and evolving homeostatic process of the whole human organism adapting to the interactions of his society and with his environment.

6. The degree or level of well-being that may be expected or attained appears to be a complex by-product of one's genotypic endowment, of the adaptive functioning of one's physical body, on one's adaptability to stresses, of one's emotional-mental and spiritual aspirations for life and of one's social compatibility.

7. Wellness and levels of well-being are interpreted and determined according to the existing value systems of each culture or subculture.

8. High-level wellness should be perceived as an essential towards personal happiness and satisfaction.

9. Well-being may be an indirect outcome of a constellation of circumstances interacting within one's environment and/or body.

The multidimensionality of health as a human condition is clearly evident in these various perspectives of health. The fact that health is an abstract idea, symbol, or component in a model of human well-being makes it a very difficult concept to define and certainly even harder to operationalize and measure.

B. Health as a Human and Social Concern

All countries share a common social concern with respect to health and attempt to provide the highest quality health care possible. Programs to improve the health of a country's population are established not only
to contribute to the satisfaction of basic human needs, but also to secure a healthy population as an investment for the future. If development is to progress, it is desirable for a nation to have an energetic, alert, physically fit citizenry. Health, therefore, is not only a social concern in regard to the well-being of a society's members, but also a priority component of social development and, thus, a basic goal area of development planning.

The process of social development may be studied using various different sociological perspectives. Viewed from a structural-functional systemic perspective, the different institutions of a society may be viewed as subsystems performing functionally relevant activities. For example, health and education systems address health and education needs of society. In these capacities the health and education systems operate complementarily with several other functionally important systems and between them they compete for and share the scarce resource inputs of society.

In such a macro-sociological perspective the unit of study is the nation-state. It is assumed that the nation-state and its administrative subunits possess a political structure capable of making policies and decisions of much greater scope and impact than would be possible if private interests and groups were to have such responsibility. These policies and decisions concern intrasocietal and intersocietal matters and in their simples form involve the creation of social roles, structure and institutions for the performance of specialized functions.
We may then view society as a system made up of a set of interdependent subsystems, each of which performs a set of specialized and complementary functions relevant to the survival and development of the entire system and its constituent parts. Since these subsystems are functionally interdependent, change—or conversely nonchange—in any one subsystem has implications for each other subsystem and for the total system. For example, industrialization and urbanization—two major dimensions of modernization and change—have far reaching consequences for many of the structures and processes of society. Their impacts will be manifest in altered kinship and interactional patterns, changes in beliefs, attitudes, and values, and in the modes of production, consumption, communication, socialization and social control.

In such a macro-sociological perspective the social institutions are essentially socially prescribed and proscribed modes of behavior which are enacted by the members of society. Institutionalized norms are more or less rigidly enforced, depending on the behavior involved.

Social institutions have their genesis in the satisfaction or functional needs and problems of society, and they form a supportive and interrelated structure around various facets of human and social activity. Every human individual in the course of his life cycle plays a variety of different institutionalized roles, and the orderly functioning of society depends on a predictable and efficient performance of such roles. It is the network of these relatively stable and predictable institutionalized social roles which constitute a society’s social structure.
Since the society as a total unit is made up of many interdependent institutions or subsystems, the integration of these with each other is a crucial matter for the viability and development of the society. The overemphasis on economic development has been common as the less economically developed countries have attempted to emulate the growth performance of more economically advanced countries. A consequence has been the relative neglect of human resources and the social areas of development need. However, the whole array of societal subsystems depend for their resources on a limited pool of legitimacy personnel and finances (Field, 1971:103). The fact that these resources are in very limited supply and the realization of the importance of other than economic aspects of development dictate that areas of crucial development concern be identified, priorities set, and short medium and long range goals outlined and planned toward.

The setting of goals and priorities which serve as guideposts for the development planning process is subject to a variety of determinants and constraints besides the lack of resources already referred to. Of major importance is the degree of political stability and the predominant ideologies of the ruling elite.

To the extent that a society is a system in which the existence and persistence of social structures depends to a great extent on the performance of social roles within interdependent institutions, any factor which affects or constrains the ability of the individual role enactors from performing to their full potential in the positions they occupy will be problematic for the functioning of the society. Illness, illiteracy,
and ignorance are such factors. In order to support and insure the ade­quate performance of roles, every society has developed mechanisms to combat and overcome these problems. Part of such strategy is the pro­vision of specialized social roles and institutions which utilize the available means to ensure the adequate performance of functionally relevant tasks.

Thus, for example, health and education institutions or subsystems might be described as those organizations or aggregates of human and material resources which are devoted specifically to dealing with problems of morbidity and premature mortality, and socialization and training, respectively. It should be stressed, however, that the clear delineation of the boundary of either the health or education system is not an easy task. There is a wealth of empirical evidence to indicate that the health and educational status of a population or its subgroups is affected only fractionally by the formal societal institutions of health and education. The contribution of many family, socioeconomic, and environmental factors are, in any given situation, equally important or even more important in their impact on health and educational outcomes. For conceptual and analytical reasons, however, it is necessary to delimit the health and education systems per se and to recognize the functional interdependence of all societal institutions.

In this dissertation, we view health as one major factor affecting—positively or negatively—the individual's well-being and his performance in the many important functional roles which he plays in a society. In turn, when the individual's abilities are impaired, whether through mental
or physical illness, each society or social group attempts to cope with the problem by allocating facilities, services, finances, and personnel in specialized roles in order to alleviate suffering, deal with premature mortality and minimize disabilities which impair human ability to function in social roles. The term health care system refers to the resulting organization of facilities, services, finances and personnel which provide or deliver health services to members of a society. The term health sector refers to the partition of the administrative structure of a society charged with responsibility to plan and implement and administer the health care system and evaluate its effectiveness in meeting the health needs of a population or society.

C. Information for Health Planning

Health planning requires an adequate health information system to provide the data base which is essential to rational decision making. A health information system for a developing nation should provide statistical data which can be used by health planners to assess and evaluate health problems in relation to health resources and services. A health information system must also shed light on the interaction between health and the other goal areas in social development. Not only does agriculture, education, and income affect the level of health experienced by an individual, but also, health affects employment, education, and agriculture. For example, "the lengthening of an individual's life expectancy through improved health raises the returns on investment in his education. In turn, an improvement in productivity through education raises the returns on investment in health" (Bleug, 1972:318).
Health planning information will be considered in this dissertation under three main headings:

1. **Health status**

2. **The health care delivery system**

3. **Societal factors** (income, population, housing, education, environment, etc.) which positively or negatively affect health status

1. **Health status**

HEW (1972a) has identified a health-disease spectrum that is not culture specific. It considers health as composed of states ordered along a continuum ranging from optimum health through incipient illness, overt illness, to recovery or death. This broad spectrum identifies the factors that influence the progression along the linking processes from one state to another and identifies the characteristics of each of the stages. Thus one can generalize from such a spectrum five areas of social concern: survival, longevity, life free from disease, life free from impairment, life free from hunger.

2. **The health care delivery system**

Factors included in the health delivery system may be classified as inputs (health personnel, facilities, and supplies); operations within the system; outputs (number of healthy people); and the distribution of these among relevant population categories. Other factors included in this category are accessibility (psychological, sociological, and physical) to health care services, and the evaluation in terms of cost-benefit analysis of preventative services such as immunization.
Information on these factors is basic to an analysis of the structure and efficacy of a health care delivery system.

3. Societal factors which positively or negatively affect health status

Factors in the broad social context which positively or negatively affect health status include geography, housing, water, sanitation, nutrition, education, and population.

In summary, the categories of information required for planning in the health sector might be outlined as (Krohn, 1968:152):

Demographic statistics

Vital statistics

Health statistics giving information on:
- Causes of death, morbidity
- Distribution of health status
- Environmental factors influencing health
- Availability and utilization of health services
- Health personnel and training facilities
- Cost by type of service provided

The main sources of such information are census data, vital records, records of health care personnel and institutions, and health surveys.

A summary framework is set out in Appendix A for items of data, classifications, data sources, and health indicators identified and developed in the chapters of this dissertation which follow.
IV. HEALTH STATUS STATISTICS

The recent emergence of several attempts to construct health indices (Sullivan, 1966; Fanshel, 1973; Bush, Fanshel and Chen, 1972; Chiang and Cohen, 1973; Berg, 1973) underlines the growing interest in this field. The procedures followed present many different approaches to the same problem. However it is doubtful if the utility of these complex indices has been demonstrated in the planning and management of health care programs. To do so an index of health should: (1) reflect changes over time; (2) be available for states, counties and smaller units of population; (3) indicate differences for demographic subunits of the population; and (4) be amenable to subdivision by causal disease groups" (HEW, 1972:55).

One of the more notable approaches (Patrick and Bush, 1971; Bush, Fanshel and Chen, 1972) incorporates dimensions of function levels, prognosis and duration in a health index. However, since their "Functional Status Index is based on a data base that doesn't really exist" (Tunstall, 1972:90), it is not immediately clear whether this particular index could be used to distinguish population subgroups with different levels of health or to chart progress in achieving higher levels of health. And, as HEW (1972:55) has noted, "... efforts to develop indices of health have not produced measures which have proved broadly useful. It is clear that more work needs to be done, perhaps including modification of present concepts and further development of data sources before satisfactory indices of health become available." Rather than
focusing on the development of a single index for health, Chapter IV of this study is concerned with the identification of a set of simple indicators that can provide the basic statistical information necessary to describe and analyze societal health status.

Mortality rates (crude death rate, infant mortality rate, and tuberculosis death rate, among others) have traditionally been used as summary indices of health. Where infectious diseases are a major component of mortality, death rates provide reasonably good measure of health status. But, as infectious diseases are brought under control, and chronic, disabling diseases with low case-fatality rates assume major importance, "morbidity becomes a more important indicator of the level of health" (HEW, 1972:55). Life expectancy, especially expectancy of life at birth, is generally considered as the best indicator of population health status, regardless of level of societal development (Shryock and Siegel, 1973:433; United Nations Economic and Social Council, 1972:147).

A. Subareas of Health Status

Health status as an analytically separate area of social concern in development subsumes several subareas of concern which we classify as: mortality, life expectancy, morbidity, disability, and malnutrition.

1. Mortality

In more developed countries death has become very much an event of advanced age and the cause of death is often difficult to discern
accurately from the several degenerative complications associated with
death at this stage of the life cycle. However, from a health information
perspective it may not be crucially important to identify the specific
causes of death among the older age groups. It is much more important
that the cause of death be identified for individuals who have not
reached an advanced age.

In LDCs mortality is especially great among the younger segment of
the population. According to Howard (1970:11), of the estimated 60
million people who die each year throughout the world, approximately
30 million are young children in LDCs.

a. Data sources Mortality is a basic component of population
change and constitutes one of the major vital events for which vital
statistics are collected and compiled. Vital statistics on mortality
are needed in demographic studies, many of which have broad ramifications
in national planning. Such statistics are also fundamental in the plan­
ing of health programs.

Mortality statistics generally come from vital statistics registers
but in some instances, they are obtained from national registers of
population.

To analyze mortality statistics reliable population data must be used
as the base or denominator for the computation of such simple indicators
as rates, ratios, and proportions. Such a data base is usually provided
by population censuses or surveys or combinations of both. In those
countries where national registers are kept, the required data for
analysis of mortality may all be recorded in such a register.
In LDCs the vital statistics registration systems are often so grossly inadequate that national census and national surveys are used as alternative data sources in measuring and analyzing mortality. The census, if it provides detailed data on age composition, allows inferences to be made as to the level of intercensal mortality; the survey may focus more directly on mortality data. This procedure has been adopted in several areas of Africa, Asia, and Latin America where vital statistics registration systems are either of very poor quality or nonexistent (U.N., 1967a; Shryock and Siegel, 1973).

b. Mortality statistics

Mortality statistics derived from vital statistics registration systems are likely to suffer from any or all of the following deficiencies (Shryock and Siegel, 1973:391): (1) inaccuracy in defining death, (2) incompleteness of registration, (3) inaccuracy in recording death by place and time, (4) inaccuracy in classifying deaths by cause, and (5) inaccuracy in classifying deaths by demographic and socioeconomic characteristics of the decedent.

Inaccuracies in the definition of death arise largely in relation to death occurring immediately after birth. In some cases such deaths may be treated as stillbirths and may not be registered either as births or deaths.

The registration of deaths is subject to serious degrees of incompleteness throughout the developing countries of the world (United Nations, 1967a). Incompleteness of registration includes (a) geographic selectivity where only part of a country is included in the registration area, and
(b) incomplete registration of vital events. Both are serious problems throughout the developing world, and few satisfactory procedures exist for estimating the completeness of vital records.

In relation to the registration of deaths by place and time, the United Nations Principles for a Vital Statistics System (1953) recommended that place of usual residence and year of occurrence (as opposed to year of registration) be used.

At the registration of deaths in developed countries information is recorded on the cause of death. The procedures for recording such information has been largely standardized throughout Western Europe and the United States. This has come about as a result of the development of international standards for death certificate format, international coding rules, and use of the International Classification of Diseases and Causes of Death (WHO), a volume which over the past two decades has had several revisions.

The reporting of cause of death in LDCs is likely to be unsatisfactory where there is no antemortem medical attendance or where cause of death has not been medically diagnosed and certified. HEW (1972), in a study of a developing country, found that while a considerable percentage of deaths occurring in urban areas were medically certified, this was true for only a very small percentage of rural deaths. Even with medical certification multiple causes may further complicate matters, and it appears that only very rarely is malnutrition diagnosed and recorded as the cause of death. This is because the condition of malnutrition makes the individual susceptible to a wide range of illnesses, and it is to
one of these that death, when it occurs, is more likely to be attributed. In the case of infant deaths also the cause is generally difficult to pinpoint.

In the analysis of mortality by cause, two common measures are used: death ratios specific for cause, and death rates specific for cause (Shryock and Siegel, 1973:404). These two measures may be used for cross-national comparisons and comparisons over time. They may be disaggregated in order to make regional or rural/urban and other comparisons depending on the subgroups or subunits for which disaggregation can be achieved.

The cause-specific death ratio is the proportion of total deaths that can be attributed to a specific cause or group of causes while a cause-specific death rate is generally defined as the number of deaths attributed to a given cause or group of causes during a year per 100,000 of the midyear population (Shryock and Siegel, 1973:404).

In view of the treatable and preventable nature of many of the health conditions which such statistics might help describe and to locate (socially and geographically) it should be possible to identify areas where health service activities could be profitably initiated or stressed.

United Nations Economic and Social Council (1972:147) proposes two health indicators using data on mortality:

1. Number and rate per 1,000 persons at risk, standardized for age and sex, of deaths according to cause: total population, urban and rural areas, national or ethnic origins, socio-economic classes
2. Number and rate per 1,000 persons at risk, standardized for sex, of neo-natal and post-natal deaths: total population, urban and rural areas, national or ethnic origins, socioeconomic classes

HEW in a research series (1972a, 1972b) also emphasized the importance of being able to disaggregate cause-specific death rates by similar subdivisions. Disaggregation by age or age group is of particular importance and the HEW study, for example, found that deaths from communicable diseases were particularly prevalent among the younger population (1-4 years of age).

2. Life expectancy

The longevity of human life and the quality of that longevity are basic human and social concerns. From the societal perspective the lengthening of life expectancy through better health yields greater returns on the investment in the individual during his childhood dependency including his education (Blaug, 1972:318). The individual, on the other hand, requires some assurance that he can expect to live long enough to reap some benefit from his efforts. Without this assurance there is little, if any, incentive to commit oneself to the long-term investment of effort which development requires.

Shryock and Siegel (1973:433) distinguish between two subconcepts of longevity: life span and life expectancy. Life span is "the maximum age that human beings as a species could reach under optimum conditions," while life expectancy is "the expected number of years to be lived, on the average" by members of the cohort under consideration.
In recent years, life expectancy has increased considerably in most countries throughout the world largely through reduction of infant mortality and a wider control of infectious diseases. These improvements in health can be attributed, at least in part, to better sanitation and general living standards and to advances in medicine (Bryant, 1969; HEW, 1972a; Swaroop, 1960).

a. Data sources Life tables to estimate life expectancy can be constructed from reliable data on births, deaths, and population. Data sources are censuses of population and vital records. In many countries census enumerations are especially inaccurate for the younger age groupings. In such instances, Shryock and Siegel (1973:435) propose using a procedure of "tracing birth cohorts." In this procedure the recorded births and deaths for as many years as is deemed necessary are used and "the cohorts of births are traced through successive years by subtracting the recorded deaths to arrive at an estimate of the living population."

b. Life expectancy statistics The life table is a device specifically designed to measure mortality or in Barclay's (1958:93) words, it is "a life history of a hypothetical group (cohort) of people," the record of which begins at the birth of each member and diminishes until all have died. The life table as it is normally constructed provides a variety of statistical information. Each specific piece of information from the life table may serve as an indicator of the health status of the population; for example, life expectation at birth and at various ages; the median age at death (the age to which half the cohort initially
assumed in the life table survives); and mortality rates at various ages which may be used as comparative measures between societies and over time for the same society. (See also Wilcox, et al. 1974, for discussion of life table uses.)

United Nations Economic and Social Council (1972:147) proposes the following indicators of life expectancy: "expected years of life at birth and at 50 years of age according to sex, total population, urban and rural areas, national and ethnic origin, and socioeconomic classes." This is generally in agreement with those proposed by HEW(1969).

The life table may be viewed as essentially a single statistical model which combines mortality rates of a population at different ages (Shryock and Siegel, 1973:429). Two types of life tables are generally distinguished--the current (or period) life table and the generation (or cohort) life table. The current life table gives a cross section or snapshot of current mortality in that it "considers a hypothetical cohort and assumes that it is subject to the age specific mortality rates observed for an actual population during a particular period" (HEW, 1969:3). The generation or cohort life table on the other hand is constructed on the basis of the mortality rates experienced by a particular cohort. The current life table is the type most commonly in use.

Life tables may be further classified as either complete (a table containing data for every single year of age) or abridged (a life table containing data by intervals of five or ten years of age). The abridged life table is easier to prepare and is sufficiently accurate and informative for most purposes.
Expectation of life at birth is generally considered to be among the best indicators of population health status (Swaroop, 1960; HEW, 1972a; Shryock and Siegel, 1973; United Nations Economic and Social Council, 1972). However, as with many other desirable social indicators, reliable data are lacking in many countries. The United Nations, in their interim guide on international definitions and measures of levels of living (1961), expressed the opinion that the 1970 Round of Censuses with their more detailed data on population age structure should make it possible to construct life tables and hence to estimate life expectancies for many more countries. The mere availability of more detailed data may, however, be of limited value since these data will in many cases be derived from birth and death registers whose reliability is suspect. The degree of completeness of registration is closely related to the level of social and economic development which a country has attained. Thus some LDCs may have to resort to the sample survey as an alternative method of obtaining sufficiently accurate data on births and deaths.

3. Morbidity and disability

The WHO Expert Committee on Health Statistics has defined morbidity as "any departure, subjective or objective, from a state of physiological well-being" (WHO, 1959:5). The term morbidity in this sense is synonymous with such everyday terms as illness, sickness, or disease (Swaroop, 1960:193). The latter term, disease, has been defined as "the state of man's inability to adapt to his internal or external environment, both physiologically and psychologically" (Howard, 1970:11). "The ultimate
failure of adaptation is death"; a relatively infrequent occurrence, however, as compared to the prevalence of morbidity. Thus, for example, in the LDCs, while the number of deaths "... may range from ten to 40 per 1,000 population per year, sickness of great variety and degree of severity may affect as many as 900 persons per 1,000 population per year" (Howard, 1970:11).

Specifying a minimum list of indicators of morbidity and of disability is particularly difficult in view of the complexity of the phenomena involved. Brockington (1968:242) points out that "... in the circumstances where every nation's needs are so different and their capacity so varying, it is hardly possible to state precisely what an annual programme of tabulation should seek to do. Every country must examine its own possibilities." At a more general level, however, a methodology to develop social indicators of morbidity and disability must adequately deal with a number of highly interrelated problems which will be more or less present in any LDC. These problems may be generally discussed in terms of two broad categories: (a) measurement considerations and (b) sources of data.

a. Measurement considerations  The WHO Expert Committee on Health Statistics has recommended a number of factors which should be taken into account in the calculation and interpretation of a morbidity statistic (WHO, 1959):

What is the purpose of the statistic?

How is "sickness" defined?
Does the statistic relate to sickness beginning within a given period of observation (i.e., incidence), to sickness current during this period (i.e., point prevalence or period prevalence), or to the duration of sickness?

What is the particular disease (or diseases) to which the statistics relates?

What is the particular time at which a period of sickness is defined as having begun or terminated, e.g., cessation or resumption of work, admission to or discharge from hospital, etc.?

What is the length of the period of observation?

What is the common denominator, i.e., the population at risk?

All these factors enter into the calculation and interpretation of morbidity statistics, but the basic methodological problem is that of using morbidity data in respect to the population and the time frame in which the morbidity occurs. A morbidity rate, however, fulfills this requirement by measuring morbidity in terms of the amount of sickness per unit of population during a defined period or at a particular point in time. In a morbidity rate, the numerator represents the occurrence of morbidity and the denominator the population at risk. When calculating a morbidity rate, it is important to ensure "that the denominator is appropriate in the sense that all persons in the denominator population were at risk of suffering the morbidity that characterizes the individuals who represent the numerator" (WHO, 1968:24-25).

The most frequently used rates are incidence rates and prevalence rates. An incidence rate is the number of new cases during a defined period divided by the average number of the population at risk during the period (WHO, 1968:24). It will be difficult in LDC situations to calculate
incidence rates so point or period prevalence rates can possibly be calculated. A prevalence rate is the number of cases either at a given point in time or during a period divided by the average number of the population at risk at or during the corresponding point or period, respectively (WHO, 1968:24).

The basic data required for morbidity indicators are thus basically twofold: (a) the number of persons diagnosed as having a particular condition at a defined point in time or during a defined period of time; and (b) an estimate of the size of the relevant population at risk at a particular point in time or during a particular time period.

Given that basic rates of morbidity can be calculated, another priority consideration is the ability to disaggregate these rates along relevant dimensions (e.g., age and sex, type of disease, etc.) to delineate those population subgroupings in which morbidity is particularly severe and most in need of medical care. As with mortality indicators, if information about a specific condition is required about any particular population subgrouping, it follows that two basic items of data are required: (a) the number of persons in the population subgrouping of interest diagnosed as having the particular condition and (b) an estimate of the size of the population subgrouping. The WHO Expert Committee has suggested a number of relevant classifications (WHO, 1968:25): type of disease, age and sex, regions of a given country, urban and rural communities, levels of medical care provision, ethnicity (where cultural, nutritional, or other differences may influence levels of health status),
and occupations. Where estimates of the age and sex distribution of the population are available, the calculation of age-specific morbidity rates for each sex is particularly informative. Where such estimates are not available, it may yet be possible to classify morbidity data per se by age and sex (WHO, 1968:26).

Assuming that suitable data have been collected and are amenable to cross classifications, we can now examine some of the possible indicators of morbidity which might be developed within a given LDC.

Three indicators of the general state of health of a population at a specified date are outlined by United Nations Economic and Social Council (1972:147):

1. Number and percentage of persons and average height and weight standardized for age and sex, according to height, weight, and measurable states of health: total population, urban and rural areas, national or ethnic origins, socioeconomic classes

2. Number and rate per 1,000 at risk, standardized for age and sex, persons with limitation of activity due to chronic condition according to type of condition: total population, urban and rural areas, national or ethnic origins

3. Number and rate per 1,000 at risk of mentally retarded according to degree of retardation and age and sex.

These indicators, however, are suggestive only of the type of morbidity and disability indicators that might be developed within any given LDC. In LDCs there should be greater interest in the development of measures of the incidence and prevalence of infectious diseases and parasite infestations in the population, or in certain population subgroupings such as young children.
In the LDCs, as is often noted, the data on morbidity and disability are especially scarce. Records of illness on injury are rarely available since persons affected do not or cannot consult with health care personnel. Perhaps they are even unaware of their services. In view of data shortages, a methodology to develop social indicators of morbidity should try to make use of such data as may be available from any source.

In studying morbidity, stress is sometimes given to its disability aspects: restricted activity days, bed-disability days, work loss days, hospital days, and chronic activity limitation (HEW, 1973). These data have provided the basis for the variety of statistics on rates of disability (HEW, 1972:52). Generally, indicators of disability among such population subgroupings as the school-age, working-age, and elderly populations would seem reasonably desirable for any country. A percentage breakdown by duration of disability within each of these population subgroupings would also seem desirable.

Disability is defined as any temporary or long-term reduction of a person's activity due to morbidity or injury. With this time distinction in mind, one may conceptualize that an individual may be classified in terms of any one of three categories as follows (OMB, 1973):

1. Long-term institutional disability; when a person is confined to a resident health care facility and is able to function only in a limited way;
2. Long-term noninstitutional disability; when the person has an enduring limitation but is able to live at home;
3. Short-term disability; when the person is only temporarily incapacitated.
Of the three categories of disability, short-term disability is generally the most common.

b. Data sources The WHO Expert Committee on Health Statistics has stated that while "procedures for analyzing data are available, . . . appropriate data on morbidity are not yet generally on the scale and with the speed that is required" (WHO, 1968:6). The general unavailability of data on morbidity stems in part either from the lack of satisfactory data-producing sources or from the failure of existing or potential sources to produce the kinds of data that are required.

Morbidity data can potentially be obtained from several broad categories of sources:

- Disease registers: notifiable and other
- School and industrial absenteeism records
- Institutional records and statistics
- General practitioners' records
- Insurance and social security records
- Interview and examination surveys

1) Disease register The primary purpose of a disease register is to record cases of diseases of various types, particularly notifiable diseases,\(^1\) as a basis for forecasting the imminence of outbreaks of diseases that are highly communicable (WHO, 1968:10). Such a

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\(^1\)Most countries maintain a list of those diseases--usually communicable diseases--which are considered particularly serious hazards to public health. The reporting of these diseases is mandatory.
register may record also cases of such other diseases as cancer, tuberculosis, venereal, and mental diseases (Swaroop, 1960:193). The accuracy and completeness of the diseases recorded depends largely on the degree to which there is full cooperation and/or compliance (where required by law) in reporting the diseases being monitored.

2) School and industrial absenteeism records These are records of the number of person-days which school children and workers have missed from their normal work setting because of sickness that is accompanied by temporary incapacity to work. The worth of this data source is generally related to urban areas where industries employing large labor forces are more likely to be located and school absenteeism records are more likely to be kept.

3) Institutional records and statistics These data records, obtained from institutional records (hospitals, hospital out-patient departments, health centers, clinics), pertain to the numbers of people who have sought medical care. Such data may include the cause (i.e., diseases) for which a particular consultation or institutionalization (e.g., hospitalization) has been made, and the frequency of consultations or hospitalizations for a particular cause. It may then be possible to estimate the distribution of the particular cause in question relative to other causes and the effectiveness of the consultation or hospitalization (HEW, 1972:13).

The WHO Expert Committee has recommended that hospital morbidity statistics minimally include a count of patients discharged and of their hospitalization days since admission, by diagnosis and sex (WHO, 1968:11).
Caution must be taken not to project conclusions as to the health status of any population beyond that segment which has access to that hospital. For example, if a child health clinic serves all the children in a given population, its records may describe the pattern of morbidity among the children in that population. However, to the extent that large numbers of children do not have access to these clinics, it becomes more difficult to define the actual coverage of the clinic's statistics, in other words, the population at risk.

4) General practitioners' records

The WHO Expert Committee (1968:22-23) has outlined several statistical units used in the study of morbidity: a case of illness; a spell of sickness; admissions to, discharges from, and patients currently resident in hospitals; sickness absence or claims for sickness benefit; and consultations. In examining general practitioners' records, the use of the consultation as the statistical unit may entail several operational difficulties. For example, several consultations may take place within the course of one spell of sickness. However, if statistics are collected by means of a sampling technique that involves only occasional reporting days for individual practitioners, or if the first consultation in an episode of illness is selected as the reporting unit, the consultation is a potentially useful statistical unit.

5) Medical insurance and social security records

These sources may be able to provide data on illnesses that cause temporary or permanent incapacity for work. However, they are likely to be of limited application in LDCs because of predominantly rural populations.
6) Interview and examination surveys  Health surveys of various types have been conducted in the more advanced countries of Europe, Japan, and the United States (Swaroop, 1960:194). They would appear to be the means most likely to produce accurate data on morbidity. The U.S. National Center for Health Statistics (NCHS) has relied heavily in obtaining morbidity data and statistics on three surveys: the Health Interview Survey (HIS) and the Health Examination Survey (HES), and the Hospital Discharge Survey (HDS), with supplementary data from reports of the Center for Disease Control on "notifiable" (primarily infectious) diseases and mortality data obtained through the Federal-State Vital Statistics Program. The HIS and HES use national probability samples of the civilian noninstitutionalized population. The HDS draws from the universe of patients discharged from short-stay hospitals, including those who die in the hospital. Of the three approaches (HDS, HIS, and HES) to the measurement of morbidity, the HES is considered to provide "the best data obtainable about the physical and physiological characteristics of the American people" (HEW, 1973:894).

Household interviews as a source of morbidity statistics are greatly limited by the accuracy of the diagnostic and other information provided by respondents. The information a respondent gives on conditions which have not been medically attended may be nothing more than a description of symptoms. Even where the respondent (or a member of the respondent's family) has received medical care, he or she may at best only be able to pass on to the interviewer such information as the physician may have communicated. Certain facts, however, such as the number of disability
days, are most accurately obtained from household members. Finally, it has been shown that knowledge of health conditions and the ability or willingness to report them tends to vary with socioeconomic and cultural characteristics of the respondent or the respondent's household.

4. Malnutrition

Since 1949, seven joint FAO/WHO Expert Committees on Nutrition have convened. In addition numerous seminars and international meetings have been sponsored in recent years by FAO, WHO, UNICEF, and other organizations to deal with the problem of malnutrition in the world. The knowledge about the etiology, prevention, and treatment of malnutrition, and its consequences and socioeconomic repercussions is fast-growing.

Malnutrition is a health concern because of the widespread suffering for which it is directly or indirectly responsible and also because of the impediment to socioeconomic development which malnutrition imposes through impairment of human resources. The processes of physical and mental development are retarded, and the general standard of health is poor among those who are malnourished. Evidence that relates malnutrition to mental retardation is growing and since the majority of children in LDCs are in various states of malnourishment, this constitutes a serious problem.

More than half the deaths in some LDCs are of children under six years of age. Many of the diseases to which these deaths are attributed are considered relatively minor in developed nations indicating the contributory effect of malnutrition in aggravating the health conditions. The body becomes so debilitated by malnutrition that it is incapable of
resisting relatively minor infections. Berg (1969:3), for example, points out that measles and chicken pox often are fatal in countries where the levels of nutrition are seriously deficient.

The costs of malnutrition in the different areas of social development are high. For example, besides loss to the population by the curtailment of physical and mental potential, losses exist in the form of medical costs, welfare payments, and the loss of productive labor through premature death. With shorter life expectancy the cost of early life or childhood dependency (up to the age of labor force entry) becomes relatively more onerous per productive year in labor force. Among many of those that survive malnutrition in early life, both physical and mental growth is retarded. Besides the loss to the labor force, such retardation becomes an increasing burden on the educational system where slow learning may be in evidence.

FAO/WHO (1970) investigations indicate that the lowest labor productivity is found in countries where protein and caloric consumption per capita is lowest. Apathy, lack of energy, and hence low productivity are seen as resulting from lack of the required quantity and quality of nutrients. Labor productivity is further retarded by a lowered resistance to disease. As a result, absenteeism is frequent and prolonged. Indications are that job related accidents are more prevalent among malnourished laborers.

The more salient nutritional problems and related conditions experienced on a world scale are (WHO, 1972:160):
Protein-calorie malnutrition (PCM)
Vitamin A deficiency
Nutritional anemias
Endemic goiter

The most serious and widespread nutrient deficiency throughout the world is protein deficiency. More than half the world's protein supply comes from grain. Different grain crops yield different qualities of protein—the quality depending on the content of "essential amino acids." Several cereal grains are low in the essential amino acid lysine. Many of the oilseed crops, however, are high in good quality protein content and are relatively inexpensive to grow.

Vitamin A deficiency in young children is an especially critical problem in Southeast Asia, but many other nutritionally based health problems are critical in their impact in pregnancy and early childhood (Scrimshaw, 1964:117).

The Joint FAO/WHO Expert Committee on Nutrition (1971:62) points out the necessity for many types of action: increased production of foods to provide adequate protein, calories, and other essential nutrients, by means of crop husbandry, animal husbandry and fisheries; reduced losses in harvesting, transporting, and storing and a better distribution and utilization of supplies; development of nutritious food mixtures for weaning; development of industries for the preservation and processing of food; education and training including the education of consumers; a broad program of environmental sanitation and disease prevention, especially in childhood; and studies to provide better information on dietary intake and
factors that influence it. National plans for social and economic development must attempt to include all of these activities.

As with many behavior components of human life, the eating habits of people are difficult to change. Attempts at incorporating more nutritious foods in deficient diets or the use of protein and vitamin supplements meet with limited success in many cases indicating that eating habits are rather inflexible.

FAO (1972:84) outlines a number of indicators of nutritional status (Table 1) which they have evaluated on the basis of their specificity in measuring changes in levels of nutrition and the feasibility of obtaining the required data in developing countries.

a. Estimates of prevalence The only satisfactory method for estimating the prevalence of malnutrition is a survey of representative communities throughout the population of interest. The basic data to be collected are age, weight, height, and the presence or absence of clinical signs of malnutrition. Certain standardized procedures have been developed in order to make comparisons possible; a variant of the percentile distribution or Harvard Standards of height and weight (Jelliffe, 1966) is a common procedural tool in studies of prevalence.

b. Indirect indicators

1) Age specific death rates The WHO Expert Committee on Medical Assessment of Nutritional Status (WHO, 1963:11) stressed that the age specific mortality rates for children in the one to four year age group is a reasonably good indicator of the nutritional status of this age group. It is, however, difficult to separate out the effects of
Table 1. Suggested indicators for progress assessment in activities directed toward the protection of mothers and young children from protein-calorie malnutrition

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Specificity of indicators in nutrition evaluation</th>
<th>Feasibility of obtaining accurate data in developing countries, especially in applied nutrition programs in rural areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific mortality rate from malnutrition</td>
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<tr>
<td>Infant mortality rate</td>
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<tr>
<td>Mortality rate in children 1-4 years</td>
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<td>Percentage of deaths of children below 5 years of age in relation to total mortality</td>
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<tr>
<td>Wills-Waterlow index (i.e., the ratio of deaths among children aged 1-4 years to that of infants aged 1-12 months)</td>
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<tr>
<td>Specific mortality rate from diarrhea and some infectious diseases (measles)</td>
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Prevalence of protein-calorie deficiencies

<table>
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<tr>
<th>Clinical signs</th>
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<tbody>
<tr>
<td>Weight deviation for age</td>
<td>*</td>
</tr>
<tr>
<td>Weight-length ratio</td>
<td>*</td>
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<tr>
<td>Arm circumference</td>
<td>*</td>
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<tr>
<td>Head-chest circumference</td>
<td>*</td>
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<tr>
<td>Skinfold</td>
<td>*</td>
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<tr>
<td>Total serum protein</td>
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<td>Serum albumin</td>
<td>*</td>
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<tr>
<td>Urinary area, expressed</td>
<td>*</td>
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<tr>
<td>per gram of creatinine</td>
<td></td>
</tr>
<tr>
<td>Amino-acid imbalance test</td>
<td>*</td>
</tr>
</tbody>
</table>

Low birth weight (data from maternities)  

Weight gain during pregnancy  

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^Greater value in areas of early weaning.
diseases per se from those of malnutrition in different circumstances. Compromising the usefulness of this measure further is the fact that the younger age groups are likely to be subjected to under-reporting in many LDCs.

A high proportion of infant mortality can be attributed to a combination of factors. "Malnutrition causes a lowered resistance to infection while frequent episodes of infectious diseases precipitate clinical malnutrition" (FAO/WHO, 1971:44). The relative importance of these combined factors decreases with age.

2) Disease specific death rates The recording of deaths by cause is not a very reliable tool in assessing nutritional status because generally some associated disease is likely to be adjudged the cause of death regardless of the degree of malnutrition. This situation arises partly because relatively few deaths in LDCs are medically certified and the layman is unable to identify malnutrition as a primary or even a secondary cause of death.

There may be some value, however, in using disease specific death rates as an indicator of nutritional status of children in that deaths from such diseases as measles are much higher in LDCs as a result of lower resistance directly related to nutritional status (Jelliffe, 1966; Swaroop, 1960).

3) Occurrence of infectious diseases Where environmental sanitation and personal hygiene are poor, malnutrition in children as measured by weight for age is found to be associated with high frequency of infectious diseases. Because of this close association, it should be
possible to generate an indirect indicator of protein/calorie malnutrition prevalence from carefully interpreted data on the frequency and duration of infectious diseases.

Besides the survey procedures proposed above for the measurement of nutritional status, two other main sources of data proposed by the Joint FAO/WHO Expert Committee on Nutrition (1971:49) are:

1. The records of infant welfare and other centers
2. The records of hospital inpatient and outpatient departments

It might be noted that both these sources are likely to be representative of a very select segment of the population and hence their usefulness is limited.
V. HEALTH CARE STATISTICS

Many health and health care problems are so closely interwoven with overall problems of social and economic development that they are not directly amenable to influence by a formalized health service. Many other problems, however, fall within the scope of a health service influence. Bryant (1969:317), for example, states: "...it is essential to identify those areas where need and beneficial action can be joined and to design a system of health care that makes this possible." The health care system is thus depicted as operating somewhere in the gap existing between health needs on one hand and limitations of resources on the other, and it must try to relate the two effectively.

Standards of health and health services are strongly influenced by limitations of resources. It may be the goal of every government to provide health services for all citizens on an equal basis, but a choice may have to be made between allocating resources too thinly or concentrating on specific regions. Undoubtedly the areas of greatest need are the remote rural areas but scarcity of resources and the magnitude of initial investment in hospitals, clinics, and other facilities in urban areas dictates that resources continue to be allotted to staffing, maintaining, and improving these central urban facilities.

The planning of health care in LDCs differs from health planning in more developed countries (Gish, 1970:67) because:

1. The resources in the form of money and skilled personnel are in very limited supply.
2. The age structure reflects a much younger population while the geographic distribution of the population is predominantly rural.

3. The disease patterns are entirely different, with infant and childhood mortality many times higher than in more developed countries.

From the point of view of accessibility of health care for the majority of the population, urban hospitals in the Western sense have little impact but consume a large proportion of health finances.

How a health care delivery system works is a required component of health statistics. Data required in this regard relate to number, size, type, distribution of facilities, and staff personnel, together with the training or skill levels of personnel.

Recommendations have been made (WHO, 1967) that all countries collect information on their health care system under the headings of finances, personnel, facilities (buildings and equipment), and organization.


1. To assist in the administration and co-ordination of health services in any particular community, region, or country, and for the effective management of curative, preventive, and environmental health services;

2. For the short-term and long-term planning of health services, both locally and nationally;

3. For assessing whether health services are accomplishing their objective, i.e., their effectiveness, and whether they are doing so in the best possible way, i.e., their efficiency;
4. For the study in depth of particular problems of health and disease and their effect on the administration of health services, i.e., for research purposes;

5. To provide background data that may be required from time to time by the administration, by legislative bodies, and by members of the public.

A. Health Facilities

Little consensus is to be found in the literature concerning the defining characteristics of different health facilities. The World Health Organization Expert Committee on Health Statistics (1963) attempted some definitions, but these do not appear particularly useful for our purposes. In general, a health facility is defined as "... the physical setting in or through which preventative, diagnostic, curative, and supportive services may be provided," whereas a service is defined as "... a specific activity provided in or through a facility which is designed to contribute to the good health of the community" (HKw. 1972:148).

It is possible then to classify the facilities on the basis of the types of services they offer. In an LDC the more important facilities in reaching people in need are the health centers with their outlying aid stations or dispensaries and mobile clinics (Gish, 1970:70). These types of facilities provide a wide range of health services including family planning services, health education, immunization, and preventative and curative measures for diseases.

Suggested categories of facilities of primary importance in comprehensive health planning are outlined below. This classification and
the definitions provided by HEW (1972:150-153) and WHO (1963) might be used as a guide in outlining the categories of statistical information to be sought in an LDC:

Inpatient care
 General hospitals
 Special hospitals (including mental retardation centers)
 Rehabilitation facilities

Outpatient care
 Outpatient clinics
 Health centers

Home nursing care

Physician care
 Solo and group practice

Blood banks

Laboratories
 Clinical laboratories
 Radiological laboratories

Public health services concerned with prevention and administration
 Local health authority

Detailed knowledge of the categories of facilities is required if existing programs are to be coordinated; if available resources are to be deployed efficiently; and if overlapping and duplication in existing programs is to be avoided.

The categories of characteristics outlined by HEW (1972:153-154) might be used in LDCs in the design and investigatory stages of guiding the collection of relevant information:

Basic inventory
 Number; location; size; categories of services; physical conditions; special diagnostic and therapeutic equipment; accessibility.
Organizational characteristics
Ownership or control; accreditation; approvals; certification; staff by-laws; board of trustees composition; articles of incorporation.

Service characteristics
Utilization of services (statistical summary); utilization rates by age, sex, race; area served by type of service provided; admissions; discharge diagnosis summary; type of payment; patient characteristics--age, sex, race: length of stay; disposition by type of patient and age, sex, and race.

Personnel
Staff by category; staff by shift; staff by service; physician staff list; allied health professionals--including psychologists, sociologists.

Financing
Expenses by type; income--sources and amount; per diem cost by type of service and cost component; fees; charges; other financial information.

Special programs
Research--internal, external, community; teaching--professionally oriented, by type of program, allied professionals by type of program, community by type of program.

Policies
Inter-facility transfer agreement; service sharing agreements; admission policies.

Detailed utilization of services
All services provided in or through the facility: pathology laboratory, dental facilities, pharmacy, occupational therapy department, physical therapy department, premature nursery, outpatient department, emergency department, psychiatric inpatient department, rehabilitation inpatient department, post-operative recovery room, social work department, hospital auxiliary, radioisotope therapy, cobalt therapy, radium therapy.

Ideally, descriptive and analytical data for comprehensive planning in the health sector would cover all the above categories. It is necessary to know what types of services are available, how these are used, and how they are distributed, and who has access (geographically,
financially and culturally) to them. It is important also to know the
different categories of health personnel, their number and distribution
by facility and geographic area and potential clientele, as well as
details on how the facilities are organized and administered. Data are
required also on the cost of different types of services to clients; for
example, per diem charges or fees.

1. Data sources

Ideally, the effectiveness with which health care planning proceeds
depends on the availability of detailed current and accurate data. It is
assumed that health facility and service data are available from
government and private sources at regional and national levels. Where
data are available from several different agencies, it will be necessary
to establish uniformity or standardization in definition and classifica­
tion of facilities. It will be necessary initially to identify and
evaluate the available data in relation to criteria to be established in
conjunction with personnel involved in health care administration and
those concerned with data collection in order to reach some decision on
feasible standards for a comprehensive planning framework. As a result
it may be possible to pinpoint information gaps and inconsistencies and
propose solutions.

The categories of data sources for health facilities outlined by
HEW (1972:164-165) might again be used as a guide in exploratory stages
of research in LDCs. These include federal, provincial, local, voluntary,
and national agencies each of which subsumes a number of subcategories whose labels or titles will vary by country:

Federal: Department of health
State or provincial: Department of health
Local: Local office of health department
Voluntary: National, regional and local voluntary agencies
National: Including professional associations, associations of hospitals, etc.

B. Health Services

It should be possible to relate data on health service use to sociodemographic information in order to enable the analysis of health service usage. In turn, it should be possible to discern the factors that affect use, potential cost, cause of use, and specific services used.

The components of a health service data collection scheme are proposed by HEW (1972:174) and WHO (1969:14-16):

Who rendered the health services?
- physician (by specialty)
- nonprofessional (specify), etc.

Where was health service provided?
- health center or clinic
- at place of residence
- general hospital
- inpatient
- outpatient, etc.

What was the health service?
- examination (i.e., physical, psychiatric, dental, etc.)
- medication (oral, intravenous, intramuscular) etc.

Why were health services administered (give appropriate diagnoses)?
What was the charge for the health service (either to client or to third party)?

How was the health service paid for?
- patients' own resources
- government provided program
- charity
- etc.

Duration of health services (e.g., days of care where appropriate)

1. Data sources

The three main sources of health service statistics are facility records (including institutional records and physicians' records); insurance reporting forms; and household health surveys (HEW, 1972, and WHO, 1969). The availability and usefulness of data from these sources in specific LDCs is a matter for investigation.

Hospital discharge records may also yield information on services provided to hospitalized patients. The records of clinics, outpatient departments, and providers of individual service are further possible sources. Periodic surveys of records together with periodic household health surveys would seem to be the most economical procedure in obtaining health service data. Questions on health service utilization may be included in other national, regional, or community household surveys to keep the cost of obtaining such information at a minimum.

C. Financial Resources

Limited financial resources must be allocated among alternatives and competing uses. It is difficult to obtain data on health service expenditure but data may be available as a by-product of account
procedures performed in conjunction with administering facilities and services. Other sources of data include sample surveys of household expenditure on health services or studies of financial operations of a sample of health institutions.

Financial data might be used to construct such indicators as:
(a) expenditure as a percent of gross national product; (b) expenditure as a percentage of national income; and (c) expenditure per head of population (WHO, 1969:13).

D. Health Personnel

Health service personnel make up a sizable and growing segment of the labor force in most countries. The classification of such personnel has not been standardized internationally but some useful divisions have been suggested (Bryant, 1969; and WHO, 1969:9-10).

Personnel providing direct personal service; for example doctors (subdivided by specialty), dentists, and nurses are differentiated from members of allied health professions: pharmacists and laboratory technicians.

Bryant (1969:335-336) classifies health personnel in developing countries into four broad groups: professional workers, subprofessional workers, paramedical workers, and auxiliary workers.

1. Professionals usually function in their area of competence without supervision. They are usually educated to the level accepted for that discipline in a particular country.

2. Subprofessionals often have an education similar to that of professionals. Such individuals are usually community health officers.
3. Paramedical personnel are those individuals allied to individuals in medicine who together make up a health team: nursing, sanitation, etc.

4. Auxiliary personnel are individuals with less than full professional qualifications. Different levels exist within the broad categories of auxiliaries; for example, in nursing, auxiliary nurses.

1. Data sources

The type of information required on these categories of personnel include their numbers; ratio to population; work load information (such as patient loads or beds to attend) in health care facility; geographic distribution; job vacancies; levels of qualification and personal characteristics. These data may be available through licensing or registration or from census enumeration. Registers of professional personnel may also be compiled and kept current by national professional associations. Statistical data on personnel in the process of training should be obtainable from the training establishedments; for example, medical schools, pharmacy schools, and nursing schools.

In developing countries the auxiliaries (e.g., midwifery personnel, etc.) together with traditional healers are major providers of health care (Gish, 1970:72). However, these categories are least likely to be accounted for in an information system. The success of the "barefoot doctors" in China, and the "helots" (village midwives trained as health and family planning educators) in the Philippines points to the need to give a high priority emphasis to these categories of skill in preference to conventional health professional training in future health planning (and health care monitoring) for developing countries (Hetzel, 1972:315).
Life tables of professional life expectancy (the time we can expect a worker to be available for employment [HEW, 1972:113]) also need to be developed.

E. Need and Demand

An integrated system of health statistics centers around the concept of requirements (HEW, 1972:110). The terms need and demand are two facets of this concept. For example, personnel need refers to the number of health professionals required to meet a predetermined standard of health care. Personnel demand is related to the demand for health services and is a function of such economic and noneconomic factors as cost, distance, time, values, and mores.

An integrated set of statistical information for the health sector will allow planners to compare demand for services, facilities, and personnel with the need for these. If the supply of available services, facilities, and personnel fall short of demand, action may be taken to increase the effective level of demand and bring it more in line with the levels of health care needs.
VI. FACTORS RELATED TO HEALTH STATUS

It has become increasingly evident that development planning must be a dynamic process capable of embodying all aspects of a society's resources, both human and material, as well as all its activities.

Only very general comments in this section will be addressed to data and data sources since social indicator research directly involving many of these related factors is elaborated more thoroughly in ongoing research at Iowa State University (Wilcox et al., 1972, 1973, 1974) on development sectors (population, education, food and nutrition, and agriculture).

A. Health and Social Development

The tie-up of health with other sectoral concerns is complex and is becoming well documented. The interrelationships between health on one hand and population, nutrition, and education on the other are especially important, and all of these need to be considered as the development process is examined.

Health programs are generally accepted as a component of development planning. However, doubt is expressed as to the degree of importance to be attached to such health programs, mainly because of the effect which better health appears to have on population growth and also because of the difficulty of making quantitative assessments of the contribution of health programs to development.

Myrdal (1968:1537) pointed out that health is an integral part of the development process and hence must be considered in the context of
of its complex interrelationships. Health has an impact on many aspects of individual functioning: nutrition, occupation, income, and education, among others and these in turn affect health.

The evaluation of investment in health from a strictly economic viewpoint has had its critics, but the methods used are quite informative. Mushkin (1962), for example, considered three perspectives. First, there is the investment needed to rear a child from birth until he is a productive member of the labor force. The returns to such investment may be lost wholly or in part through premature death or disability. Second, there is the contribution to output and economic growth attributable to health programs. Taking the negative perspective, the measures of the effect of ill health on labor productivity could be classified (Mushkin, 1962:138) as: deaths (loss of labor units); disability (loss of time at work); and debility (loss of ability to perform at full potential). A third perspective is the present value of future work potential attributable to health programs. The present value can be viewed as a capital asset (Mushkin, 1962:148).

B. Related Concerns

1. Population

The vexing problem of improving health and health-care facilities and programs and the resulting impact of reduced morbidity and mortality and ultimately population increase which in turn taxes further the already limited educational and nutritional resources is not amenable to a simple solution. However, in some instances the benefits of health improvement
in better role performance capability of individuals and increased efficiency of the labor force as a whole are evident. The improvement in attitudes toward life in general and the acceptance of the fact that improvement is possible is likely to emerge more forcefully in a climate of improving health among the population. The positive attitudes attributable to better health status are more likely to have a long-term impact and hence may be considered to outweigh the consideration of population increase.

The negative argument stating that improved health results in increased population growth must be balanced also against the acceptability of high mortality as a means of population control. In solving this two-sided issue, a balance must be sought "... between the moral imperative of providing health care and the urgent need for developing effective means of population control" (Bryant, 1969:100).

The part played by improved health in increasing population through lowered infant mortality may be offset by the part it plays in lowering fertility. Many demographers argue that to significantly reduce fertility in developing countries, it will be necessary to first lower the rate of infant mortality.

The health service can also be a medium for the diffusion of new and optimistic—as opposed to fatalistic—social attitudes which are vital to all aspects of development. The mother who through pregnancy and childbirth is most likely to have contact with and need for health services becomes the means through which health services can influence family behavior. Bryant (1969:102) states:
Whether the goal is to improve health or to reduce the birth rate, the means is behavior change, and this can seldom be accomplished in a health center or hospital clinic. Health services must reach into the communities and establish close and trustworthy relationships with the people before they can hope to influence the ways in which people live their lives.

2. Health care access and distribution

The computation of rates and ratios of population to health care personnel and facilities are of limited utility in describing the real issues of health. Whether it is hospital beds, clinics, doctors, nurses, or other facilities or personnel that are being described, the consideration of distribution, utilization, and quality must be emphasized.

The meaning of hospital bed, hospital, clinic, or doctor will vary considerably with the situation being considered and the quality of health services is probably more dependent on the availability, organization, and distribution of many different aspects of health facilities than on the numbers of doctors or the type of training they have received.

If, for example, the geographic distribution of health care facilities can be estimated, this information per se is of limited value since it must be determined how these facilities are used by the local population. Rural areas rarely have facilities comparable with urban areas. In Thailand, for example, the ratio of population to doctors is 17 times as high outside the capital city as inside the capital city. The vital statistics for rural and urban areas--where they are available--reflect this inequity. In Nigeria the infant mortality for the capital city is approximately 70 per thousand; in rural areas it is claimed to
be as high as 300 per thousand. It is worthy of note that many of the
doctors and other health personnel and facilities outside the capital
cities are most likely to be located in provincial towns. This leaves
the strictly rural population with virtually no health services in many
cases. The seriousness of this situation is amplified when it is
realized that the rural population constitutes approximately 80 percent
of the national population for most LDCs.

The availability and distribution differentials is not a clearcut
rural/urban phenomenon. Such variables as ethnicity, religion, or
socioeconomic status may all contribute to such differentials. This is
the case in developed societies. For example, in the United States the
nonwhite population in urban areas experience much higher infant
mortality rates than the white population.

The health problems of whatever society one wishes to study are
closely intertwined with the history, culture, and socioeconomic develop­
ment of that society. Many aspects of health may only be understood when
viewed against the specific contextual factors with which they are
associated. The scarcity and inadequacy of health services across LDCs
is not matched in all cases by an overzealous demand for these services.
For example, in Africa and Latin America the demand for health services
tends to exceed the supply of services; in Thailand the sparse services
are in little demand (Bryant, 1969:78). No satisfactory explanation has
been offered for such variances, but it has been suggested that in the
case of Thailand the social distance and other-worldliness so character­
istic of Asian Buddhism may be an important explanatory factor.
3. Environmental quality and resources

Recognition of the relationship between environment and health has increased. This is especially true of those countries undergoing industrialization where traditional sanitation services and facilities are unable to cope with industrial wastes.

Traditionally, sanitation services have directed their activity largely toward the prevention and control of communicable diseases transmitted through physical environmental elements: water and human wastes. These concerns are still of primary importance in LDCs but, in industrializing countries as well as in the urban sectors of LDCs, control of water and air pollution, noise, accident reduction, and the improvement in housing and physical planning receives increasing emphasis. Concern is being voiced also about the social and psychological factors associated with crime and delinquency in the overcrowded and deteriorating squatter areas or slums.

a. Water supplies "There is probably no factor that has a greater effect on the health, well-being, and development of a community than the provision of an ample and convenient supply of good quality water" (U.N., 1971:167). To amplify this observation the same report cites a delegate from an Asian country attending the 1969 World Health Assembly who estimated that waterborne diseases were directly responsible for 40 percent of all mortality and 60 percent of all morbidity in his country.

The importance of a suitable water supply for towns and cities is given wide recognition because it is so vital for street cleaning, sewage
disposal, fire fighting, and industrial uses. Provision and maintenance of rural water supplies has been given much less attention and constitutes a problem of great magnitude. According to U.N. (1971:168) estimates, "... at any one time the number of people suffering from disabling disease due to lack of clean water is not less than 500 million." In developing countries it is estimated that the proportion of rural dwellings served with safe water is in the neighborhood of 10 percent. The Second United Nations Development Decade has set a target of raising this figure to 20 percent at an estimated cost of $1,600 million, three quarters of which the countries will be required to raise themselves. The plight in regard to water supplies is grave when one considers that more developed countries are faced with deteriorating supplies as a result of chemical and bacteriological pollution.

1) Data sources Few countries, regardless of their stage of development, collect, analyze, or report data on water supplies. As a result, attempts to provide safe water supplies--a high priority among U.N. development programs--are hampered. Referring specifically to community water supplies, WHO (1972:7) points out that data on the following subjects are frequently lacking:

Demography (population statistics, social information relating to existing and future water demands);

Health (the endemicity of water-associated diseases and conditions likely to cause epidemics);

Existing installations (the technical and financial soundness of present facilities);

New sources (the quality and quantity of possible new sources);
Criteria (for the design and performance of installations);

Costs (unit costs of constructing, administering, operating, and maintaining installations); and

Benefits (to health, social welfare, and economic development—preferably in economic terms—resulting from new and improved water supplies).

Data gathering and processing is expensive and only data likely to be useful should be collected. This principle applies to all data gathering situations in LDCs.

Information on community water supplies is needed at the local level "... for planning, designing, and constructing installations; management and supervision; the procurement of funds; public information and securing community interest" (WHO, 1972:9).

At the national level, data are needed for planning of community water supply policies as well as for monitoring and evaluation. National programs require data on:

Demography;

Quantity and quality of water resources;

Financial matters, to enable budgets to be prepared and to justify the deployment of national financial resources;

Approval for obtaining or providing loans;

Calculating the proportion of external funds needed;

Manpower needs;

Training programs;

Undertaking programs to prevent the pollution of water supplies;

Research and development programs.
In conjunction with health statistics these data will be useful in justifying the need for better water supplies and the surveillance of water quality.

International agencies need data to plan the allocation of their support for community water programs as well as to evaluate their impact. Since the demand for such funds far exceeds the supply, data need to be carefully collected and presented so that priorities can be identified. Data to establish the viability of proposed water schemes are often lacking in LDCs and so areas in dire need may fail to benefit from international financial and technical assistance.

The WHO (1972:11) suggests that pertinent data may be acquired from the following agencies:

- National planning agency and the planning departments of the institutions responsible for community water supply
- Ministry or other agency responsible for environmental health; the control of pollution and surveillance of water quality; and urban and rural community water supply programs
- National, regional, state, and local water authorities; semiautonomous bodies or private companies supplying water
- Financing institutions or lending agencies (such as national and international banks); bilateral and multilateral agencies; national, state, or provincial subsidizing agencies; and local financing organizations
- Bilateral and multilateral technical assistance organizations
- National, state, and local organizations for the management, administration, operation, and maintenance of water supply schemes
Governmental and private construction agencies

Housing agencies

Census bureau

Agencies responsible for hydrological, meteorological, and geological surveys

Land surveyors

Government departments of industry, decentralization, relocation, and industrial development

Legal departments

Firms of consultants

The importance of water supply data and the diversity of sources from which it may need to be gleaned suggests the need for national or regional centers on water resources in order to coordinate information. It is also well to reiterate at this point that much of the information on requirements of a water supply will be based on population statistics (census bureau) and statistics on morbidity, mortality, and water quality (ministry of health).

b. Waste disposal and air pollution The problem of waste disposal, so long a relatively neglected topic in developed countries, has commanded increasing attention in recent years. This development has come about in recognition of the social and economic importance of proper waste management. The health consideration is of primary importance but industrial growth, urbanization, the fishing industry, and tourism are all part of this picture.

Air pollution is a growing problem in most big cities mainly as a result of the volume of motor traffic and the number of industrial plants.
Changes in atmosphere conditions are associated with sharp fluctuations in air pollution. When sudden increases occur, those have been shown to be causally related to increases in mortality and morbidity. Also, a growing body of evidence indicates that air pollution has delayed effects in the form of bronchitis and possibly lung cancer.

4. Agriculture and food production

Farming is the main livelihood of most people in LDCs. In many cases, however, agricultural production is insufficient to meet domestic food demands. A common reason is that only a fraction of the arable land is under cultivation. Production from the area in cultivation can be increased considerably by better management techniques in cultivating, draining and irrigating, fertilizing, using better varieties, pest control, and more careful harvesting and storage.

Agricultural production has shown large increases in recent years and there is considerable potential yet to be exploited. However, the increases in production are barely on par with the demand created by population growth.

An appraisal of the adequacy of increased production can be made by comparing food production with population increases (Table 2 uses Thailand as an example).

It appears that food production is inadequate to meet the minimum nutritional requirements of the population and, furthermore, the increases in agricultural production are largely offset by population growth.
Table 2. Food production and population growth: Thailand

<table>
<thead>
<tr>
<th>Year</th>
<th>1961</th>
<th>'62</th>
<th>'63</th>
<th>'64</th>
<th>'65</th>
<th>'66</th>
<th>'67</th>
<th>'68</th>
<th>'69</th>
<th>'70</th>
<th>'71</th>
</tr>
</thead>
<tbody>
<tr>
<td>Index of food production</td>
<td>91</td>
<td>98</td>
<td>105</td>
<td>102</td>
<td>105</td>
<td>121</td>
<td>106</td>
<td>115</td>
<td>124</td>
<td>127</td>
<td>128</td>
</tr>
<tr>
<td>Total agricultural production</td>
<td>91</td>
<td>96</td>
<td>106</td>
<td>102</td>
<td>107</td>
<td>124</td>
<td>108</td>
<td>115</td>
<td>125</td>
<td>128</td>
<td>130</td>
</tr>
<tr>
<td>Per capita food production</td>
<td>97</td>
<td>101</td>
<td>105</td>
<td>99</td>
<td>98</td>
<td>111</td>
<td>94</td>
<td>99</td>
<td>104</td>
<td>102</td>
<td>100</td>
</tr>
<tr>
<td>Per capita total agricultural production</td>
<td>97</td>
<td>99</td>
<td>104</td>
<td>99</td>
<td>101</td>
<td>113</td>
<td>96</td>
<td>99</td>
<td>104</td>
<td>103</td>
<td>103</td>
</tr>
<tr>
<td>Total population (millions)</td>
<td>28.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>31.7</td>
<td>32.7</td>
<td>33.7</td>
<td>34.7</td>
<td>35.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In many countries the production and distribution of agricultural produce is further curtailed by inadequate marketing and distribution systems.

a. Data sources

1. FAO food balance sheets. FAO first published its food balance sheets for 41 countries in 1949. In 1954 annual balance sheets were discontinued and three-year-average food balance sheets were substituted showing production, available supply, feed, and manufacture as well as per capita food supplies available for human consumption in quantity, caloric value, and protein and fat content.

A prewar World Food Survey (FAO, 1946) and two postwar World Food Surveys (FAO, 1952; FAO, 1963) were conducted in which ad hoc procedures were used in the preparation of balance sheets for some countries. The statistical information used in FAO's Indicative World Plan for Agricultural Development (FAO, 1969) was mainly derived from 1961-1963 average food balance sheets which were prepared for 64 developing countries.

FAO has extended the scope of its work on food balance sheets "... to meet the statistical needs of FAO's contribution to the review and appraisal studies for the second U.N. Development Decade" (FAO, 1971:vi). In view of this objective, food balance sheets for 132 countries were assembled for the 1964-1966 period.

Food balance sheets provide an outline of the stocks and flows related to the supply and utilization of foodstuffs during a given period.
Making up the supply side are production, imports, and net changes in stocks. Use is categorized as export or domestic. Domestic use is divided between food and nonfood purposes. The nonfood category comprises feed, seed, industrial usage, and waste in storage and transportation. Estimates are thus obtained of the quantity of food available for human consumption.

In the preparation of food balance sheets, the FAO uses all available statistics from countries on the production supply and utilization of foodstuffs. Such statistics "... vary a great deal between countries both in terms of coverage as well as in accuracy and, in fact, there are as many gaps particularly regarding the statistics of utilization for nonfood purposes such as feed, seed, and industrial uses as well as those of farm, commercial, and even government stocks" (FAO, 1971:vii). Averaging out over a three-year period is considered by FAO as overcoming some of this inaccuracy. Considerable improvement in accuracy can also be made through field surveys.

Consistency checks are used extensively in the preparation of food balance sheets. Food balance sheets then, while being less than statistically accurate in many cases, provide a good approximation of the food situation and may be used in economic and nutritional studies as well as in the preparation of development plans. FAO (1971:viii) also expresses the hope that "... through identification of major gaps in available data the improvement of national statistics at the source will be stimulated."

Classified under the heading of per capita food consumption in the balance sheets are estimates of per capita food supplies available for
consumption for a given period in terms of quantity, caloric value, and protein and fat content (Table 3). In calculating caloric value and protein and fat content of per capita food supplies, various expert resources and food composition analysis standards are used.

2) FAO production yearbook  The FAO Production Yearbook contains annual data on many aspects of food and agriculture including population, index numbers of agriculture and food production, food supplies, prices, freight rates and wages. These data are supplied to FAO by governments in reply to an annual questionnaire. Where no official figures are available from particular countries, FAO makes estimates of area and production of major crops and livestock numbers and products. The publication of these estimates gives the countries concerned a change to examine them, pass judgement as to their accuracy and if necessary, to propose revisions.

5. Income and consumption

Those factors influencing the nutritional state of the population and those which determine socioeconomic development are closely interrelated. The quality and quantity of food consumed by a family is dictated by availability, cost in relation to income, acceptability, and the degree of development of the distributional structure in the economy.

Nutritional state is also influenced by the degree of literacy, cultural and religious taboos, development of environment sanitation, and the extent to which a cash economy has emerged, as well as the degree of urbanization. As family income increases, the diet will undergo some
Table 3. Food sources and supply per capita: Thailand and United States

<table>
<thead>
<tr>
<th>Country and year</th>
<th>Cereals</th>
<th>Potatoes starchy and other staples</th>
<th>Sugars and sweets</th>
<th>Pulses nuts and seeds</th>
<th>Vegetables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thailand 1964-66</td>
<td>446</td>
<td>62</td>
<td>30</td>
<td>48</td>
<td>101</td>
</tr>
<tr>
<td>Compare with U.S.A. (1963-65)</td>
<td>179</td>
<td>141</td>
<td>131</td>
<td>22</td>
<td>302</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country and year</th>
<th>Calories</th>
<th>Proteins</th>
<th>Total animal protein</th>
<th>Total protein</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thailand 1964-66</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1605</td>
<td>66</td>
<td>119</td>
<td>130</td>
</tr>
<tr>
<td>U.S.A. (1963-65)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>652</td>
<td>97</td>
<td>505</td>
<td>103</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Country and year</th>
<th>Total animal protein</th>
<th>Total protein</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thailand 1964-66</td>
<td>12.3</td>
<td>50.5</td>
</tr>
<tr>
<td>U.S.A. (1963-65)</td>
<td>66.4</td>
<td>93.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fruits</th>
<th>Meat</th>
<th>Eggs</th>
<th>Fish</th>
<th>Milk</th>
<th>Fats and oils</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quantity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>137</td>
<td>37</td>
<td>10</td>
<td>24</td>
<td>18</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>239</td>
<td>276</td>
<td>50</td>
<td>17</td>
<td>669</td>
<td>59</td>
<td></td>
</tr>
<tr>
<td>Calories</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>73</td>
<td>83</td>
<td>15</td>
<td>37</td>
<td>17</td>
<td>43</td>
<td>2210</td>
</tr>
<tr>
<td>99</td>
<td>598</td>
<td>72</td>
<td>26</td>
<td>40</td>
<td>520</td>
<td>3140</td>
</tr>
<tr>
<td>Proteins</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.0</td>
<td>4.4</td>
<td>1.1</td>
<td>6.2</td>
<td>0.6</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>34.1</td>
<td>5.5</td>
<td>3.3</td>
<td>23.5</td>
<td>0.1</td>
<td></td>
</tr>
</tbody>
</table>
restructuring with the total expenditure on food increasing but the proportion spent on food tending to decrease.

The socioeconomic development index developed by the United Nations Research Institute for Social Development (1970) was compared with mortality rate in the age group one to four years and a strong inverse correlation was noted (FAO/WHO, 1971b:48). It is inferred that malnutrition in this age group is closely related to family socioeconomic level.

6. Housing and shelter

Housing conditions in LDCs generally show great extremes in quality. These conditions range from the dilapidated shacks of subsistence farmers and the hurriedly constructed shelters of urban migrants to the quality housing of the rural and urban upper social classes. The use of mud walls and floors and thatched roofs is common among rural dwelling structures throughout many countries. Generally speaking, water and sewage facilities are inadequate and the contamination of food and water supplies through seepage of human wastes, insects, and rodents is a common occurrence. The lack of drainage around dwellings and stock houses results in stagnant water pools which provide a breeding ground for insects. Similarly, earthen walls and thatched roofs cannot be cleaned as adequately as other materials and thus they become havens for disease-carrying insects and animals.

Lack of lighting--either window openings for sunlight or artificial lighting--is also characteristic. Damp proofing in floors and walls is
generally nonexistent and construction materials are often flammable thus constituting a serious health hazard.

The often crowded unsanitary conditions in such housing, whether in rural areas or urban areas, provide conditions in which such diseases as tuberculosis thrive.

The U.N. (1962) proposes a number of indicators of housing conditions. These are divided into basic and supplementary, the former referring to generally accepted housing qualities such as protection against weather, the safeguarding of privacy, a protected water supply, and the provision of sanitary facilities. The supplementary indicators are designed to provide more detail on housing conditions with one an "index of dwelling construction in relation to estimated requirements."

The total list of indicators outlined by U.N. (1962) is:

a. Basic indicators

Percent of population living in dwellings

Percent of occupied dwellings with three or more persons per room

Percent of occupied dwellings with piped water inside the dwelling or outside the dwelling but within 100 meters

Percent of occupied dwellings with toilets

b. Supplementary indicators

Percent of the population living in housing units classified as "rustic," "improvised," "not intended for habitation," or which is without shelter of any kind

Average number of persons per room (for occupied dwelling only)
Percent of occupied dwellings with flush toilets (urban)
Percent of occupied dwellings with toilets other than flush
Index of dwelling construction in relation to estimated requirements

These indicators are intended to be descriptive of "actual housing conditions as a component of levels of living" (U.N., 1962:1) and must be viewed within their context of climate, culture, degree of urbanization, and the demographic, economic, and social structure. No single one of these indicators provides adequate descriptive and analytical information on housing conditions. In this sense the list should be viewed as a set.

The U.N. Statistical Yearbook tabulates data on housing for each country as follows:

Households
Number
Average size (persons per household)
Tenure of household
   Percent owner occupants
   Percent renters

Conventional dwellings
Total number
Number occupied

Occupied conventional dwellings
Size
   Average size (rooms per dwelling)
   Percent of dwellings with:
      1-2 rooms
      3-4 rooms
      5-6 rooms
      7 rooms or more

Density of occupation
   Average density (persons per room)
   Percent of dwellings with persons per room:
      Less than 1.5
      1.5 or more
      2.0 or more
      3.0 or more
Facilities
Percent of dwellings with:
Piped water inside or outside
Piped water inside toilet (any type)
toilet flush
fixed bath or shower
electric lighting

Data for construction of indicators of housing conditions are obtained from (1) census of housing, (2) housing surveys, and (3) current housing and building statistics. Data are frequently reported missing for many of these classifications in the U.N. Statistical Yearbooks leading us to conclude that most countries do not have detailed data on their housing situations.

7. Other related concerns

Only relatively recently has criticism been voiced at the absence of or low priority given to health and education in national development planning.

The interdependence of health and education can be demonstrated in many ways. If educational services are available or accessible to a child, his state of health will determine how efficiently he can use such services if at all. Furthermore, the ability of potential labor force members to use their skills to their own and to society's advantage is dependent on the individual's state of physical and mental health.

The knowledge people have about health practices and their attitudes toward such practices determine the improvements that can be effected in health in any given time period. Pointing out that development in the
areas of health and education depends largely on societal attitudes and institutions, Myrdal (1968:1535) expressed the view that only broad social reforms can bring about significant changes in health and education. In effect, then, health planning cannot be effective if it is attempted in isolation from the broader development process. Food production, education, population control, and reduced poverty—to mention but some of the factors—are intricately related to improved health status.
VII. INCOMPLETE DEMOGRAPHIC DATA

As outlined earlier in this study, the categories of statistical information required for comprehensive health planning are:

1. Demographic and vital statistics

2. Health statistics; information on:
   - Causes of death, morbidity
   - Distribution of health status
   - Environmental factors with influence on public health
   - Availability and utilization of health services
   - Health personnel, training facilities
   - Cost, by type of service provided

This chapter deals briefly with the problem of providing useful demographic and vital statistical information where data systems are incomplete.

Two types of information are essential for the description of the main demographic processes of populations and population subgroupings: **Stocks and flows.** Stocks refer to the number of persons at a given point in time appropriately classified by characteristics (sex, age, socioeconomic status, and geographic area). Data of this type are collected in the census of population. Flows refer to events (births, deaths, and migrations) which change the population in terms of its size, structure, and composition as well as geographic distribution. Data on flows have been collected in developed societies through a system of vital registration.

The discussion throughout this study may give the impression that demographic data are generally available in most countries. This is far from the true situation. As Shryock and Siegel (1973:810) point out, the
deficiency in demographic data may be seen as a part of underdevelopment, and significant progress toward better data is likely to occur only as a concomitant of general social and economic improvement. To purposively speed such development, it is necessary to make the best possible use of any available statistical information and to attempt to improve and supplement it as it becomes feasible to do so.

The improvement of existing systems of social information in LDCs might be viewed as simply a matter of putting into operation the procedures in use in developed countries. However, many difficulties exist in such a transition, foremost of which is the great financial cost. Experiences in some LDCs would indicate that in many cases even if such expenditures were made, success in the shape of a reliable social information system may not logically follow. This is true because a high degree of voluntarism is required of such systems to operate effectively and to provide reliable information, and the reliability of a system of vital registration of any description is often viewed with suspicion even in developed countries. It is also recognized that even where census and vital registration systems are established these will be found wanting in relation to the more stringent standards required for description and analysis which social indicators are designed to address.

Further difficulties arise in constructing even simple indicators from existing census and vital records. For example, in the calculation of a mortality rate, the analytical usefulness of the rate will depend on how well we are able to disaggregate or delimit both the denominator (or
population at risk) and the numerator (or number who actually died during a given period). It may be assumed that classification by sex will be common but classification by age will be much more difficult to find. For socioeconomic variables, this difficulty is likely to be even more pronounced. The reason for such discrepancies may be that vital registration and census enumeration are planned and administered quite independently. Required and corresponding classifications such as sex, age, and socioeconomic status may not be recorded in both sets of records or even when they are, they may be independently biased to such a degree as to limit their usefulness.

A. Interim Alternatives

Faced with such considerations interim alternatives to the more elaborate systems of vital registration must be sought if current and future planning is to be given the guidance it requires.

1. Sample surveys

The obstacles to developing a system of social information based on combining census and vital records has tended to focus attention on using sample surveys together with census information or on sample registration systems with sample surveys.

In general, developing countries are more likely to have survey or census-type data than vital statistics. Census-type data will tend to be of better quality than vital statistics even where the latter are available (Swaroop, 1960; Waterston, 1969a). This fact has resulted in
considerable effort being expended by demographers toward the wider and more imaginative usage of census and census-type data.

The census gives essentially a cross-sectional view of the population and certain of its characteristics. However, some inferences about the dynamics of the population and its characteristics can be derived from census-type data provided data from one or more censuses are available. A further recent development in census-taking techniques is the use of recall-type questions (questions requiring recollection of events which have occurred in the past) in order to reconstruct the time sequence of intercensal events. In this way it is possible to approximate functions which would normally be provided by vital registers. The technique of developing longitudinal or flow-type data using cross-sectional procedures has long been used by survey researchers and would appear to have some possibilities in making greater use of censuses and census data. However, greater expense is incurred in eliciting retrospective information since large numbers of more highly skilled field personnel are required because of the high incidence of illiteracy among the respondents in developing countries. In view of this, sample surveys appear to offer a more feasible solution to obtaining retrospective data. When carefully planned they can supplement and complement the census and in so doing may substitute temporarily for vital records.

The sample survey has several advantages over the census in the collection of recall or retrospective data. It is more flexible, easier to report, can have a humanly oriented content, can incorporate subjective
elements, and produces usable data in a shorter time span at much less cost. In addition, where the sample design is valid for the total population, the findings can be generalized. All of these are important attributes, many of which are often lacking where the data are obtained from complete national censuses coupled with vital records of doubtful quality.

2. Population registers and panel studies

Besides limited or sample vital registration and survey techniques other procedures might be adopted where census and vital statistics data are inadequate or incomplete; examples are population registers and panel studies (i.e., surveys that are repeated over time using the same or similar samples of respondents). The limitations of these latter procedures both in terms of cost and information yielding potential are such as to relegate them to minor consideration. Thus the most feasible procedures appear to be: (a) those which use census or survey data alone and through demographic models and other analytical techniques generate information otherwise not available; and (b) the use of data from sample registration areas which may then be linked with cross-sectional data available from census or survey sources (Shryock and Siegel, 1973:812).

Where available data per se are insufficient, lacking, or defective, demographic models may be used as "tools of estimation." Shryock and Siegel (1973:812) claim that ". . . the judicious use of models is indispensable in checking and adjusting data, in filling gaps in the available records, and in deriving reliable estimates from fragmentary
pieces of evidence each of which may be defective if taken in isolation."

Model life tables and model stable populations are particularly useful in this regard.

B. Demographic Models

1. Model life tables

The construction of life tables must be based on reasonably reliable data on age specific mortality. In developing countries such data are rare. In these circumstances life tables available for countries which may reasonably be assumed to have similar patterns of mortality might be used. Based on such a rationale, the United Nations (1955b and 1956) has documented a set of model life tables.

Coale and Demery (1966) developed four sets of regional model life tables, designated as "north," "south," "east," and "west," referring to the mortality patterns in distinct regions of the world. In each set are 24 tables with separate calculations for males and females. The decision as to which model to use is based on some substantive evidence that the country under study tends to have mortality characteristics approximating those of a particular model.

2. Model stable populations

If it can be realistically assumed that a population is stable based on the age structure and distribution observed in consecutive censuses, the stable population model permits the estimation of population characteristics where available demographic statistics are deficient. All
available statistical information is used to construct a stable population and then values within the stable population are used as estimates of corresponding parameters in the actual population. Shryock and Siegel (1973:816) state that the usefulness of this technique lies in the fact that a stable population can be constructed on the basis of fragmentary data and once such a model is developed and its parameters used as estimates of the real situation, it is possible to obtain "... a whole series of sophisticated measures for which no direct information exists at all in the actual population." It may, however, be difficult to approximate the real situation either because the available data are too deficient and fragmentary or because the stable model may be a poor representation of the actual situation. The latter can result from the effects of sex selective migrations or such unusual conditions as epidemics and wars even where fertility and mortality are constant. Much of what is known of world population trends and characteristics can be attributed to the development and use of model stable populations.

Procedures for devising model stable populations together with examples are found in Coale and Demery (1966) and United Nations Manual IV (1967b) as well as in Shryock and Siegel (1973).

Life tables are required in using stable population techniques but if data are so deficient as to require these latter techniques, it is unlikely that actual life tables will be available. Regional model life tables are most often used.
C. Methods of Estimation Based on Censuses and Surveys

1. Estimates based on two or more censuses

In many LDCs vital records are seriously inadequate or lacking altogether. However, if these countries have conducted one or more censuses or if one or more demographic surveys have been taken, certain techniques can be used to measure dynamic aspects of population. Such techniques are contingent on the types of flows to be measured and on the type and quality of data available.

Vital rates may be estimated where population data are available for two or more censuses by observing the intercensal population growth rate and the survival rates. For example, if census data are available classifying the population by sex and age and if age classifications are by five-year intervals, it will be possible to identify the members of a five-year birth cohort surviving and hence the effect of mortality on the cohort assuming, of course, that migration has a limited or known effect. Estimates of vital rates based on two consecutive censuses require an analysis of the population by age distribution in both censuses so that age specific survival rates and population growth rates can be calculated.

Using data from two or more censuses alone, intercensal deaths for the population under ten years (assuming a decennial census) cannot be accounted for. However, by using model life tables and assumptions based on the census enumerations, it is possible to estimate crude death rates and crude birth rates.
2. Retrospective reporting

The use of retrospective census or survey reporting (i.e., the recording of information about events which have occurred during a past time period) on childbearing to estimate fertility is a very practical means of providing information on vital events. Data on vital events collected in this manner have a number of attractive features including low cost and the fact that vital events and the population at risk--the numerator and denominator, respectively, in rates or simple indicators--are linked on the one set of schedules. We have already indicated that the cost will be higher than that involved in a census without retrospective questions but because it supplies information on vital events as well, the cost in relation to overall information yield can be relatively low.

These attractive attributes of retrospective census and survey procedures are contingent on the accuracy of recall data. In the process of recall, the respondent may have some difficulty in locating events in time so that under or over-reporting for a specific time period may result. This will be especially true of births. A technique is, however, available (Brass, 1968) for estimating the average time distortion in reporting. In respect to deaths an additional bias is introduced because of differential importance is attached to deaths of individuals depending on several of their attributes and characteristics, especially age. Also duplication of retrospective death reporting is likely since, unlike reporting of births where only women of childbearing age supply information
in relation to themselves and their children, any of a number of respondents may report the death of a particular relative.

Questions used in retrospective reporting on fertility for women over 15 years of age refer to number of births occurring during a specified time, number of children still alive, and number of children ever born. A measure of child mortality can thus be obtained but is likely to be characterized by under-reporting. A method is, however, available (Brass, 1968) through which correction can be made for bias and transformation of such information into a more conventional mortality index can be achieved.

Fertility may be estimated from data on child mortality and the age distribution of children and, with more detailed retrospective questioning, pregnancy histories can be outlined. In this fashion estimates of fertility and mortality may be obtained.

D. Data Requirements for Censuses and Surveys

Censuses and surveys are often designed according to descriptive administrative requirements and their substantive content and data tabulation and publication formats may not lend themselves to the analysis of key development problems. Available census and survey data must meet certain minimum criteria in order to be useful. We have already indicated that many of the deficiencies in census and survey data in relation to analytical requirements are a result of lack of coordination between the purposes for which surveys and censuses are designed and the purposes for which demographic data are being increasingly required. In some cases it may be relatively easy to rectify this deficiency.
It is important that data collection procedures be designed to allow the same indicators to be constructed using alternative methods, and that it be possible to use checks within the methods themselves (Shryock and Siegel, 1973:832) like, for example, being able to estimate and compare male and female birth rates.

For the estimation of vital rates using census or survey data, it is possible to outline minimum required classifications. These are (Shryock and Siegel, 1973:832):

1. Population by age, sex, and marital status;
2. Women by age; and total number of children born alive for each age group of women;
3. Women by age; and total number of children living, for each group of women.

There is no universally valid set of subdivisions or categories in addition to these that should be sought. However, it is recommended (U.N., 1967a and 1964) that data allow subdivision by geographic area, socioeconomic status, and by such social demographic categories as race, religion, and language.

E. Sample Registration

Sample registration is one way of obtaining the required detail. It may be designed so that it is representative of the entire population. Since the number of skilled personnel needed to operate such a system can be relatively small, only the most competent staff need be hired and the system can operate relatively economically. However, census and survey-type data on population stocks are needed to complement sample registration data for analysis of social concerns.
Some of the data obtained in sample registrations are also obtainable through sample surveys and censuses, and thus it may be possible to do some cross-checking of data provided the systems of data collection operate independently.

F. Long-Term Demographic Data Requirements

Where vital records are incomplete or deficient the most economical and timely approach to development of indicators of vital events will be through estimation procedures using census and surveys. The development of measures in such a fashion constitutes an interim procedure which can yield valuable trend information. But analytical studies on health, for example, require in many cases much more detailed data on age and cause-specific death rates, much of which can only be accurately obtained from a continuous vital registration system in combination with census and survey data.
VIII. SUMMARY AND DISCUSSION

The present study, an outgrowth and continuation of previous development in the design of a social monitoring system (Wilcox, et al., 1972; Wilcox, et al., 1973; Wilcox, et al., 1974), addressed the methodological problems involved in developing a health information system for an LDC.

The methodological approach suggested in this dissertation seeks to view health--a component of social development--within the framework of the priority problems confronting development planning. The major objectives of this methodological perspective were:

1. To identify the principal dimensions or priority social concerns within the health sector.

2. To identify priority information needs, the provision of which may facilitate rational decision making relative to specified health concerns.

3. To identify available statistical series that constitute quantitative measures for each dimension.

4. To identify methodologies to bring these series together into sets of indicators for analysis of each dimension.

5. To suggest a reporting system to monitor the change in each dimension over time.

Since this study was ultimately concerned with the development of a methodology which will assist LDCs to improve the health component of their own social information system, we were concerned with first evaluating the feasibility of some development planning models and assumptions; the data gathering procedures currently employed; the information content which different sources yield; the manner in which such information is made available; and how it is used in the LDC situation.
To deal adequately with the range of indicators it was felt that should be incorporated, classifications of measures were developed using as guidelines the work of organizations and agencies in the U.S. (HEW, NCHS, and OMB) and on the international scene (WHO, FAO, and OECD). These were viewed as constituting a somewhat idealistic statistical information system as far as LDCs are concerned.

Additionally, in the evaluation of existing data and data sources the standards and recommendations of various organizations (U.N. and U.S. Bureau of the Census) in relation to censuses, vital records, household and health surveys, and institutional records were used. Using such guidelines and considering the limits of the data available it was felt necessary to reach some decision as to the minimal data requirements for rational decision making. This study constitutes the conceptual and preliminary methodological steps towards such a goal, and the sequence of indicators in the summary framework in Appendix A is suggestive of the priorities in the development of health indicators.

A. Indicators of Social Development

Traditionally the main basis for national statistics was a narrow range of government and business needs. These needs remain but most countries are experiencing a broadening of governmental functions together with the concomitant data requirements for guiding the more comprehensive and detailed economic and social policy decisions and for monitoring social and economic conditions at the national and subnational level.
The governments and publics in many countries are devoting increasing attention to a broader concept of development. In addition to the achievement of economic well-being, much more attention is being given to the quality of life and the solving of social ills and inequities. Policies aimed at pursuing these objectives are being actively developed and set in operation by national, regional and local governments. In the midst of such planning activities, the need for more and better statistics for purposes of assessing social conditions and monitoring social changes has come to the forefront.

Social statistics have, up to the present, been mainly by-products of a few specific government programs. It is felt that these series, however, must be reexamined against criteria of scope, validity and relevance to current issues and with a view to identifying the more serious informational gaps.

The development of new social statistical series in many countries might be viewed as an attempt to bridge the major gaps in existing information corresponding with emerging areas of social concern such as health, education, nutrition, population growth, crime, and rural development. New programs aimed at measuring various specific concerns are being actively developed. These new initiatives include the exploration of improved methods of social reporting and the development of a wide range of social statistics.

Side by side with the effort to achieve better planning and organization of social statistics is the international effort to develop a system of social indicators for those specific concerns embodied in the
main areas of social concern or goal areas of social development planning.

Primarily these social indicators are likely to be simple rates, ratios and proportions selected and organized in such a way as to describe social conditions and identify social trends for the nation and more importantly for substantial territorial and population units.

The methodology being proposed and developed in the project this study is a part, is designed with several broad procedural objectives. Primarily the aim is to identify, evaluate, and integrate from current social indicator research in the U.S. and elsewhere those methodologies and indicators which appear most useful to the management processes of development planning in less developed countries. Secondly, it is hoped that in addition to these tasks, the comprehensive and simultaneous consideration of the many different areas of social concern which this methodology embodies can be organized and presented in such a way as to become an heuristic framework around which any country may set out to develop its own social statistics programs.

The major development planning areas which different countries are building their statistical programs around are very similar. Within these broad areas, however, specific concerns are likely to differ from one society to another. The society specific concerns to be defined and measured should go beyond the immediate short term and acute problems and attempt to deal with the chronic established and emerging problems of the total society and of relevant subcategories of society. The
resulting set of social concerns (and their measures) should encompass most of the important social issues and should portray conditions that are presently or are likely in the future to be dealt with by appropriate social policies. The concerns and their associated measures are thus related to widely held social objectives.

Development planning and decision making in many countries is decentralized and the localized nature of some problems as well as the allocation of resources and responsibilities on a regional and local basis has raised to a priority status the need for statistical information on subareas and subcategories within nations.

The combination of national and subnational concerns and the proliferation of local responsibilities demands cooperation in many aspects of developmental activities. For example cooperative effort is required between national, regional and local agencies in the development of statistical series. The statistical agencies in turn must be responsive to the needs of policymakers.

B. Emerging Trends in Development Planning

The tendency on the international front to make comparisons on the basis of economic concepts directs attention to other than the most important ideas in development. Further, there is good reason to believe that the goal of nearly equal economic status for all nations in the foreseeable future is quite unrealistic, but the pursuit of this mythical state of affairs serves as a diversion from attempting to bring about--internationally and intranationally--a greater degree of balance in social development.
There is a need to expand the definition of development from the present emphasis on economic growth—where the societal unit is generally the unit of analysis—and focus more directly on categories of people and articulate the possibilities of attaining the greatest and most equitable levels of well-being consistent with the prevailing economic, social, political, cultural, and physical constraints. There are claims of some initial moves in these directions which may be considered under the headings of planning comprehensiveness and flexibility.

1. Comprehensiveness

There is evidence of a much greater emphasis on the comprehensiveness of development planning. However, the use of both social and economic indices as inputs in planning is not new, even in LDCs. What is new is both the attempts to broaden the scope and increase the integration of social, political, economic, behavioral and physical issues in policy making, planning, and programming.

The emergence of such comprehensiveness and integration recognizes that development planning is a broad operational methodological process which must take into account all relevant components of the developmental milieu. In the sense that planning is regarded as an operational methodological process, the preparation and content of plans are but small components of the total process.

Comprehensiveness in planning also entails an effort to incorporate and integrate national, regional and local perspectives and issues. While in essence national plans are built up from policies and programs
aimed at regional or local problems (or issues), planning in relation to local issues must take regional and national perspectives into account.

The tendency to see planning as independent of political, economic, cultural and other feasibility considerations is recently under severe criticism. It is possible to draw up plans in such circumstances of isolation but the realities of effective implementation demand that all possible situational factors be taken into account.

2. Flexibility

There is a growing recognition of the need for flexibility in the total planning process. Society is becoming more and more regarded as a dynamic entity so that the usefulness of long term fixed goals, static plans and repetition in programs and policies are being increasingly questioned.

Priority attention to the more immediate problems of development and the adding together of these in order to structure a total planning perspective to deal with them is gaining more advocates in the planning literature. Long range goals and objectives must still be given a high priority but not a monopoly status.

The provision of solutions to more immediate social problems gives rise to considerable interest in short range planning. The mere accumulation of short range plans and programs, however, provides only a very insecure framework for development planning in which long range goals may be lost sight of.

Thus rather than advocating short range or long range planning per se, the consensus appears to be that a perspective is supplied by long range
plans or sets of goals and objectives. However, the short term allocation of resources to immediate problems needs to be more than just that. It requires the guidance of middle range policies. These policies become the building blocks of the development planning process and incorporate the more specific activities devoted to specific problem solving.

In this perspective then a social development plan would integrate long and short term objectives, the entire set of social policies, the budget financial planning and the actual and alternative procedures for problem solving.

C. Monitoring Health

Society may be conceptualized as a social system or interdependent set of subsystems each contributing a unique set of functions essential to the survival and well-being of the overall system and its members. It follows from this definition that change in any one subsystem affects other subsystems and the larger system. Thus, for example, improved health status should be reflected in better work performance in the industry subsystem, better learning performance in the school subsystem, and a more optimistic outlook on life in general.

The extent to which health statistics are available for any country or its regions and areas depends to some extent on the degree of development of public health services. An exception may be that in some cases vital statistics are produced despite the absence or the inadequacy of the development of public health facilities.

Health statistics in LDCs are characterized generally as suffering from two major defects: (a) incompleteness of reporting and (b) inaccuracy
in diagnosis due to lack of professional opinion. This is especially likely to apply in rural areas or among the more deprived groups.

In Chapter IV of this dissertation we outlined the major sources of data health planners might use and discussed their more important characteristics and items of content in relation to standards and recommendations proposed by the United Nations and other agencies.

Statistics related to the health status of individuals were examined. Five dimensions of health status—mortality, life expectancy, morbidity, disability, and malnutrition—were identified and suitable indicators outlined.

It was pointed out that where health status data are available in LDCs, they generally are descriptive of very selective population groups. This is due to problems of population distribution in relation to location of facilities and services, and problems of access to these facilities and services attributable to such variables as socioeconomic status, cultural background (including religious beliefs), and level of education.

In Chapter V the sources of health care statistics were discussed. Statistics related to health facilities, services, and personnel were examined as well as those activities directed toward the improvement of the health status or condition.

In Chapter VI factors of a physical, environmental, social, or economic nature which have a direct or indirect bearing on the health status of the population were examined. Included among these are population (size, growth, density, and distribution); education; agriculture
and food production; environmental quality and natural resources (including water supply); income and level of consumption; and housing and shelter.

In Chapter VII the problems of providing useful demographic and vital statistical information where data systems are incomplete were discussed. It was pointed out that the procedures outlined constitute an interim approach, and in the long run much more detailed data will be required for the analytical study of health problems.

A summary framework relating the items of data, classifications, data sources, and social indicators suggested in this report in respect to health status and health care are set out in Appendix A, and research uses for social indicators—other than policy planning—are outlined in Appendix B.

D. Implications

Recent efforts to develop social indicators arose from a recognized need for better social information in social planning and from a desire to make a wider range of social scientific knowledge and expertise relevant to social policy considerations. The thrust of these objectives has placed new demands on all social scientific disciplines but more specifically on the discipline of sociology. In response to these new demands sociological involvement in social indicator research has confronted two major tasks. The first is the problem of refocusing sociological theory and methods toward more applied problems than have normally been of concern to traditional modes of sociological inquiry. The second has been a growing awareness that sociological knowledge will
be of value to problems of planning and assessing social development only if the ability to measure, describe, and explain social change is greatly improved.

The task of making sociological knowledge more relevant to the applied problems of social development is, in part, a problem of focusing sociological inquiry more directly on questions of concern to social policy. It is also, in part, a problem of articulating existing sociological theories into less abstract and more defined theories that deal with specific problems of relevance to social planning. Existing sociological theories are too often no more than perspectives on society and have not been developed into systematic sets of interrelated propositions or hypotheses that explain concrete social processes. In turn, sociological theories tend to be built on abstract or global concepts that cannot be at this time effectively operationalized and monitored through time. No sociological theory currently exists that provides an integrated approach to the range of phenomena of concern to social planning. Therefore, the approach proposed in this study has focused primarily on an inductive style of theory building in which the first priority is the need to develop a conceptual basis for the establishment of time series statistics that reflect the social concern toward which social planning and social policy are being directed.

Even though this thesis has merely outlined the initial conceptual basis of a health information system and has dealt only with certain methodological procedures for developing time series statistics, it is felt to be an important preliminary step in developing inductive and
more empirical approaches for description and explanation of health in society.

The approach taken represents, in many respects, new emphases in sociological inquiry: Firstly, there is an emphasis on construction of a logically derived set of concepts and categories designed to aid the systematic development of time series necessary for the study of social change. Secondly, the emphasis has been to play down primary data collection procedures and give more attention to summarization and utilization of existing sources with the hope of improving the economic feasibility of developing time series. Even where particular data series are incomplete or absent, there are procedures to improve the information value of what is available. Thirdly, there is an emphasis on simple descriptive indicators which it is felt at this time are more useful than complex indices from the point of view of planning.

In order to make social inquiry more relevant to social planning the position taken in this study is that policy makers, planners and researchers must make a greater input into the design and content of data generating mechanisms if these are to have the greatest impact on the theoretical and operational fields.

This approach represents a departure also in the sense that it is focusing away from basic research towards the role of sociology in policy science.
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X. ACKNOWLEDGMENTS

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The trials of a graduate program can be anxiety producing to say the least. Their impact, however, go almost unnoticed if one is fortunate enough to have an ally of the caliber of Sandy Hunter. To the author Sandy has been a colleague, a confidant and a truly great friend to whom his debt of gratitude is immeasurable.
XI. APPENDIX A: SUMMARY FRAMEWORK
Table 4. Health status and health services: indicators by substantive and sociodemographic classifications and data sources

<table>
<thead>
<tr>
<th>Health concern</th>
<th>Indicator descriptor</th>
<th>Social indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A. Health status of the population</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Life expectancy</td>
<td>Cohort estimates</td>
<td>Expected years of life at birth and at 50 years of age, according to sex: total population, urban and rural areas, national and ethnic origins, socio-economic classes</td>
</tr>
<tr>
<td>Mortality</td>
<td>Incidence (infant)</td>
<td>Number and rate per 1,000 persons at risk; standardized for sex of neo-natal and post-natal deaths according to cause: total population, urban and rural areas, national or ethnic origins, socioeconomic classes</td>
</tr>
<tr>
<td></td>
<td>Incidence (general)</td>
<td>Number and rate per 1,000 persons at risk; standardized for age and sex of deaths according to cause: total population, urban and rural areas, national and ethnic origins, socio-economic classes</td>
</tr>
<tr>
<td>Substantive classifications</td>
<td>Sociodemographic classifications</td>
<td>Data sources</td>
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<tr>
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</tr>
<tr>
<td>A. Health status of the population</td>
<td>Age and sex, urban and rural areas, national and ethnic origins, and socioeconomic classes</td>
<td>Census, vital records, and model life tables</td>
</tr>
<tr>
<td>Cause of death</td>
<td>Sex, urban and rural areas, national and ethnic origins, and socioeconomic status</td>
<td>Census, vital records, and institutional and health care personnel records</td>
</tr>
<tr>
<td>Cause of death</td>
<td>Age and sex, urban and rural areas, national and ethnic origins and socioeconomic classes</td>
<td>Census, vital records, and institutional and health care personnel records</td>
</tr>
<tr>
<td>Health concern</td>
<td>Indicator descriptor</td>
<td>Social indicators</td>
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</tr>
<tr>
<td>Morbidity-disability</td>
<td>Incidence and prevalence</td>
<td>Number and rate per 1,000 persons at risk standardized for age and sex, persons with limitation of activity due to chronic condition according to type of condition, bed disability and restricted activity according to broad classification of diseases and injury: total population rural and urban areas, national and ethnic origins, socioeconomic classes</td>
</tr>
<tr>
<td>Prevalence (mental illness)</td>
<td></td>
<td>Number and rate per 1,000 at risk of mentally retarded according to degree of retardation and age and sex</td>
</tr>
<tr>
<td>Substantive classifications</td>
<td>Sociodemographic classifications</td>
<td>Data sources</td>
</tr>
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</tr>
<tr>
<td>A. Health status of the population</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of chronic disability or condition, acute infections and non-infectious illness, and injuries</td>
<td>Age and sex, urban and rural areas, national and ethnic origins and socioeconomic classes</td>
<td>Surveys, institutional and health care personnel records</td>
</tr>
<tr>
<td>Degree of mental illness</td>
<td>Age and sex</td>
<td>Surveys, institutional and health care personnel records</td>
</tr>
</tbody>
</table>
Table 4 (Continued)

<table>
<thead>
<tr>
<th>Health concern</th>
<th>Indicator descriptor</th>
<th>Social indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Health status of the population</td>
<td>Malnutrition</td>
<td>Incidence and prevalence</td>
</tr>
<tr>
<td>Substantive classifications</td>
<td>Sociodemographic classifications</td>
<td>Data sources</td>
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<tr>
<td>----------------------------</td>
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</tr>
<tr>
<td>A. Health status of the population</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinical or other signs of malnutrition by types</td>
<td>Age and sex, urban and rural areas, national and ethnic origins and socioeconomic classes</td>
<td>Health and nutrition surveys, institutional and health care personnel records</td>
</tr>
</tbody>
</table>
Table 4 (Continued)

<table>
<thead>
<tr>
<th>Health concern</th>
<th>Indicator descriptor</th>
<th>Social indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>B. Availability and use of health care facilities, services, personnel</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Availability:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Availability of health personnel</td>
<td>Number and rate at specific date</td>
<td>Number and rate per 1,000 persons at risk of professionals, sub-professional, paramedical and auxiliary personnel (by specific types e.g., doctors, dentists, nurses, midwives): total population, urban and rural areas, and geographic and administrative areas</td>
</tr>
<tr>
<td>Availability of health facilities and services</td>
<td>Number and rate of specific date</td>
<td>Number and rate per 1,000 at risk of 1) inpatient care facilities (beds) and 2) outpatient care facilities (health centers, stationary and mobile clinics): total population, urban and rural areas, and geographic and administrative areas</td>
</tr>
</tbody>
</table>

Gains or losses since previous year
### B. Availability and use of health care facilities, services, personnel

<table>
<thead>
<tr>
<th>Substantive classifications</th>
<th>Sociodemographic classifications</th>
<th>Data sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health personnel by type or specialization</td>
<td>Urban and rural areas and geographic areas</td>
<td>Census Records of licensing and registration Registers of professional personnel</td>
</tr>
<tr>
<td>Health facilities and services by types</td>
<td>Urban and rural areas, and geographic areas</td>
<td>Records of federal, provincial, local voluntary national agencies Institutional records (e.g., hospital entry and discharge and clinics and outpatient services) Practitioner records Household surveys</td>
</tr>
</tbody>
</table>
Table 4 (Continued)

<table>
<thead>
<tr>
<th>Health concern</th>
<th>Indicator descriptor</th>
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<tr>
<td>B. Availability and use of health care facilities, services, personnel</td>
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</tr>
</tbody>
</table>

**Use:** Institutional (inpatient) health care

**Incidence (usage during year)**

Number of patient days, rate of admission per 1,000 persons at risk standardized for age and sex according to broad classifications of diseases and injuries: total population, urban and rural areas, national or ethnic origins, socioeconomic classes.

**Use:** Institutional (outpatient) health care

**Incidence (use during year)**

Number and rate per 100,000 at risk of outpatients by chronic disability, acute illness, injury, other: total population, urban and rural areas, national and ethnic origins, socioeconomic classes.
<table>
<thead>
<tr>
<th>Substantive classifications</th>
<th>Sociodemographic classifications</th>
<th>Data sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>B. Availability and use of health care facilities, services, personnel</td>
<td>Age and sex, urban and rural areas, geographic areas, national and ethnic origins, socioeconomic classes</td>
<td>Records of federal, provincial, local voluntary national agencies</td>
</tr>
<tr>
<td>Type of service (including specialty)</td>
<td>No. of patient days</td>
<td>Institutional records (e.g., hospital entry and discharge and clinics and outpatient services)</td>
</tr>
<tr>
<td>Rate of admission</td>
<td></td>
<td>Practitioner records</td>
</tr>
<tr>
<td>No. of days per admission</td>
<td></td>
<td>Household surveys</td>
</tr>
<tr>
<td>Type of chronic disability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of acute infectious and noninfectious illness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mental illness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of injury</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kind of service including specialty</td>
<td>Age and sex, urban and rural areas, geographic areas, national or ethnic origins, socioeconomic classes</td>
<td>Records of federal, provincial, local voluntary national agencies</td>
</tr>
<tr>
<td>Chronic disability, acute illness, injury, and other</td>
<td></td>
<td>Institutional records (e.g., hospital entry and discharge and clinics and outpatient services)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Practitioner records</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Household surveys</td>
</tr>
<tr>
<td>Health concern</td>
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<td>Social indicators</td>
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</tr>
<tr>
<td><strong>B. Availability and use of health care facilities, services, personnel</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Use:</strong> Noninstitutional health care</td>
<td>Incidence (use during year)</td>
<td>Number and rate per 100,000 at risk of individuals cared for in office and/or home by health personnel by type or specialization (doctors, midwives, dentists, nurses): total population, urban and rural areas, national or ethnic origins, socioeconomic classes</td>
</tr>
<tr>
<td></td>
<td>Average cost per person per year</td>
<td>Per capita consumption expenditure on medical care and health: total population, urban and rural areas, national and ethnic origin, socioeconomic classes</td>
</tr>
<tr>
<td>Substantive classifications</td>
<td>Sociodemographic classifications</td>
<td>Data sources</td>
</tr>
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</tr>
<tr>
<td><strong>B. Availability and use of health care facilities, services, personnel</strong></td>
<td>Chronic disability, acute illness, injury, and other</td>
<td>Age and sex, urban and rural areas, geographic areas, national or ethnic origin, socioeconomic classes</td>
</tr>
<tr>
<td><strong>Urban and rural areas, national and ethnic origins, socioeconomic classes</strong></td>
<td>Household and health surveys</td>
<td>Government estimates</td>
</tr>
</tbody>
</table>
XII. APPENDIX B: SOCIAL INDICATORS AS ECOLOGICAL DATA
A main thrust of the social indicator movement to date has been towards social development planning and policymaking frameworks where, as many writers point out, social indicators are most likely to prove useful in defining and specifying social problems that require action. Social indicator research in these frameworks strives to identify the key social concerns, how these are related, and how the concerns and relationships change over time.

In this section there is a brief discussion of some other research uses which may be made of simple descriptive and analytic social indicators as they are defined in this dissertation. It is probably true to say that many social scientists would refer to this type of data as ecological data, so for reasons of compatibility with a renewed interest and a growing body of literature on ecological data we will in this section use that term to include simple descriptive and analytic indicators.

A. Use of Ecological Data in Social Science

Many different categories of ecological data such as election returns, population enumerations and various aggregated demographic variables have had considerable usage in the study of human relationships and activities. However, the advent to popularity of the sample survey as a research technique opened up a new source of research data whose flexibility and inferential utility immediately sold it as the procedure for obtaining data on individuals, households or families. Concomitant with
the emergent popularity of the sample survey, the use of ecological data came under attack and was for a period largely discredited mainly because of inferential problems. These latter problems of drawing inferences about individual behavior from ecological data (i.e., data referring to characteristics of groups, geographically delineated categories, or other collectivities) have continued to give rise to controversies and only relatively recently have the basic inferential problems been satisfactorily elaborated. These parallel developments in social science research, while they did not result in a complete abandonment of ecological data usage, did serve for some time to undermine the credibility of research using such data. The eventual reassessment of ecological data problems indicated that while some of the earlier objections were well founded, these data are of paramount importance in social science research both in their own right and in a supplementary capacity with other types of data.

To Robinson (1950) goes the credit for initially raising questions about the inferential problems in the use of ecological data. In this frequently quoted work Robinson demonstrated that "ecological correlations" based on social system characteristics (i.e., characteristics of groups or geographical units) could differ very drastically from "individual correlations" using data based on characteristics of individual persons. The conclusion reached was that ecological correlations could not be substituted for individual correlations.

At one and the same time, an impetus was given to the sample survey as a research technique and procedure for collecting data, while the value of earlier work using ecological data was subjected to negative criticism.
At stake was, for social scientists in some countries, readily available and non-costly type of data, since ecological data have been produced in large quantities in many countries as a by-product of ongoing administrative and governmental processes.

Subsequent to Robinson's work, the question of moving between levels of variation was examined in the context of the broader problem which the researcher faces as he attempts to infer the behavior or characteristics of units at one level of analysis from data referring to a higher or lower level of aggregation.

Finding solutions to the inferential and methodological problems facing users of ecological data became part of the social scientific research endeavor, and considerable effort was expended in clarifying and elaborating relations involving covariations appearing at different levels of aggregation. Such research activities have been instrumental in the development of several methodological innovations (Clubb, 1970:12; Alker, 1969:83-84). The net result has been to demonstrate that while inferential errors have been made, the almost total condemning of ecological data was an exaggeration.

The domain of interest to social scientists is obviously not confined to individual activities, behaviors, and characteristics. Characteristics of geographic or territorial units, population categories, and social groups often become the subject matter or focus of concern of the social scientist. For example, the comparison of groups, organizations, communities, or regions along some social or economic dimension is a valid research endeavor in its own right and may not be in the least
concerned with people as individuals. It should also be pointed out that there are global characteristics of collectivities and administrative or geographic units which do not have corresponding referents at the individual level. The interrelations between these global characteristics constitute important research pursuits which often supplement individual level investigations.

A very common research interest is that of identifying characteristics of the more inclusive unit or group as a means of providing a context within which individual behavior and characteristics may be better understood. Ecological variables may be related to individual behavior and characteristics to identify the impact of environmental conditions on the individual or to elaborate some aspects of individual behavior. The fact that much of the available ecological data are longitudinal is important in that the sociological variables considered in most studies have a time dimension which cross-sectional designs deal with at best inadequately.

Individual data are prone to certain inferential problems which are in some ways quite similar to problems of the ecological fallacy. Schench (1966), for example, points out that erroneous inferences may be just as common with individual data as with aggregate data. Where data on individual attitudes and behavior are gathered using the sample survey technique, many studies attempt to explain behavior using personal characteristics and attitudes alone while neglecting contextual circumstances and characteristics. In such instances not only is the effect of the context on attitude formation and behavior overlooked but also the
possibility of perhaps finding that similar attitude patterns may be associated with different behavioral outcomes because the context is different. Thus confining the focus of study to individual characteristics may result in erroneous inferences about the groups or collectivities to which these individuals belong and can also lead to incorrect explanations of individual behavior.

There is a formidable consensus (Alker, 1969; Allardt, 1969; and Clubb, 1971) that many of the critics of the use of ecological data have been under the impression that certain inferential and methodological problems are peculiar to ecological data despite the evidence that these same problems confront empirical research in the social sciences regardless of whether the data refer to individuals, aggregates or global characteristics. It is possible to have spurious correlations and to make incorrect inferences regardless of whether the data being used is individual or ecological. Problems of inference are closely tied to the difficulties of making the transition between empirical data and theoretical statements. There have been a number of different multivariate techniques developed which can cope with data at several different levels of aggregation taking into account the interaction between individual and system characteristics. The development of such techniques and the elaboration of the inferential problems have enabled fuller advantage to be taken of ecological data in social science research.

B. Data Availability, Levels of Variation, and Types of Analysis

The types of research and analysis undertaken in the social sciences, then, differ according to the level of variation under study and the data
available. Data available at different levels may be referred to as either primary (generated at that level) or derived (generated from characteristics of subordinate or superordinate units) (Dogan and Rokkan, 1969: 4-5).

We will assume for the sake of illustration that social research involves only two levels of analysis—variations among individuals and variations among population categories and subgroupings including territorial units. If these two levels of analysis are crossclassified with the primary and derived data types, four different data types are obtained as follows: personal attributes; global attributes; contextual data; and aggregate data.

In most real world research situations data of all four types, which would allow the researcher to more fully elucidate his research problems, are not available. In such situations the researcher has recourse to a number of procedures, depending on the data available and the questions he seeks to answer (Dogan and Rokkan, 1969:6). For example, the study may be focused on the explanation of individual level variations or variations at the level of population categories. At the same time the research may be confined to one level of analysis or may attempt to deal simultaneously with both levels and the interactions between them. These data types and research options are set out in Table 5.

Riley (1964:1014-1020) also attempted a classification of types of analysis based on the levels of measurement used and the level of the

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1 In dealing with group variables, Riley (1964) does not differentiate between those obtained by aggregating individual characteristics and those that are uniquely global characteristics.
Table 5. Data and analysis options in research involving different levels of variation

<table>
<thead>
<tr>
<th>Available data</th>
<th>Level of variation</th>
<th>Primary data</th>
<th>Derived data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individuals</td>
<td>Personal attributes (sex, age, etc.) or behavior characteristics (church attendance, voting)</td>
<td>Contextual data: membership of, exposure to, population category or territorial unit of given global or aggregate attribute</td>
<td></td>
</tr>
<tr>
<td>Population categories or territorial units</td>
<td>Global attributes characterizing aggregate or unit as a whole, not derivable from data on individuals in the unit</td>
<td>Aggregate data: unit characteristics derived from distribution of individual attributes or behaviors</td>
<td></td>
</tr>
</tbody>
</table>

a. Adapted from: Dogan and Rokkan (1969:5-6).
## Focus of analysis

<table>
<thead>
<tr>
<th>One level</th>
<th>Interaction of two levels</th>
<th>Level of dependent variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Either: individual data (e.g., from surveys) treated without reference to population or territorial contexts</td>
<td>Either: individual data used jointly with contextual data for territorial or population units Or: aggregate/global data used to test interaction between levels</td>
<td>Individual</td>
</tr>
<tr>
<td>Or: territorial or population aggregate data used to analyze individual variations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aggregate/global data for territorial or population units used to describe and account for variations at territorial or population category level</td>
<td>Either: joint use of individual/aggregate/global data to test source of change in territorial or population structure Or: aggregate/global data used to test interaction between levels</td>
<td>Population category or territorial unit</td>
</tr>
</tbody>
</table>
social system the analysis is primarily concerned with. Four types of analysis are distinguished as follows:

1. Group analysis--where the data refer exclusively to characteristics and properties of groups and aggregates and where the conclusions and inferences are also confined to the groups and aggregates.

2. Structural analysis--where conclusions and inferences refer to the group or aggregate. Data also refer mainly to groups and aggregates but some individual level variables are used in order to specify and validate the conclusions and inferences.

3. Contextual analysis--where the main focus is on the individual but group or aggregate data are used to validate and specify individual variations and relationships. For example, variations between the groups to which individuals belong may partially account for observed individual level variations.

4. Individual analysis--where data refers exclusively to the individual level and conclusions and inferences are confined mainly to this level also.

C. Problems in Using Ecological Data

Many national social data producing agencies have for several years been producing vast amounts of social information, much of which is not easily accessible to the potential user.

Only in very few instances are ecological data series designed, collected, organized or stored with the needs and interests of the sociologist in mind. More commonly ecological data series have been collected in order to serve administrative purposes or as by-products of ongoing governmental programs and processes. Also, the array of variables generally will not coincide with those the researcher would choose if he were to design the studies anew.
Ecological data series are characterized by discontinuities in that, for example, a variable included on one round or phase of data collection may not appear in a later phase. Discontinuity also results from redefinition of concepts. Censuses and national (household) surveys may vary considerably from one phase to the next in terms of information collected as well as in terms of the categories and classifications used in organizing and presenting the data. These types of discontinuity may restrict the researcher in his attempt to incorporate extended time dimensions into his studies and in his attempts at temporal and interpretation.

An equally frustrating problem for the social researcher is that of varying territorial units on which data are recorded. This may sometimes result, on one hand, from different classifications being used in data collection, organization or presentation, or on the other hand, it may come about as a result of changes in geographic boundaries of ecological study units. These latter changes are often undocumented so that the comparability of nominally identical units is compromised. Since no descriptive details may be available on changes undergone, the evaluation of available data on this criterion (identical units of analysis over time) is at best, difficult.

It is evident that ecological data are often plagued with problems of accuracy, interpretation, and comparability which in the past has tended to limit their usefulness to a level below their potential.