INFORMATION REQUIREMENT FOR SOCIO-ECOLOGICAL MODELS

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1. Introduction

Reflecting the growing concern over the ecology and environmental problems, there has been an increasing number of studies on the quality of life and the environmental repercussions of economic growth in recent years.

The distinct trend of recent studies as contrasted to previous ones is the attempt to quantify the non-market variables such as pollution, and to assess the social cost of the externalities. This seems to indicate the awareness among social scientists that one can no longer simply contend with the theory of social cost a la Marshall-Pigou-Scitovsky, and have to show empty boxes when an occasion calls for a concrete policy analysis which influences the magnitude of social costs.

The recent attempts to quantify the social costs can be classified into three categories: One is those who attempt to quantify the "quality of life" and monitor changes in so-called "social indicators" [Bauer (2), Perloff (10), Wayne State University (3)]. A second group attempts to introduce explicitly the non-market variables in the inter-industry or ecological models and study the environmental repercussion of the economic growth [Leontief (9), Hirsch (5)], or proposes to build a social accounting system which includes a complete description of ecological chains and investigates the interrelationship among them [Isard, (7)]. The last group focuses its attention in constructing a mathematical model which shows the consequence of rapidly rising population on society and natural environment [A Model of Society (1)].

The purpose of this paper is to identify the information requirements for these various socio-ecological models and accounts and proposes the development of a coherent information system on environment in the future.

2. Construction of Social Indicators

The first group resembles the NBER (National Bureau of Economic Research) project of economic indicators construction in studying the business cycle during the past decade. It is mostly concerned with the identification and conceptualization of those variables which describe "the quality of life." This includes both measurable and non-measurable factors which influence the perception of individuals on the quality of their lives. Measurable indicators contain such traditional variables as per capita income, income distribution, and education services as well as variables which indicate the quality of natural environment, e.g., air and water pollution. Non-measurable indicators are

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concerned with the psychological conditions of individuals, such as expectation about the future, contentment with the present life, aspiration levels, motives, and goals. The Survey Research Center Project (University of Michigan) is expected to concentrate on the subject.

The proposed project represents "an effort to measure and regularly monitor trends in economic behavior and their non-economic determinants before they are manifested in the statistics." The proposed study, therefore, attempts to delineate a set of social indicators by developing psychological measurements which have implications for economic behavior.

The construction of comprehensive social indicators requires more than mere collection of the relevant data. The analysis and interpretation of data should require a truly interdisciplinary approach. The meaning of a coliform count of polluted water, for instance, would require a complete description of conditions under which the sample is taken (such as time, temperature, current, etc.) and expert opinions of medical scientists on its potential health hazard.

The information requirement for the construction of social indicators is enormous. It requires information on population characteristics, health, income and unemployment, public safety, education, housing, recreation, the environmental quality (e.g., noise, air and water quality, esthetics), waste disposal, the use of pesticides, and radioactive waste storage and disposal.

In addition, the complete description of "quality of life" requires psychological indicators which show satisfaction and expectations about the future.

The pitfall of using social indicators will be that it cannot provide any satisfactory causal interrelationship among the variables selected as indicators. Koopmans' argument on measurement without theory could be applied here as well as to economic indicators.

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2 The word "non-measurable" indicators may not be appropriate since those psychological variables can be ranked and expressed, especially utilizing the survey of opinion techniques.


4 Ibid., p. 5.
