

## CHAPTER 3

### RESEARCH METHODS



This chapter is concerned with the methods used in the study. Since the research was primarily methodological, examining how objectives, constraints and health insurance elements might be elucidated and measured, the methods, in large measure, evolved as the research progressed.

There are five parts to the research methods, identification and analysis of social objectives, identification of constraints to the achievement of those objectives, identification and analysis of insurance elements, quantification of effects (effects of alternative elements on objectives and constraints) and finally, the two stages of Multi Criteria Analysis, first to select the 'best' alternative within each element set and then to rank the alternatives in an insurance scheme.

In the first four steps, efforts were made to procedure which could be used in subsequent studies.

#### 3.1 Identification and Analysis of Objectives

The identification of the objectives to be achieved through the introduction of health insurance was essentially a three stage iterative process.

##### 1. To identify, in general terms, the social objectives.

Social objectives were determined first by reviewing a range of literature relating to the functions and outcomes from health care (World Bank (1993), WHO (1978, 1979, 1981a, 1981b), and the purposes of health insurance (Abel-Smith, 1992, Ron, 1990). Subsequently these general objectives were reviewed in the light of conditions in Guangxi.

##### 2. Analysis of meaning

The outcome from stage one is a list of general terms, such as improvement in health and improvement in equity, which are open to many interpretations and can not be readily measured. As a result the terms were analyzed in an attempt to more clearly define what is meant.

This stage often revealed alternative meanings which can have a profound effect both upon the objectives and, in consequence the effects of insurance elements. Analysis also highlighted the interdependence of the objectives and started to reveal the complex web of economic determinants.

##### 3. Formulation of an indicator

Given the selection of a meaning for a general objective, there still remained the problem of how to measure or assess the effects of insurance elements. For example, if equity is defined as equal access for equal need, what criteria or indicator can be used as an example by which to assess effects of insurance elements. In the third stage an attempt was therefore made to identify an indicator, proxy or example by which assessment could be made.

### 3.2 Identification and Analysis of Constraints

Constraints are, by definition, constraints to the achievement of objectives. In this case the insurance elements are a means to achieve the objectives. As a result constraints relate both to the implementation of the means (insurance elements) in a general context and in the context of Guangxi and the achievement of outcomes (achievement of objectives). This interdependence poses a major methodological problem.

Again the process was iterative, with new insights emerging at each stage. The framework used for the analysis was to consider the 'players' in the operation of a health insurance system; the insurer, the supplier, the consumer and the government.

#### 1. To identify, in general terms, the constraints

The literature was first reviewed to identify the problems associated with the operation of health insurance schemes. These problems provide a list of potential constraints.

#### 2. Analysis of meaning

As with objectives, the general terms ascribed to some constraints make it difficult to assess the effect of insurance elements. Efforts were therefore made to more clearly define meaning.

#### 3. To review in the context of Guangxi

The list was reviewed in the context of Guangxi where economic operational and political factors can play an important part in the successful implementation of any health insurance scheme.

### 3.3 Identification and Analysis of Insurance Elements

The procedure used to identify and analyze insurance elements was similar to that used for the identification and analysis of objectives. Again the basis for determining elements was to consider the consumer, supplier, insurer and government.

There were two stages.

## 1. Determine insurance elements

The literature on health insurance was reviewed to identify types of scheme and the key elements or components within each scheme. Particular attention was given to the theories of insurance and deficiencies of established health insurance schemes.

Efforts were made to filter out the key components or elements from alternatives within an element. For example, insurance contributions may be paid by government, by individuals, by employers or any mix of these. The key element is 'sources of contribution' with the government, individual and employer being alternatives. The analysis is essentially similar to that required to establish fields in a data base.

## 2. Determine alternatives within each element

Having identified the key elements possible alternatives were then identified by logical analysis and from the literature.

### 3.4 Assessment of Effects

The assessment of effects is an extremely difficult and inexact process for three reasons:

- \* objectives, constraints and elements are interdependent
- \* objectives, constraints and elements are very broad in meaning and the range of application
- \* there is no basis for proper quantification, only subjective judgement

However on the assumption that some analysis is much better than no analysis the following procedures were developed:

1. Analysis of the general effects of each element on supply, consumption, and the performance of the insurer using reasoning
2. In relation to these effects, which of the alternatives would probably have the largest and least effect on achieving each objective and developing each constraint, based upon the general analysis.

### 3.5 Multi Criteria Analysis (MCA)

Traditionally MCA is used to evaluate alternative projects in terms of achievement of objectives and demands upon resources with the decision maker able to assign weights or priorities to objectives and resources. In this context resources are clearly a constraint to the achievement of objectives.

### 3.5.1 The Principles of MCA

There are three major stages in the traditional MCA.

Stage 1 : Analyst determines the relative aggregate efficiency of each project (alternative) in relation to the importance of each objective and consumption of resources (constraints).

Relative Aggregate Satisfaction

---

Relative Aggregate Claim on Resources

Stage 2 : Sets of possible projects are selected, in terms of cumulative absolute performance and resource demands for various weights of objectives and constraints.

Stage 3 : The decision maker selects the most suitable set of projects or may ask for a reworking with changes in weight or to find a project set with less demand upon resources.

Stage 1.

Preparation

- \* Identify projects, objectives and resources
- \* Establish criteria to measure the extent to which each project achieves objectives and demands resources

Assign absolute measures of performance

- \* Assign absolute satisfaction (s) of each objective (i) by each project (p)  
[S<sub>ip</sub>]
- \* Assign absolute claim (c) on each resource (r) for each project (p)  
[C<sub>rp</sub>]

Compute relative performance

- \* Compute relative satisfaction (s') of each objective (i) by each project (P)

$$S'_{ip} = S_{ip} / \max S_{ip}$$

- \* Compute relative claims (c') on each resource (r) by each project (p)

$$C'_{rp} = C_{rp} / \max C_{rp}$$

Assign absolute weights to objectives and resources

- \* Assign absolute weights (X) to each objective (i) in one or

more sets (v)

$X_{iv}$

- \* Assign absolute weights (y) to each resource (r) in one or more sets (z)

$Y_{rz}$

Compute relative weights to objectives and resources

$$* \quad \sum_{i=1}^n X_{iv} = 1 \quad [X_{iv} = \text{relative weight in set (v)}]$$

$$\sum_{r=1}^q Y_{rz} = 1 \quad [Y_{rz} = \text{relative weight in set (z)}]$$

Compute relative aggregate satisfaction for each project ( $AS'_{pv}$ )

$$AS'_{pv} = \sum_{i=1}^n S'_{ip} X_{iv} \quad [\text{for each set of v}]$$

Compute relative aggregate claim on resources by each project ( $AC'_{pz}$ )

$$AC'_{pz} = \sum_{r=1}^q C_{rp} Y_{rz} \quad [\text{for each set of z}]$$

Compute and rank relative efficiency of each project for each set of (v) and (z)

$$E_{pvz} = AS'_{pv} / AC'_{pz}$$

for p = 1, 2, ..... n  
 v = 1, 2, ..... t  
 z = 1, 2, ..... e



## Stage 2

Compute cumulative absolute project satisfaction (CS) and cumulative absolute claim on resources (CC), in rank order from 1 to k for each objective and each resource for combinations of weighing sets (v) and (z)

$$CS = \sum_{i=1}^k S_i \quad \text{for } i = 1, 2, \dots, m$$

$$CC = \sum_{r=1}^q C_r \quad \text{for } r = 1, 2, \dots, q$$

k is project in rank order

The decision maker selects sets of projects / programmes for each weighing set combination (v,z). Selection is based upon discontinuities in cumulative satisfaction or resource demands and/or political return and effort required to obtain a level of resources.

## Stage 3

Present the cumulative absolute project performance (CAPP) of project sets for each v,z combination. Then compute the relative absolute project performance (RAPP), for each v and z combination, using one project as a base line. The decision maker reviews CAPP and RAPP and takes one of the following actions:

- \* Select one set of projects and enter into negotiation with funders
- \* Assign new weights (loop back to stage 1) and assess the sensitivity of priorities
- \* Explore what actions are required to increase achievement of a particular objective or reduce the claim on a particular resource

The process has three outcomes; it ensures comparison of proposals and assignment of priorities as a quantified base; it ensures proposals recognize claim on resources (inputs) as well as satisfaction (outputs) and it makes value judgements explicit while the implications of changing judgements can be explored.

### 3.5.2 Application of MCA to Evaluation of Insurance Elements

Traditionally Multi Criteria Analysis is applied to the

evaluation of alternative projects where the relative efficiency of each project is expressed as the ratio of relative aggregate satisfaction to relative aggregate demand upon resources.

In the evaluation of insurance elements and alternatives, two factors are changed. Firstly while resources are a direct constraint on achieving the objectives of development projects the relationship between constraints and elements in the analysis of insurance schemes is more complex. Constraints can affect the achievement of objectives independent from the insurance elements i.e. government policy. Secondly constraints may be affected by insurance elements but also have an effect on insurance elements. For example, fee for service may effect the constraint of quantity and quality of services provided. At the same time the constraint of government policy may determine what fees are charged and therefore the demands on premiums.

The interdependence of the three sets of variables, explained in more detail in Chapter 6 makes it difficult to apply the conventional MCA analysis although there appears to be no better alternative or an interaction between elements, objectives and constraints which can not be separated (see Chapter 6). Secondly, there is a constraint affect elements and elements have an effect on one another

### 3.5.3 Selection of alternatives within each element

Selection of an alternative from the set of alternatives for each element was achieved by:

- \* Computing the Ranked Relative Efficiency of each alternative using MCA
- \* Selecting the alternative with the highest relative efficiency
- \* Cumulating the cumulative absolute satisfaction in achieving objectives (CS) and cumulative absolute calaim on constraints (CC), in rank order from 1 to k for each objective and each constraint for combinations of weighting sets (v) and (z)