CHAPTER 2

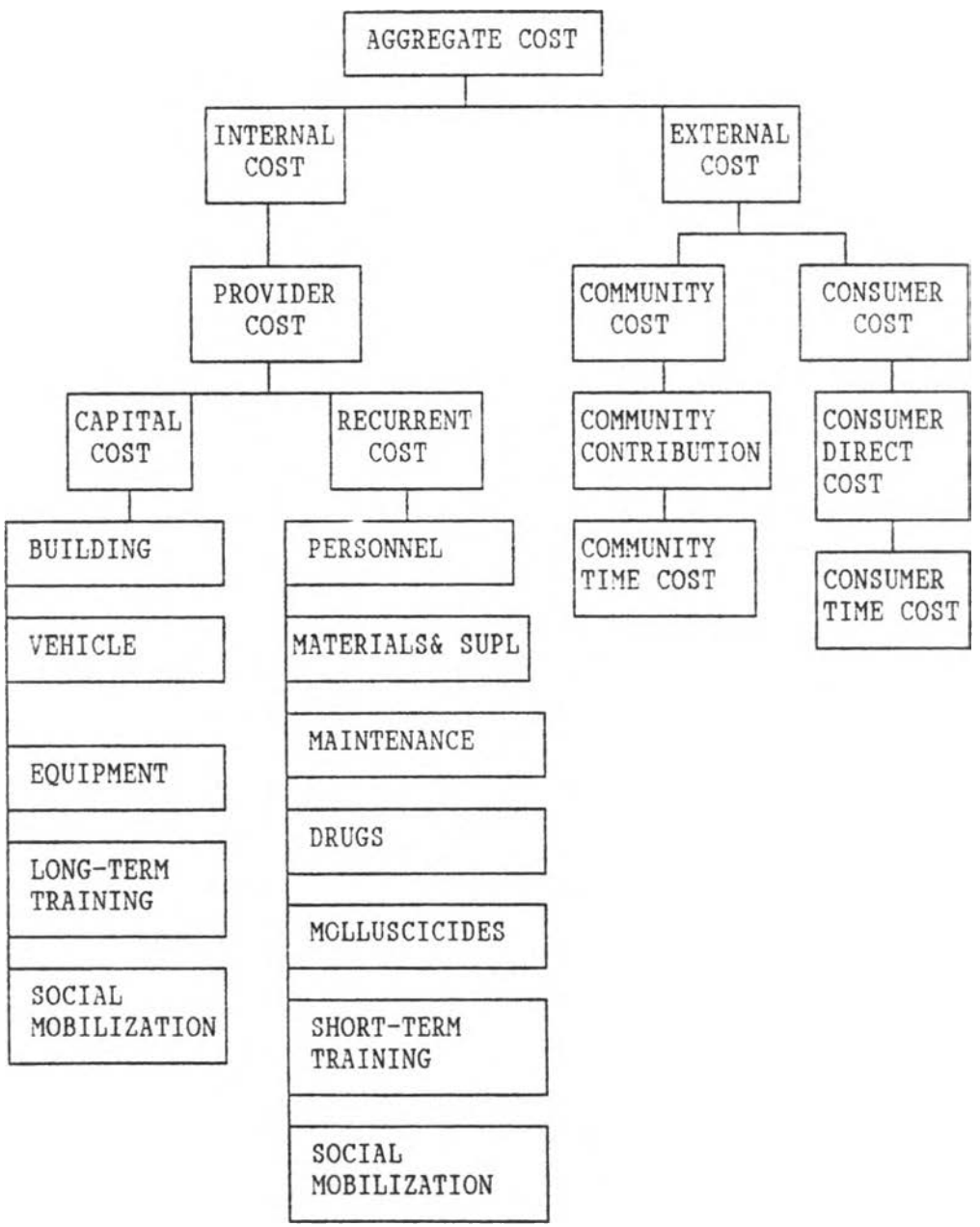
CONCEPTUAL FRAMEWORK

2.1 Conceptual framework

1. Cost model

Based on the objectives of the study, the first step is to establish methodology for cost estimation and unit cost calculation. The following is the general conceptual framework of cost model for the schistosomiasis control in China.

Figure 2.1 General Conceptual Framework of Cost Model



a. The aggregate costs include internal costs and external costs. Internal costs are the costs incurred by the schistosomiasis control program which is the provider costs. External costs are those incurred outside the program, which are the consumer costs and community costs.

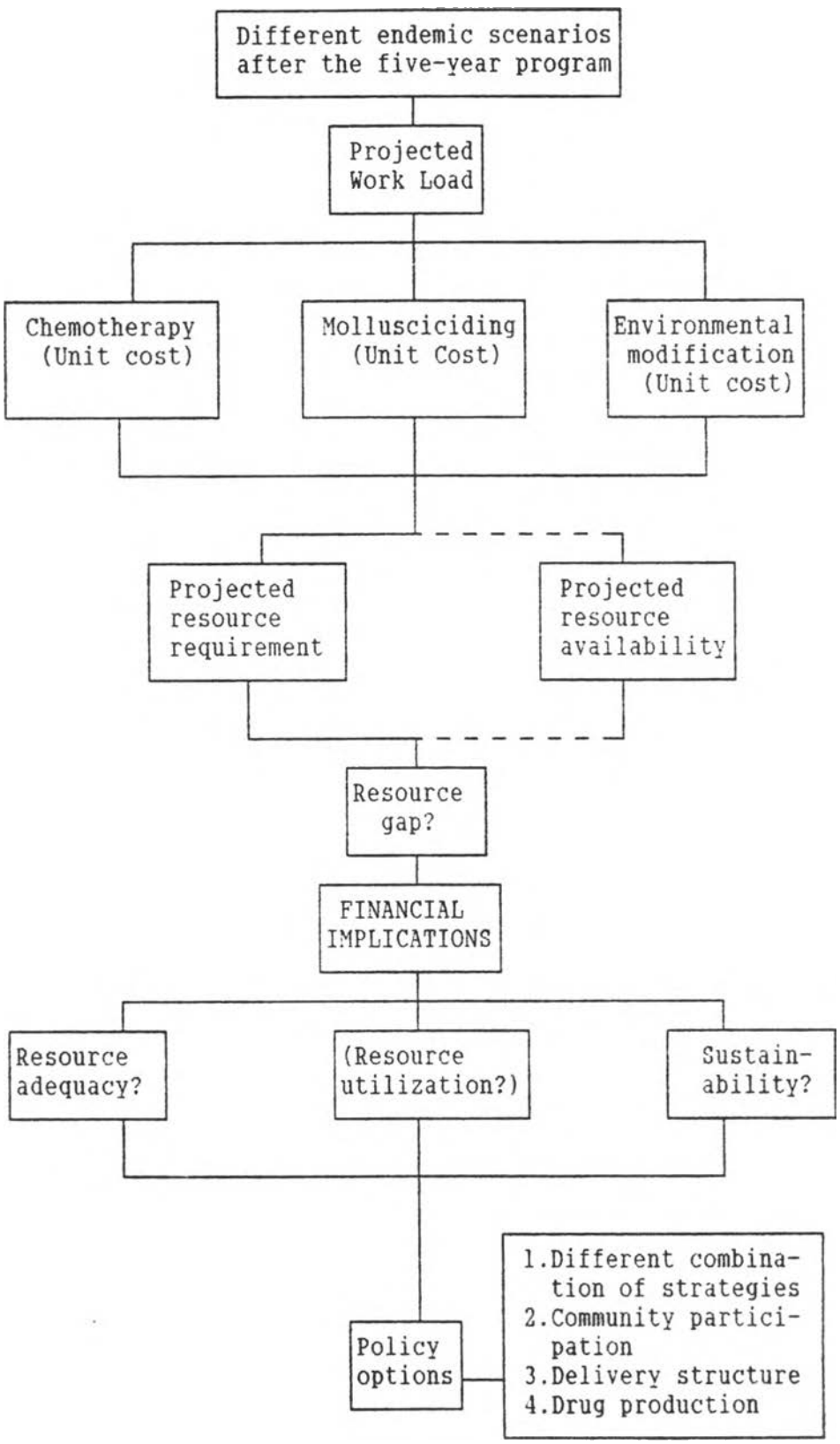
b. On the provider side, capital cost include buildings, vehicles, equipment, long-term training and social mobilization. The recurrent costs are composed of personnel, materials and supply, maintenance, drugs, molluscicides, short-term training and short-term social mobilization.

c. Community costs include community contributions and community time cost.

d. Consumer costs consist of consumer direct cost and consumer time cost.

2. Evaluation framework

Figure 2.2 General Framework for Evaluation of Financing



a. The term control strategy principally refers to chemotherapy and snail control approaches, including different chemotherapy options, snail control by molluscicide and by environmental modifications. In different endemic areas, corresponding strategies are being pursued according to the epidemiological situations.

b. Resource availability will be projected in consideration of the past financial input from the government, external support, the debt repayment and community participation and financing.

c. In analyzing the resource gaps which refer to the difference between the resource requirement and resource availability. resource adequacy. resource utilization efficiency and the sustainability should be considered. However in this study, resource utilization efficiency is not going to be discussed. It is assumed that they will be efficiently utilized.

d. Policy implications will be focus on the policies of selection of combination of control approaches, delivery structure of drugs, drug production policies and community participation.

2.2 Literature review

1. Costing and financing schistosomiasis control

Just as Fenwick (1989) pointed out, the technologies for attacking schistosomiasis are available, but finance is not. The costs and financing of schistosomiasis control have been disturbing the health administrators in many endemic countries where the resources available for health care are extremely scarce. This necessitates studies on the costs and affordability of the control options. A number of studies have been published on the cost of the control program. However, all those studies have considered programs based on chemotherapy only, consistent with the belief that the costs for vector control are too variable to show general estimates, and the capital costs for water and sanitation projects are likely to be beyond the capacity of disease-specific control programs (Rohde, 1989). Gryseels (1989) compared the reported annual cost "per protected person" in large-scale schistosomiasis control program with population oriented chemotherapy in three African countries. The strategies adopted by each country were different, from selective, targeted to mass chemotherapy. The costs for "per protected person" varies from US$ 0.7 to US$3.1 per year, whereas the total expenditure for health in subsaharan African countries is generally less than US$ 5 per capita per year. He further pointed out that such cost calculations are often not realistic, leaving out expatriate' salaries, development costs and failures.

Brinkmann and others (1988) reported the cost of schistosomiasis control in Mali. They divided their control activities into months of action and their unit cost were calculated on the basis

of field allowance, transport, drugs, expendable materials and equipment. By using these unit costs, and on the basis of present knowledge of prevalence, epidemiology and efficiency of control, the need and quantity of activities and the probable duration of a program to achieve the goals set in the national health plan were estimated.

Among the studies, Korte and others (1986) derive some policy implicationS from the cost component analysis. It was demonstrated that, through comparison of the cost components in the schistosomiasis mansoni treatment campaign, the operational costs were more important than the cost of drugs. They argued that the importance of operational cost in the execution of schistosomiasis control program underlines the necessity to limit the vertical action to a minimum. Fenwick (1989) also indicated that delivery costs like this are simply not sustainable from national resources in most endemic countries, where typically all the annual per capita expenditure on all forms of primary health care is between US$1 and US$4.

Some progress in the search for more affordable alternatives has been made. For example, the estimated cost of delivery through primary health care facilities using active case finding, could be as low as US$0.45 per person depending on the price of praziquantel. There are some attempts in China, where schistosomiasis japonica is endemic in the southern provinces, to integrate snail control into aquatic production or other agriculture development projects. Cai and others (1991) reported the successful application of snail control combined with fish raising using low-dam and high-nets fishing ponds in the snail infested lake beaches, which brings not only the snail control effect, but also the economic benefit of fishing to the investors. More tests are being carried out in China, which aim to encourage the local involvement and make the control program more sustainable.

2. Cost and effectiveness of schistosomiasis control

There have only been a limited number of cost effectiveness studies of schistosomiasis control, and they have rarely provided an adequate analysis of both cost and effectiveness, nor have they provided clear policy guidance to the health care planners (Guyatt & Tanner, 1994). Unfortunately, in the endemic countries of schistosomiasis japonica, which is endemic in China, the Philippines and Indonesia, there is no report available in international journals on cost studies of the control program.

Jordan (1977) reported the results of comparative evaluation of snail control, chemotherapy and provision of water supplies for schistosomiasis control in St Lucia. Annual cost per capita, rather than cost-effectiveness ratio, were calculated, and were lowest for chemotherapy, followed by snail control and water supply. However, this study indicate one of the classic problem of cost-effectiveness analysis, that is to find an indicator of effectiveness that adequately reflects all the consequence of the alternatives. Another earlier contribution was made by Rosenfield et al (1977), who developed a model

of schistosomiasis transmission in Iran in order to simulate the effectiveness of applying different techniques - molluscicides, engineering techniques, chemotherapy and a combination of these controls - subject to a budget constraint with a seven-year planning horizon. Their analysis indicated that a combination of chemotherapy with mollusciciding was the most cost effective way where the program objective was specified in terms of maximization of the reduction in prevalence achieved after seven years.

Korte and others (1986) compared the cost and effectiveness of different chemotherapy approaches to schistosomiasis control in Congo and Mali. By using metrifonate, the cost per person rendered negative is calculated at DM 12.57 for the Congo and DM 32.52 for Mali. Using praziquantel, the costs were DM 8.36 and 11.47, respectively. They attributed the difference in cost to the high operational cost incurred by the 3 dose regimen. Once low prevalence levels are reached, operational costs further outweigh drug expenses.

3. Some general aspects for costing and financing tropical disease control

There is a growing interest in health economics in developing countries, and quite a few studies have been undertaken on economic aspects of tropical diseases, especially to malaria. The economic evaluation of control programs is to answer the question of the internal and the external efficiency. External efficiency is concerned with the broad question posed in cost-benefit analysis: is schistosomiasis control worthwhile by comparison with expenditure on alternative projects within the health sector or in other sectors? Internal efficiency concerned narrowly with the question posed by cost-effectiveness analysis: what is the most efficient choice among alternative methods of achieving schistosomiasis control (Prescott, 1993)? The growing economic concern for the limited resources necessitates the study of the most cost-effective ways of implementing schistosomiasis control strategies. As Evans (1992) stated, the major criterion used to identify research issues is that they should be of practical value to control program.

Usually in doing cost analysis of a control program, there are many problems. Most notably, the community contribution and volunteer work were never considered as economic costs and are never under consideration by the health care planners. Other omissions are frequent. In particular, many costs don't include development and training costs, including supervision, quality control of diagnosis, maintenance of equipment and health facilities, expatriate salaries, freight charges and the wastage cost of items due to loss or theft. Secondly, capital cost such as equipment, vehicles and buildings are often treated as expenditures at their time of purchase rather than being charged over their useful life to the program. Thirdly, when a control program is to last for more than one year, it is inappropriate to utilize the present value analysis to weigh the future cost a discount factor to make them comparable to the present cost. This has not been undertaken to the previous cost studies of schistosomiasis

control (Guyatt & Tanner, 1994; Creese, 1993).

The economic technique of costing involves identifying the main inputs used in the provision of health services, determining the costs of these inputs, and finally sharing or allocating the costs between the activities which take place at facilities. Combining these costs with information about service output gives the average cost (Hanson and Gilson, 1993). The authors further pointed out that one important use of costing information is to compare what we know about present resource availability with some estimates of resource requirements to determine the magnitude of "resource gap".

Hanson and Gilson (1993) identified financing of health care services as addressing issues of absolute inadequacy of resources. Information about sources of finance for health care service is relevant to the issues of "what does control over specific resources lie?" and consideration of sustainability. Hoarce and Mills (1986) argued that financing may be defined as the raising of resources to support or pay for the goods and services used in the health sector, which may consist of cash or may take the form of in-kind contributions such as labor, organizational skills and materials. Each financing mechanism can be considered with respect to who pays; who benefits; how much; for what and through what mechanism.

An assessment by the Asian Development Bank (1987) revealed serious problems in a number of countries in the mobilizing and allocating resources for new policy and program requirements. With increasing cost and expectations and decreasing budgets, many countries started recognizing the need for generating additional resources that the government tax revenues alone could not support. A WHO Study Group (1993) recommended the following criteria for assessing changes in financing, level of funding; efficiency, equity; variability and health impact.