CHAPTER VI
PROPOSED IMPROVEMENTS WITH REFERENCE TO UNDERDEVELOPED ECONOMIES
As we have seen, a considerable number of methods have been developed for multicriteria evaluation. However, most of these methods have been developed by economists in the developed countries keeping in mind the setup of those countries. Would the same methods be adequate for underdeveloped countries too? Or would it be unwise to use such tools, which have been forged in the developed economies, to solve policy decision problems in an underdeveloped economy as ours?

1. Characteristic Features of Underdeveloped Economies

Often the incorrect view is held that the difference between developed and underdeveloped countries is only 'dimensional' and not 'qualitative' in nature. It is also wrongly assumed that there is merely a 'time lag' between developed and underdeveloped countries. Actually, however, the very institutional setup of the underdeveloped countries is different from that of the developed countries. For such institutional differences, is it necessary to have a different framework for methods of evaluating public policies in underdeveloped countries?

There is a general tendency among economists to generate general propositions which they expect to be true for every time, place and economy, though there is no empirical
justification for this. When such theories are confined to the use in developed countries, there is not much harm done. But when models and concepts designed to fit the conditions of social reality of the developed world are applied to underdeveloped economies where the same conditions do not exist, such models and concepts do not fit in with reality and projections based on such models can have serious consequences. A major source of bias could enter into policy evaluation in underdeveloped countries by treating their internal problems and giving solutions to such problems from the point of view of developed western societies.

Due to institutional differences we observe two main characteristics of underdeveloped countries with respect to evaluation. The first is that the type of data on the basis of which evaluation will be done is very scanty. We are not, however, dealing with this problem in our study. The second characteristic is that many other factors mainly non-economic in nature need to be accommodated even in the methods of evaluation so as to meet the requirements of such economies in general.

We understand that any model is an abstraction but it should definitely be an abstraction of reality and should not be built in vacuum. Only then it will be able to help in making projections or finding solutions to evaluation problems of the particular kind of institutional setup. If this is so,
then it is no use starting with a model suited to developed economies and when any distortions arise, by attributing them to the residual influences, which are characteristic features of the underdeveloped economies, that we have not taken into account. To make evaluation useful we must from the very beginning make provisions for inclusion of these other factors into the methods, i.e., we must change the very framework of the methods for applying them to underdeveloped countries.

Of course this is difficult to do in the absence of plenty of empirical work. Hence, meanwhile it is also worthwhile to perform the negative task of demonstrating the inadequacy of the existing methods. But we should have the more ambitious purpose of replacing the framework of these model with a more realistic model for underdeveloped countries. Hence our first step is to find out how the underdeveloped economies actually function. Failure to do this would lead to distortions in evaluation and hence failure of planning.

In this chapter we shall discuss the aspects of the methods of multicriteria evaluation already available that do not fit into the conditions of the underdeveloped economies and then we shall make some suggestions for improvements in the methods for making them applicable for evaluation of public policies in underdeveloped countries.

Multi criteria evaluation processes necessarily involve the following:

(1) A set of decision variables from which the choice of the right alternative is to be made by assigning different set of values to the decision variables.

(2) A set of criterion variables (or impact variables) corresponding to the set of decision variables i.e., corresponding to the levels that the decision variables assume, the impact variables will assume certain levels.

(3) Some functional relationship which maps the set of decision variables to the impact variables.

(4) A vector of weights to be assigned to the impact variables (or criterion variables).

Let X be a vector of decision variables with n elements, and Y a set of impact variables with m elements. If the decision variables are fixed at certain levels say $X_1^*, X_2^*, \ldots, X_n^*$, then corresponding to these fixed levels, the different impact (or criterion) variables $Y_1, Y_2, \ldots, Y_m$, will also assume certain values depending upon the function that maps the X's to the Y's.

Hence we have,
For another set of values for the $x_i$'s the $y_i$'s will take different values. The overall effect of an alternative (i.e., one set of values of decision variables) will be calculated by taking weighted aggregative impact over all the impact variables, for which we will have a vector $W$ of weights consisting of $m$ elements such that the overall impact of the alternative represented by $(x_1^*, x_2^*, \ldots, x_n^*)$ is given by

$$W \times Y$$

or

$$\sum_{i=1}^{m} W_i y_i$$

Once we have described the general structure of the majority of multi-criteria methods we will now discuss their applicability in underdeveloped economies.

3. Non-Economic Factors in Evaluation

Let us first consider the vector of decision variables. In a developed economy, the decision variables (which compose
the alternative policies) consist of only economic factors. But in underdeveloped economies, the decision variables would include many non-economic factors also. In the developed countries an analysis of problems in 'economic' terms, i.e., in terms of markets and prices, investment, output, savings and consumption, unemployment, underemployment and such concepts that abstract from culture, institutions and attitudes of the people may lead to reasonably valid inferences, but in underdeveloped economies this procedure does not work at all. Here any realistic approach would be to include also the non-economic factors that do not adjust smoothly to economic changes but rather set up obstacles against them. There is therefore a greater need to coordinate the planning in the 'non-economic' and 'economic' fields.

The social matrix in the developed countries is generally permissive of economic development. Even if it is not then also it gets readjusted easily and does not place much obstacle in the path of economic progress. It is because of this that an analysis in purely 'economic' terms, abstracting from the social matrix can produce valid and useful results. In these countries the non-economic and the economic factors have become integrated in such a way that the non-economic factors have got adjusted to the system and even if any change takes place in the economic factors, the social and other factors readjust themselves to the new situation and vice versa.
It is as if the matrix consisting of economic and non-economic factors is indecomposable. In such a case even by changing the economic factors alone it is possible to effect the desired changes in the society.

In the underdeveloped countries not only is the social matrix not easily adjusted to economic conditions and changes in economic conditions but it also places obstacles to any effort to economic development that is made. In these countries the economic, social, political and other factors have not been integrated. When economic factors are changed, the impulses of such a change do not run through the other factors also to bring about the desired change in the overall economy. Rather each of these sectors seem to work on their own and reach their own equilibria. Due to this lack of integration, by changing some economic factors through policies it is not possible to bring changes in the right directions and so development cannot be ensured. However, the economic factors are also not totally independent of the non-economic factors so that the non-economic factors exercise their influences by presenting obstacles to economic development. The difficulty therefore is that such influences cannot be known since the complex relationship between economic and non-economic factors cannot be predicted. The many social evils prevailing in these economies like caste structure together with other factors like illiteracy, poverty, inequalities in the distribution
of income and wealth, often result in diverging the economy from the path that it is desired or intended to follow. Since there are many such non-economic factors that are non-conducive to economic growth, the situation calls for induced changes in the social and institutional structure, since they do not change spontaneously to changes in the 'economic' sphere and also because it is necessary to change any factors that are impediments to economic growth. There are many non-economic factors that are not only peculiar to these countries but are greatly responsible for their underdevelopment and for the particular difficulties faced by them in their efforts to develop. Many economists have felt that radical egalitarian reforms are necessary for steady and rapid development of underdeveloped economies. Since the aim of planning is not just to increase the per capita income or National Income (which is a very partial measure of development of an economy) therefore to bring about overall development in the economy we think that it is necessary to include in the set of decision variables, not only economic factors but also some of the most important non-economic factors which are thought to be major obstacles to economic growth.

This is therefore the first important difference between developed and underdeveloped countries. As the economy gets more and more developed with the better integration of all sectors it is possible to bring about desired changes by
changing lesser and lesser factors because their impacts will spread smoothly and predictably over the entire structure. The number of decision variable to be taken will also decrease with development. But in underdeveloped countries it would be wrong to use just a few 'economic' decision variables for economic policies since their impulses will not run through the entire structure to effect desired changes.

Moreover it would be very superficial to first establish a method based on purely 'economic' factors i.e., abstracting from non-economic factors and then reserving the possibility for later adding the considerations for non-economic factors. In underdeveloped economies it is difficult to demarcate between 'economic' and 'non-economic' factors.

Our first suggestion for improving the framework of the methods of multi-criteria evaluation to suit conditions of underdeveloped countries is that the set of decision variables should include both economic and non-economic factors. We realise that this will make the evaluation process more cumbersome, but considering the fact that any 'simplification' of this complex situation would in fact be 'distortion' of reality, we think that it is worthwhile to go through this cumbersome process. At least we will be free from the 'opportunistic' bias that is so much prevalent in studies on underdeveloped countries which arises due to the attitude to escape the complexities by going in for simplification.
4. Heterogeneous Structure of Preferences

Next let us come to the weight vector, \( W \). We know that due to the conflicting nature of the criteria it is difficult to find any policy (alternative) that optimises with respect to all criteria simultaneously. This is because higher level of achievement of one criterion is usually followed by a lower level of achievement of some other criterion. Hence one alternative may have a higher level of achievement of one criterion and lower level of achievement of some other criterion as compared to another alternative. This creates difficulty in comparing the two alternatives. It becomes necessary therefore to attach weights to the different criteria. These weights are assigned by the decision maker and they represent the needs and preferences of the society.

In developed countries, again, due to the involvement of different sections of society and due to greater equality in distribution of National Income there is much greater coordination between the preferences of the different classes of society. Hence it is not very difficult to give suitable weights to the criteria which will more or less approximate the overall preferences of the society. Therefore in such countries, the vector of weights will have some significance in the evaluation process. With development of the economy, the weights assigned to the different criteria become more or less unique and they become consistent.
But in underdeveloped countries the picture is different. In these countries there exist several classes in the society. Because of inequality in the distribution of income and wealth the economic standard of the different classes are different. Also the social structure of the different classes are different. As such, the needs and requirements of the different classes also cannot be the same. And so, the preference pattern of the different classes for the criteria also will be different. This means that there cannot be any uniqueness of weights in these countries as in developed ones. A set of vectors of weights will also not be consistent.

Not only this, the preferences and requirements of the different classes often conflict with each other. For achieving a criterion preferred by one class it may be necessary to sacrifice the level of achievement of another criterion preferred possibly by another class.

What we suggest, therefore, is that there should be more than one weight vector for such economies, each representing the preference pattern of a major class of society. But for this it is necessary to create another weight vector, this one for assigning weights to the different classes whose preferences are being taken into account.

5. Uncertain Relations Between Decision and Criterion Variables

Now, let us consider the functional relationship \( f_1 \)
which maps the decision variables to the impact variables (or criterion variables)

In the developed countries it is possible to predict more or less, the levels of the impact variables corresponding to the levels that the decision variables may assume. In the underdeveloped economies it becomes more difficult to relate observed outcomes and effects directly to policies. Policies exist in the operational world and not in the laboratory where randomness, coincidences, etc. can be controlled. Hence there may be numerous plausible explanations for the same effects. Due to the unpredictable manner in which the non-economic factors influence the working of the economy it is more likely that the outcomes (impacts) will be random in underdeveloped countries. Moreover it is difficult to generalise evaluation results in practice. The same program which has worked successfully under one set of circumstances and institutional setup or at one point of time may not work in other settings or at a different point of time. At one point of time, i.e., when evaluation is being done, a set of decision variables may yield certain values for the impact variables. But during actual implementation of policies (which will be at a different point of time) it may not lead to the same levels of impact variables as was predicted. In underdeveloped countries therefore it is more likely that \( f_i \) will be multi-valued functions. Hence for a set of decision variables we cannot
assign a single value to the impact variables. We can at the most say that the value of each impact variable, for a set of decision variable, will lie within a certain range and then use probabilistic models to arrive at a solution.

6. Costs of Uncertainty: Lower Achievements

But under probabilistic conditions if we want to optimise the achievement of one criterion we will have to sacrifice much more of an alternative criterion than we would have to do if the impacts were deterministically predictable. Hence to ensure achievement of target levels under probabilistic conditions with a high level of confidence one should be willing to pay the cost for it. However, the lesser the standard deviation the lesser the cost. In underdeveloped economies the standard deviations of the levels of impact variables are quite high and this is one of the main reasons why development is much more expensive in these economies. This also explains to some extent why there is so much underutilisation of resources.

We, therefore, suggest that probabilistic models are more suited to underdeveloped economies and such models and methods of multicriteria evaluation and decision making should be developed. In Chapter II we have seen that probabilistic models have hardly been developed for multicriteria evaluation.
It goes without saying that the set of impact variables, $Y$, should include non-economic factors also. The objective of planning is not only to improve economic conditions but also social conditions in these countries. Hence some of the criteria will be non-economic in nature.

7. A Summary of Proposed Improvements

Symbolically we may present the structure of our proposed improvements as follows:

Let,

$$[Y_1 | Y_2] = [F_1 | F_2][X_1 | X_2]$$

Where $Y_1$ stands for economic criteria
$Y_2$ stands for non-economic criteria
$X_1$ stands for economic type of decision variables
$X_2$ stands for non-economic type of decision variables
$F_1$ stands for the set of functional relationships of $(X_1 | X_2)$ with $Y_1$; $F_1$ are multivalued functions
$F_2$ stands for the set of functional relationships of $(X_1 | X_2)$ with $Y_2$; $F_2$ are multivalued functions

The symbol "|" stands for partition.

The problem of Evaluation is to find the ordered set $S = [(Y_1, X_1), (Y_2, X_2), \ldots, (Y^K, X^K)]$ such that

$$(Y^1, X^1)$$

is not dominated by $$(Y^j, X^j)$$ where $j > i,$
\[ Y^1 = [Y_1^1 | Y_2^1], \quad X^1 = [X_1^1 | X_2^1] \text{ for all } i \]

or to find out the ordered set

\[ V = \left[ w(Y^1, X^1), \ldots, w(Y^k, X^k) \right] \text{ such that } w(Y^1, X^1) \text{ is not dominated by } w(Y^j, X^j) \text{ for any } j > 1, \]

and \( w \) is a vector of weights, obtained from a compromise solution of weights assigned to the different objectives by the different classes in the society.

The problem of decision making is to choose \((Y^1, X^1)\) from \(S\) or \(V\) for implementation.

For developed economies \(Y_2, X_2\) may be null sets, and \(F_2\) may be irrelevant. \(F_1\) may be single valued. But for underdeveloped economies \(Y_2\) and \(X_2\) are not null, \(F_2\) are relevant and \(F_1\) and \(F_2\) are multivalued.

With this kind of framework for multicriteria methods, they will be more suitable for application to underdeveloped countries. There is no doubt that such modifications will make the evaluation process more complicated. But if evaluation is to be really useful then it must be based on reality even if it is difficult to do. Hence we think that such modifications are worthwhile in underdeveloped countries.