CHAPTER IV

POLICY ANALYSIS MATRIX

This chapter gives a brief introduction on the Policy Analysis Matrix (PAM) framework and then goes on to discuss as to how the framework can be constructed. Based on the framework, effort has been made to interpret the results. PAM has been used in this study as the major tool for analysis because the efficacy of both agricultural price policies and public investments in agriculture can be studied with one approach and that is the Policy Analysis Matrix. This kind of analysis using the PAM shows the individual and collective efforts of price and factor policies. The PAM also provides essential baseline information for benefit-cost analysis of agricultural investment projects (Pearson, Gotsch and Bahri, 2003). With the use of Policy Analysis Matrix in this study the objectives of measuring the profitability of rice production, assessing the impact of policy changes affecting the economic viability of rice and its associated technologies and determining critical policy options and changes in rice production can be met.

Policy Analysis Framework (PAM) a logical framework for policy analysis was developed over the later 1970s and early 1980s by Scott Pearson of the Food Research Institute, Stanford University, and explained in detail by Monke and Pearson in 1989 (Kydd, Pearce and Stockbridge, 1996). According to Seini (2004) it is basically an application of social cost-benefit analysis and the basic concepts of trade theory. The PAM approach is a system of double-entry bookkeeping and is constructed for the study of each selected agricultural system. With the PAM method, the analyst reassesses the revenues, costs, and profits indicated in farm-level and marketing budgets (Monke and Pearson, 1989). The analysis of divergences between private costs and social costs and benefits form the core of policy analysis (Monke and Pearson, 1989, cited Ekasingh, 1999). The construction of PAM model starts

with the estimation of farm budgets that represents the costs and returns to production activities (Adesina and Coulibaly, 1998).

The basic PAM is a three by four matrix accounting matrix designed to display the financial (private) and economic (social) returns to an activity (Monke and Pearson, 1989). The basic format of the PAM, as shown in Table 4.1, is a matrix of two-way accounting identities. The model consists of two components: (i) the profitability identity in which profits are identically equal to revenue less costs, which includes tradable inputs and domestic factors and enables us to isolate private profits from the social profits;(ii) the divergence identity which measures divergence between observed private price and estimated social price.

Table 4.1. The Policy Analysis Matrix (PAM)

	Revenue	Costs		Profits
		Tradable Input	Domestic factor	
Private values	A	B	C	D
Social Values	E	F	G	H
Effects of divergences	I	J	K	L

D = (A-B-C); H = (E-F-G); I = (A-E); J = (B-F); K = (C-G); L = (D-H) = (I-J-K).

Source: Monke and Pearson, 1989

There are three principal purposes of the PAM analysis. The first one is to provide information and analysis to assist policy makers in three central areas of agricultural policy. The construction of a PAM for an agricultural system allows one to calculate private profitability – a measure of the competitiveness of the system at actual market prices. Similar analyses of other systems permit a ranking of the competitiveness of agricultural systems at market prices. The calculation of private profitability or the competitiveness is carried out in the first row of the PAM matrix where it is defined as private profits (D=A-B-C). Private revenues (the revenues at the

prevailing market prices) are shown by the letter A. Costs are divided into two components--Costs of tradable inputs (inputs which are traded on world markets) such as fertilisers, weedicides and seeds. The value of these tradable inputs at the prevailing market prices (private prices) are recorded in the first row and second column and are denoted by the letter B. Tradable inputs used in the analysis are imported from to other countries. The third column of the matrix includes domestic factors or the non-tradable like land, labour, and capital. Domestic factors as denoted by C are also called non-tradable inputs because there is generally no international market for these inputs.

The fourth column in the matrix is labeled as profits. Private profits are denoted as D in the matrix and are included in the first row of the fourth column. Profits are defined as total revenues minus total costs. A positive value for profits at prevailing market prices confirms the profitability of the business. Positive profits also provide stimulus for existing firms to increase output and for other forms to enter the business. It is very important to note that when the market prices of inputs or outputs are distorted by either market failure or by taxes or subsidies, then private profits alone could provide misleading signals.

A second purpose of the PAM approach is to estimate the agricultural systems' social profitability. This is shown by the second row of the PAM whereby social profits, H=(E-F-G). Social profits are those profits calculated at efficiency (shadow) prices. The letter E portrays the revenues valued at efficiency prices (social prices) and F and G indicate the efficiency values of tradable inputs and domestic factors, respectively. Positive social profits (H) indicate that there is a positive social valuation of output and is an incentive for the expansion of the activities under consideration.

The third purpose of the PAM analysis is to measure the transfer effects of policies. By contrasting revenues and costs before and after the impositions of a policy, one can determine the effect of that policy. This is shown by the third row of the matrix where L = I - J- K or L = D - H. If market failure does not exist, then

distorting policies causes all divergences between private and social prices of tradable outputs and inputs. Policies, which may cause divergences, include subsidies, taxes and quantitative controls applied to domestic production or trade of the commodity. Price policies may also cause distortions.

In the third row, if the value of I, defined as output transfer, is positive then private revenues exceed social revenues. This indicates that the Government is subsidising output prices or in the absence of a subsidy there is room for a tax to eliminate this divergence and to scale the output back to where the social and private valuations are equal. If the government is subsidising the output, then the Government and/or consumers are purchasing the commodity in prices greater than international market prices or those that would equate social and private valuations. The value of the difference is theoretically a transfer from the treasury to the producers of that commodity.

If the value of I is negative, then social revenues are greater than the private revenues. This means that the government is taxing instead of subsidising the producers. In other words, the government and/or consumers are purchasing production in prices lower than those prevailing in international markets or those that equate private and social valuations. The actual or implicit tax, in this case, is a transfer from producers to the treasury.

The letter J represents the differences between the private costs and social costs of tradable inputs. If J is negative, the private cost of tradable inputs is lower than the social costs. This means that the government is actually or implicitly subsidising the costs of inputs as these inputs are sold at prices lower than those prevailing in the international markets. There is a need to curtail the use of these inputs for the sake of efficiency.

On the other hand, if J is positive, then private cost of inputs are greater than the social costs. This indicates that the Government is probably taxing the price of inputs used by farmers. The net effect is that prices paid by farmers are greater than

the world market prices and efficiency can be served by expanding the use of these inputs.

The letter K portrays the divergences in domestic factors. The Government can affect the prices of domestic factors such as capital or land. When any factor of production is subsidised, the private cost of a domestic factor will be less than the social costs and K will have a negative value. But, if the Government taxes domestic factors, which rarely is the case in developing countries, K will have a positive value. Again we need to eliminate the difference between the two valuations. This divergence can be affected by re-alignment of the taxes and subsidies or by adjusting the prices of the domestic factors.

Taxes and subsidies are commodity-specific policies. They directly affect the prices of outputs or inputs. Governments may use indirect policies such as the manipulation of the exchange rate of the country's currency to affect commodity prices. Since in PAM accounting is done in domestic currency and world prices are reported in international currencies, hence an exchange rate is required to express international prices in their domestic equivalents. The effect of exchange rate manipulation depends upon whether the policy results in over or under-valuation. An overvalued exchange rate occurs if there is an excess demand for foreign currencies, which results in extra foreign borrowing, excessive drawing down of exchange reserves, or rationing of foreign exchange among domestic users. "An undervalued exchange rate reflects an excess supply of foreign exchange that is accumulating as excessive reserves and reducing potential income".

An overvalued exchange rate inflicts an implicit tax on producers of tradable exportable goods. Overvaluation reduces the competitiveness of the local producers in international markets because they are practically being taxed. Undervalued exchange rate exerts the opposite effects. The social exchange rate may differ from the official exchange rate or even an artificially supported exchange rate. In the PAM approach, this distortion in the exchange rate is actually corrected once border prices

are converted to domestic prices at the social exchange rate (equilibrium exchange rate) rather than at the official rate.

The letter L denotes the net effect of all policies on the commodity system. It is the sum of all divergences that cause private profits to differ from the social profits. It shows the extent of inefficiency in an agricultural system. If market failures are a large source of the net transfer, this measure indicates how much long-term government effort (price policy, investment, and regulation) will be required eventually to permit the economy to operate efficiently. If most of the L is traced to distorting policies, the government can increase efficiency by reducing the distortion – unless such changes will seriously impair the attainment of non-efficiency objective. If the overall effect of all policies and/or market failures on input and output prices is in favour of the producers (in the short run), L will have a positive value. Alternatively, L will have a negative value, if the policies and/or market failures are working to the detriment of the producers.

The most difficult task for constructing a PAM is the estimation of social prices and the decomposition of inputs in to their tradable and non-tradable components (Yao, 1997). The principal aim of social profitability analysis is to find out if a production system is efficient and thus contributing to the growth of national income (Salam and Rahmadani, 2003). Theoretically, social prices are those that would exist in perfect market situation and such prices are estimated using different methods such as identification of quantifiable market intervention that make the differences in the observed and free market price, calculation of border price and the estimation of shadow prices (Monke and Pearson, 1989, Yao, 1997). The social price in the matrix correct for effects of distorting policies and these distorting policies are introduced because decision makers are willing to accept some inefficiency in order to further some non-efficiency objectives (Seini, 2004).

As the Policy Analysis Matrix (PAM) framework is simple and yet providing to vast insights on the quantitative analysis of agricultural systems, it is felt as the right choice of model for this study.