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# THE POLICY ANALYSIS MATRIX FOR CROP ROTATIONS IN EGYPT

**A Case Study**

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## I. INTRODUCTION

The increase in interest in policy analysis in recent years has arisen from the serious economic problems faced in a large number of developing countries over the past decade. These problems include severe indebtness, acute balance of payments deficits, inflation, economic stagnation, and related problems that have in some cases reached crises proportions.

In order to face such circumstances the last decade has seen a growing number of devolving countries implement a package of economic reforms generally defined as "stabilization policies" and "structural adjustment policies".

The major difference between these policies is that IMF stabilization policies aim at restore current account deficits in the short run, while the structural adjustment programmes of the World Bank have a wider development role in establishing better conditions for economic efficiency and growth.

A typical stabilization policy recommends a devaluation of the national currency, coupled with measures to reduce public sector expenditure and restrain any inflationary tendencies which could invalidate any increase of the nominal exchange rate. Ceilings are place on government borrowing and on money expansion. Food and other subsidies are discouraged. Wage increases, especially in the public sector, are contained. More detailed recommendations, however, are refrained form. The government in question decides on the incidence of cuts, etc., provided ceilings and macro targets are observed.

On the other hand, a typical structural adjustment programme works on the premise that any distortions in the economy should be dismantled in order to restore efficiency. The timing, extent, and priorities of adjustments in eliminating distortions and prioritizing the role of markets signals has become the subject of detailed discussions and recommendations.

The rationale behind these policies is based on the causes of excess consumption in developing countries. These exists an unfinished debate as to the relative importance of external and domestic factors. The choice of policies considered is based on the analysis of the root causes of the problems and the factors aggravating and perpetuating these problems. The effective implementation of policy reforms requires that policy measures be identified and their effects anticipated. In this macroeconomic context the role of "policy analysis" has come to the forefront.

## II. ECONOMIC FRAMEWORK FOR AGRICULTURAL POLICY ANALYSIS

### 2.1 Agriculture Under Structural Adjustment

As noted in the introduction, structural adjustment programmes can have a positive impact on agriculture and hence on rural populations by reducing or eliminating disequilibria in the general economy. The total impact also depends on the measures that directly influence the agricultural sector through their effects on production, distribution, marketing and pricing of inputs and outputs.

In the approach of structural adjustment the key objective is to improve resource allocation and to reduce or eliminate inefficiencies created by government intervention. In other word, the programmes seek to reduce the government's role in the production, pricing and marketing of agricultural commodities.

Structural adjustment programmes aim at raising producer prices to the levels of international prices, thereby also raising farmers' returns. The net effect of such policies on government tax revenue depends on the extent to which the reduction in revenues resulting from tax rate decreases is offset by the higher tax base brought by increased exports.

Even if total export tax revenues decline , the net effect on the government budget depends on the changes in the government outlays resulting from the reform of dismantling of inefficient parastatals as part of a general liberalization policy.

Trade liberalization may benefit agriculture directly and indirect. The lowering or abolition of trade taxes improves the relative prices of exportable commodities. Deregulation and privatization of trade and marketing channels may also favour agricultural producers.

However, several factors may contribute to reversing these benefits either in part or completely. In case of agricultural products which had benefitted from import protection tariffs, trade liberalization would tend to reduce their relative prices. The net effect on the prices of such commodities will depend on the extent to which they were protected and on the degree of reduction in trade protection.

### 2.2 Agricultural Policy Analysis

Policies are the instruments of action that governments employ to effect changes. Three principal categories are aimed at changing resource allocations in agriculture.

The first is agricultural price policy. Two main types of price policy instrument can be used to alter prices of agricultural outputs or inputs:

- Quotas, tariffs, or subsidies on imports and quotas, taxes, or subsidies on exports directly decrease or increase amounts traded internationally and thus raise or lower domestic prices. These policies apply only to volumes traded internationally, not to domestic production.

- Domestic taxes or subsidies, in contrast, create transfers between the government treasury and domestic producers or consumers. Some cause a divergence between domestic and world prices; others do not.

The second category of policies is nationwide in coverage. Macroeconomic policy includes the central government's decisions to:

- Tax and spend (fiscal policy);

- Control the supply of money (monetary policy);

- Impose macro price policies affecting the foreign exchange rate (exchange rate policy) and the domestic factors (wage, interest, and land rental results).

With the exception of land market policy, these decisions typically are not taken because of their impact on agriculture.

The third category of policies is public investment policy. In addition to price and macro polices, governments influence their agricultural sectors through public investment policy. Government budgetary resources can be invested in agriculture to increase productivity and reduce costs. The most common investments are:

- In agricultural research to develop new technologies;

- In infrastructure (roads, irrigation, marketing facilities);

- In specific agricultural projects to increase productive capacity and demonstrate new technologies;

- In education and training of agriculturists to upgrade the human capital in the sector.

The first step in policy analysis is to have a clear understanding of the current design of policy. We need to understand where we are in order to understand how to go somewhere else.

Quantitative policy analysis plays a dynamic role in the policy making process by ensuring that the agricultural sector objectives, constraints, and policies remain consistent.

The role of policy analysis may be described as follows:

- Identification of problems and constraints;
- Analysis of problems, identification of causes and contributing factors;
- Identification of objectives and alternative policies meeting these objectives;
- Examination of policy options and their socio-economic impact;
- Make appropriate recommendation on specific policies for government and recommending ways of ensuring monitoring and evaluation of policies and their amendment where necessary.

## 2.3 Agricultural Economic Policy Reform in Egypt

Following are the major measures of agricultural economic policy reform in Egypt:

- Removing governmental controls on:
  - farm output prices, (this does not preclude government crop price supports) and crops areas;
  - procurement quotas with regard to crops except cotton, sugar cane, and rice.
- Increasing farm gate prices of cotton and sugar cane.
- Removal of farm inputs subsidies.
- Removal of governmental constraints on private sector in:
  - importing, exporting and distribution of farm inputs to compete with the Principle Bank for Development and Agricultural Credit (PBDAC).
  - importing and exporting agricultural crops particularly citrus.
- Adjusting the interest rate and the foreign exchange rate.
- Adjusting the land tenancy system.
- limitation on state ownership of land and sale of new land to private sector.
- Diverting gradually the role of PBDAC to financial services.

## III. THE POLICY ANALYSIS MATRIX (PAM)

The Policy Analysis Matrix (PAM) approach to policy analysis is a simple powerful tool for analyzing the impact of current policies on costs and returns of agricultural production. The results can be used to identify which crops are competitive under current policies affecting both output and input prices and how profit changes as policies are altered. Through the use of an accounting matrix, the sources of all policy distortions affecting profitability become easily identifiable. Finally, a PAM can also address the issue of economic efficiency (or comparative advantage) thus providing important information on how best to allocate funds for investment and research.

The main purpose of PAM analysis is to measure the impact of government policy on the private profitability of agricultural systems and on the efficiency of resource use.

PAM methodology allows the comparison of actual private profitability of a given commodity with the economic profitability as it would be in free trade environment. The coefficients calculated on the basis of the PAM data permit the ranking of commodity systems according to the degree of protection that they receive and the efficiency with which they receive. The indicators can be calculated for the commodity system as a whole or for each single stage so that more specific measures can be identified and recommended.

### 3.1 Elements of the Policy Analysis Matrix

The matrix consists of three rows and four columns. The PAM is a product of two accounting identities, one defining profitability (first two rows ) and the other measuring the effects of divergences (third row). Profitability is measured horizontally, across the columns of the matrix. Profits shown in the fourth column are found by subtracting of costs, given in the second and third columns, from revenues indicated in the first column. The two cost columns contained in the PAM representing costs of tradable inputs and costs of domestic factors.

$$\text{Profit} = \text{Revenue} - \text{Cost}$$

The equation can be written in terms of actual private (market) prices or social (shadow) prices. The Policy Analysis Matrix presents the results of such comparisons.

| | | Cost | | |
|---|---|---|---|---|
| | Revenues | Tradable inputs | Domestic factors | Profits |
| Private profits | A | B | C | D |
| Social profits | E | F | G | H |
| Transfers (Divergences) | I | J | K | L |

Comparisons of private and social costs and returns provide three essential pieces of information for the policy maker. The calculation of private profitability provides information on the incentives and competitiveness of domestic commodity and factors markets. The same computations using social prices provide information on profitability of commodities and factors when these are priced at their social or opportunity cost. Divergences provide insights into the extent of policy interventions in the form of taxes, subsidies and trade restrictions. The comparison also points to imperfections in the functioning of factor markets.

**Private Profits**

The data entered in the first row of the matrix provide a measure of private profitability. Private profits expresses the returns of an activity when products and factors have been valued at market price. Private profits shows the competitiveness of the agricultural system, given current technologies, output values, input costs, and policy transfers.

In the PAM it is defined as the difference between the revenues (A) and costs (B+C). Private profits is calculated at actual market prices and is defined in the PAM as (D).

Private profits: $D = A - B - C$

If $D<0$ (private profits are negative), operators are earning a subnormal rate of return and thus can be expected to exit from this activity, unless something changes to increase profits to at least a normal level i.e. $D=0$.

If $D>0$ (private profits are positive), operators are earning supernormal returns and should lead to future expansion of the system, unless some constraints are existing.

### Social Profits

The data entered in the second row of the matrix provide a measure of social profitability. Social profits expresses returns to the economy when products and factors have been valued at their opportunity cost. Social profitability measures the comparative advantage or efficiency in the agricultural commodity system.

In the PAM it is defined as the difference between the revenues (E) and costs (F+G). Private profits is calculated at prices that reflect social opportunity cost and is defined in the PAM as (H).

Social profits: $H = E - F - G$

If $H<0$ (social profitability is negative), the production system is using resources inefficiently and gives a negative contribution to the national income.

If $H>0$ (social profitability is positive), the production system is using resources efficiently and gives a positive contribution to the national income.

### Transfers (Effect of Divergences)

Transfers expresses the effects of policy interventions and market failures, which are reflected in the difference between private and social costs and returns. In the PAM transfers defined as the differences between private and social valuations of revenues, costs, and profits i.e. $I=A-E$, $J=B-F$, $K=C-G$, and $L=D-H$.

Output transfers: $I = A - E$

If $A<E$ (output transfers are negative), this is the case when the private output price is less than the social out price.

If $A>E$ (output transfers are positive), this is the case when producers can fix a market price higher than the international price for similar items.

Input transfers: $J = B - F$

If $B<F$ (tradable inputs' transfers are negative), this happens when producers are paying tradable inputs a price lower than the corresponding world price, e.g. a subsidized price.

If $B>F$ (tradable inputs' transfers are positive), this happens when the market price of tradable inputs higher than the world prices.

Factor transfers: $K = C - G$

If C<G (domestic factors' transfers are negative), this is the case when producers pay for domestic factors a price less than its opportunity cost.

If C>G (domestic factors' transfers are positive), this is the case when producers pay for domestic factors a price higher than its opportunity cost.

The sum of the first three elements on the transfer line gives the total value of the incentive/disincentive effect of government policies and market failure on private profitability and defined as (L).

Net transfers: $L = D - H$

$L = I - J - K$

If L>0 (profits effect are positive), the commodity activity is generating profits at a level higher than what would occur in a without government intervention situation.

## 3.2 Measures of Economic Protection

Economic protection defined as the degree to which domestic prices are sustained above world market prices. At least some agricultural prices deviate from international levels in all countries, developed and developing alike.

Economic protection could be positive and also could be negative. As an example of positive economic protection, the Japanese price of rice at the farm gate has been three to four times higher than the international price. As an example of negative protection, the Egyptian price of cotton at the farm gate amounted only eighty percent its international equivalent.

Economic protection distorts the allocation of resources away from a more efficient pattern that could be achieved through greater reliance on mechanism of international trade, and it diminishes economic welfare in other countries through reducing their opportunities to participate in international trade.

The optimal or desirable rate of protection is not always immediately obvious, but it is clear that protection that is excessively high, or strongly negative, or sharply uneven over products has negative net economic effects.

## Protection and Comparative Advantage

Protection coefficients are important analytic tools for monitoring the performance of the sector over the time. Some kinds of protection coefficients are useful in assessing the comparative advantage of products in the sector.

The information behind such coefficients is central to developing production and trade strategies for the sector. Protection can be measured using two different but closely related concepts, nominal protection and effective protection.

## Nominal Protection Coefficient (NPC)

The nominal protection coefficient involves a comparison of a product's (output's) domestic price with its international counterpart, after converting to common currency units via the exchange rate.

The NPC is, thus, a summary indicator of all protection or taxation measures that prevent equality between domestic and border prices, and can be used to show whether the price structure works as an incentive or disincentive to local producers.

According to PAM elements, the NPC is the ratio between revenues measured at private prices (A) and revenues measured at social prices (E).

$$NPC = \frac{\text{Revenues measured at private prices}}{\text{Revenues measured at social prices}} = \frac{A}{E}$$

If NPC > 1, this means that the private price is higher than the border price and implies an implicit subsidy to producers.

If NPC < 1, this means that the private price is lower than the international price, reflecting an implicit tax on producers. In other words those involved in the commodity system are earning less than they would if the commodity was freely traded.

If NPC = 1, this means the absence of any price intervention. In other words, the absence of any protection.

## Nominal Protection on Inputs (NPI)

NPI is the ratio between tradable inputs measured at market prices (B) and tradable inputs measured at social prices (F).

$$NPI = \frac{\text{Tradable inputs measured at private prices}}{\text{Tradable inputs measured at social prices}} = \frac{B}{F}$$

If NPI < 1, it means that the government is subsidizing the use of inputs by farmers.

If NPI > 1, it means that the government is taxing the use of inputs by farmers.

**Effective Protection Coefficient (EPC)**

Effective protection is a natural extension of the nominal protection concept in that it makes allowance for distortions in the output as well as the input markets. It is conceptually easy to find a case where output prices are high relative to world prices, but where the disincentives in the input market are so large that net incentives are negative. Effective protection coefficient takes this phenomenon of balancing implicit taxes on production with subsidies on input, or vice-versa, into consideration as it measures the net effect of domestic economic policy in both the output and input markets.

Generally,the effective protection coefficient is the ratio of value added (in producing the given output), computed at prevailing domestic prices, to that same value added computed at international prices.

In PAM, the EPC is the ratio between value added measured at market prices (A-B) to the value added measured at social prices (E-F). EPC takes into account the values of both outputs and inputs.

$$EPC = \frac{\text{Value added measured at market prices}}{\text{Value added measured at social prices}} = \frac{A-B}{E-F} \quad \text{or}$$

$$EPC = \frac{\text{Financial price of output-Financial price of traded inputs}}{\text{Social price of output - Social price of traded inputs}}$$

If EPC > 1, it implies protection of the commodity i.e, the commodity activity is receiving positive incentives. In other words the combined effect of transfers on revenues and tradable inputs is increasing private profits above socially optimal levels.

If EPC < 1, it implies a net disincentive to the commodity activity.

## Notes on Protection Coefficients

- The NPC and NPI are useful tools that can be used to obtain a preliminary assessment of the incentive structure facing a commodity, EPC is a more accurate measure of price incentives.

- The rate of protection is expressed in percent and defined as 100*(Protection coefficient - 1), Accordingly:

  * The Nominal Rate of Protection on Outputs = 100*(NPC - 1);

  * The Nominal Rate of Protection on Inputs = 100*(NPI - 1);

  * The Nominal Rate of Effective Protection = 100*(EPC - 1).

- Protection rates can vary substantially in short periods of time, mainly because they are measured against international prices, which vary considerably from year to year. The sources of instability are:

  1) variations in the real domestic price;

  2) variations in the world market price;

  3) variations in the degree of disequilibrium in the exchange rate.

  Therefore it is preferable to calculate the protection coefficients for several years, or at least three years, before attempting to draw conclusions about protection policies.

- Protection rates can vary substantially by technology and region.

- Protection rates do not say much about the comparative advantage of domestic producers in the international market. A high rate of protection is incompatible with competing against imports or entering export markets.

## Domestic Resource Cost (DRC)

The DRC coefficient is a cost/benefit ratio. It measures the incremental increase in primary inputs valued at their shadow prices for an incremental increase in net output valued at its shadow price. Primary inputs (land, labour and capital) are the non-tradable inputs (i.e., non-tradable in the international market) used in domestic production. Net output is defined as value added or output price minus costs of tradable goods. Border prices for tradable are usually taken to represent their shadow prices. The opportunity cost of non-tradable or primary factors are their shadow prices.

The DRC coefficient is the rate at which a country is substituting domestic resources to produce one unit of a commodity for each unit of foreign exchange saved by not importing that commodity.

In the PAM the DRC coefficient measures the social cost of using domestic resources (G) with the net flow of foreign exchange (E-F) generated by the system.

$$DRC = \frac{G}{E - F}$$

The DRC concept is essentially a measure of the efficiency of domestic production relative to the international market. It indicates whether there are social costs or social benefits in producing the commodity rather than importing it. Consequently, the DRC coefficient can be used as a measure of the comparative advantage of a commodity system. A commodity system has a comparative advantage when its DRC is < or = the equilibrium exchange rate.

If DRC < 1, it means that it is needed less than one unit of domestic resources to generate one unit of foreign exchange. In this case the country enjoys a comparative advantage in producing the commodity as the costs associated with importing the commodity are greater than the costs of producing it domestically.

If DRC > 1, it means that more than one unit of domestic resources is needed to generate one unit of foreign exchange. This means that the country is not internationally competitive in the production of the commodity or the country is better-off importing the commodity than producing it. In other words the opportunity cost of using domestic resources exceeds the value added (at world prices); this is socially unprofitable activity.

<u>Notes on Comparative Advantage</u>

- Comparative advantage is dynamic. It changes with exogenous fluctuations in world prices, but also with technological factors such as yield increase and substitution of imported inputs for domestic inputs.

- Border prices at the relevant marketing level, which play an important role in DRC analysis, are affected by marketing efficiency in the domestic market.

- Changes in marketing factors such as port charges and domestic transport will affect the border prices for inputs as well as outputs. Such changes in these elements will alter comparative advantage without there being any structural or technological changes in production activity.

- If a country does not have comparative advantage in the production of a particular commodity, it should produce other commodities for which comparative advantage exists. Yet, it is quite possible that the region where the commodity is produced does not have other production options.

- Comparative advantage and competitiveness in the export market are two closely related but separate concepts. Comparative advantage simply shows if a country is better-off producing a commodity than importing it, but does not provide a proof that the country can effectively compete in the international market. A country can have comparative advantage in producing a commodity, but its marketing system may prove unable profitably move the commodity to potential import markets. Competitiveness can also be artificially created by subsidies and other policy measures that will enable exporters to offer lower price than its competitors.

## Summary of Protection and Comparative Advantage Measures

### I. Nominal Protection Coefficient (NPC)

NPC = 1 implies no distortion on output price

NPC > 1 implies an implicit subsidy to producers

NPC < 1 Implies an implicit tax on producers

### II. Nominal Protection on Inputs (NPI)

NPI = 1 implies no distortion on input price

NPI > 1 implies an implicit subsidy to inputs

NPI < 1 implies an implicit tax on inputs

## III. Effective Protection Coefficient (EPC)

| | |
|---|---|
| EPC = 1 | implies no distortion |
| EPC > 1 | implies effective protection or a net incentive to producers |
| EPC < 1 | implies effective taxation or discrimination against producers |

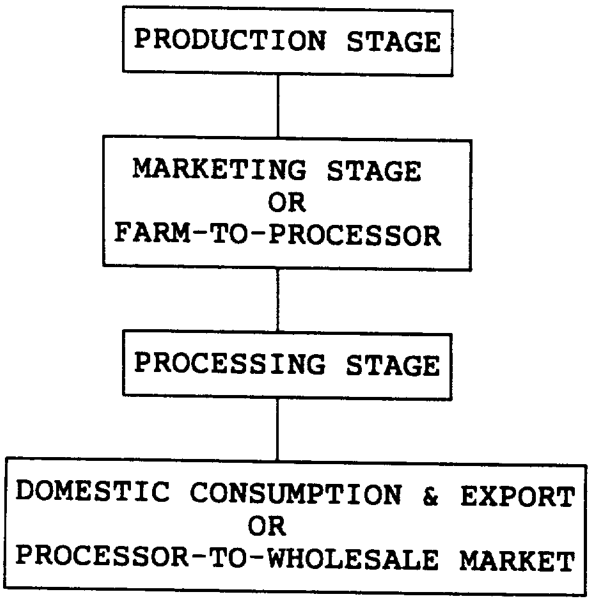
## IV. Domestic Resource Coefficient (DRC)

| | |
|---|---|
| DRC = 1 | indicates an inclusive test. |
| DRC > 1 | indicates comparative disadvantage or that the activity is inefficient. |
| DRC < 1 | indicates comparative advantage or that the activity makes efficient use of domestic resources to save or earn a unit of foreign exchange. |

## 3.3 The Stages of the Commodity System

The most efficient supply of agricultural produce is not necessarily from the most efficient producers; it is rather the result of the combination of the costs of producing, marketing and processing the commodity. For example, inefficiencies in transport, marketing and processing may generate negative value added; e.g. the value added at the production stage will be reduced by the activity downstream.

Including transport, marketing and processing stages in the commodity system analysis is critically important in order to identify exactly where is the main bottlenecks to the full exploitation of the commodity lie and the overall comparative advantage of the country in producing a given commodity. Following figure illustrates the structure of the commodity system.




Following are short notes about activities contained in each stage and level of analysis:

**Production Stage:**

Inputs and outputs for production of raw materials. Evaluation stops at farm gate.

**Marketing Stage or Farm-to-Processor Stage:**

Commodity moved from farm gate to processing site. It may include storage and handling as well as transportation costs.

**Processing Stage:**

Commodity processed into consumer-acceptable form. It may involve physical transformation or just packing, handling, and quality control.

**Domestic Consumption or Processor-to-Wholesale Market:**

Commodity moved from processing site to market where domestic activity is comparable to tradable product. It may include inputs and outputs for farm-to-wholesale market if processing activity is irrelevant.

Example of Hypothetical DRCs for Different Stages of Two Commodities

| | STAGE 1 (production) | STAGE 2 (marketing) | STAGE 3 (processing) | TOTAL |
|---|---|---|---|---|
| COMMODITY 1 | | | | |
| system 1.1 (traditional) | 1.2 | 0.8 | 1.0 | 0.9 |
| system 1.2 (innovation) | 1.5 | 0.5 | 0.4 | 0.7 |
| COMMODITY 2 | | | | |
| system 2.1 (traditional) | 0.8 | 1.2 | 1.9 | 1.2 |
| system 2.2 (innovation) | 0.7 | 1.8 | 1.7 | 1.4 |

Looking first at the column labeled total, commodity 2 is inefficient under the two systems, while commodity 1 is always efficient. According to such results, government policies should promote commodity 1 and discourage commodity 2.

Both commodity 1 systems have comparative advantage with total DRCs less than one. In the case of commodity 1, system 1.1 is more efficient at stage 2 (marketing) while system 1.2 is more efficient in stages 3 and 2 (processing and marketing). Commodity 2 is quite efficient in stage 1 (production) while not efficient in stages 2 and 3 (marketing and processing)

## 3.4 Social Valuation in the Policy Analysis Matrix

Commodities are usually defined as tradable and non-tradable goods. For tradable inputs and outputs, social valuation entails calculation of world price equivalents for the domestic product. For domestic factors, the social valuation process begins with observed market prices and then adjusts those prices for the effects of factor market divergences.

The production of any good or service, whether it be tradable or non-tradable, is the result of a transformation of some combination of traded and non-traded goods and services. Therefore the contents of a non-tradable can be broken down into tradable and original factors. Original factors basically refers only to labour and land, the essential domestic resources.

### Estimating Social Prices for Tradable Goods

Tradable goods, by definition, have border prices. Tradable goods may be divided into four categories:

| Category | Price |
|---|---|
| Exported output | The price is the FOB value of commodities actually exported. If the country is a major exporter of the good and its sales can affect the international price, the shadow price is the marginal export price. |
| Diverted export | The price is the FOB value of commodities that would be exported if they were not used as inputs by the domestic economy. |
| Import substitutes | The price is the CIF value of commodities that would be imported if there were no domestic production by the commodity system. |
| Imported inputs | The price is the CIF value of imported goods used by the commodity system to produce outputs. |

## Estimating Social Prices for Non-Tradable Goods and Services

Non-tradable goods and services have no readily available border price by which to measure social value.

## Estimating Social Prices for Domestic Factors

All analysis begin by asking a basic question: what does the economy forgo because input X is used in the production of Y?. This is refered to as its contribution to the next best alternative use.

There are two polar cases. First, no alternative is forgone if input X is not used in production of y. Second an alternative is forgone if the contribution of X in the alternative output Z would have been as valuable as in the current production of Y. The task is to identify and price this next best alternative.

### Shadow Price of Land

If there is a competitive market in renting or leasing land, it can be assumed that land rentals and prices reflect the marginal productivity of the land, then there is no real problem in determining its social value as the rental value indicates the net value of production of the land. If there is no land market or rental market exists, the production foregone from the unit of land would be its value.

In valuing social cost of land used by a crop in PAM we will consider the second best alternative of crops that compete directly for land with the concerned crop. The foregone production, in this case, will be the social value of " profit excluding land cost".

### Shadow Price of Labour

The market wage of labour sometimes does not reflect the opportunity cost of the marginal worker to the economy. In many countries government fixes minimum wage rate for unskilled labour

The valuation of labour in shadow terms is of importance, specially, in production systems where labour forms a large part of the total cost structure. Generally speaking, the opportunity cost of labour in production of Y is its contribution to Z, or its marginal product in the next best alternative. If the labour markets are competitive, an average of market wage rates is indicative of the marginal product of labour.

In valuing social cost of labour participating in the production of a crop in PAM we will consider the best wage prevailed in the sector.

Shadow Price of Irrigation Water

Assessing the economic value of water can be a difficult task because its value is dependent on the particulars of the delivery system: quality, time, and location.

If the public provision of irrigation water is a major component of public investment, as in Egypt, water's shadow price is equal to the cost of operating and maintaining the delivery system. The best source of information would be a detailed cost-benefit appraisal of the investment in the irrigation system.

Finally, the following table illustrates the sources of social prices for tradable and non tradable goods and domestic factors :

| Item | Source of Social Price |
|---|---|
| Revenue (Tradable Output) | |
| - exported | border price |
| - exportable (diverted export) | border price similar goods |
| - import substitutes | border price of competing goods |
| Tradable Input | |
| - imported | border price |
| - importable | border price of similar goods |
| Domestic Resources | shadow prices |
| Non Tradable Input | break-down in terms of tradable inputs and domestic resources. Domestic resources are then valued at shadow prices. |

## 3.5 The Foreign Exchange Rates and Social Valuation

Before meaningful comparison between domestic and border prices can be made, it is essential to choose the appropriate world price and then to convert that price at an appropriate exchange rate into domestic currency units. An exchange rate that either undervalues or overvalues domestic currency will correspondingly overprice or underprice the commodity to the domestic economy.

Once the appropriate price for the exchange rate is determined, analysts apply it in valuing the prices of imports and exports so that domestic prices for various commodities can be compared to their equivalents in the world market. Interest then centers on what exchange rate to use to convert world prices into domestic currency for social valuation.

**Foreign Exchange Rate**

The foreign exchange rate is the price of a unit of foreign currency in terms of local currency. In many developing countries the foreign exchange rate is overvalued. This means that the cost of foreign exchange is artificially cheap. This would make the price of tradable outputs and inputs lower than that measured at social price

When the exchange rate is overvalued, farmer and market system allocation of resources, which are response to actual prices, will not result in either efficiency or foreign exchange maximization measured at sectoral or national level. This is because the price of tradables is artificially depressed, leading to over production of non-tradables and over consumption of tradables.

Since the agricultural sector usually has a larger share of tradable production potential relative to other sectors, this exchange rate situation draws resources out of the agricultural sector and causes an inefficient allocation of resources within the agricultural sector.

From the perspective of input use and choice of technology, overvalued exchange rates, by making imported capital artificially cheap, encourage the use of inappropriate capital intensive technologies. This causes serious long-term distortions and limitations to the agricultural sector's capacity for employment absorption and real economic growth.

## Shadow exchange rate

Is the most commonly used and defined as the equilibrium rate in a situation of no distortion in trade policy and international capital markets. The shadow exchange rate is a summary of the trade-related distortions, and it is used to adjust for distortions in the official rate. The terms shadow exchange rate and equilibrium exchange rate are often used interchangeably.

## The Standard Conversion Factor (SCF)

The standard conversion factor is the ratio of the official exchange rate ( OER) to the shadow exchange rate(SER). It is used to adjust for distortions introduced by the trade regime between the border prices of traded goods and the domestic prices of non traded goods.

Thus $$SCF = \frac{OER}{SER}$$

or $$SCF = \frac{\text{value of traded goods in border prices}}{\text{value of traded goods in domestic prices}}$$

## Calculation of Real Effective Exchange Rate

In a world of floating exchange rates, the real rate is not entirely under the control of the domestic government. The real rate depends both on domestic policy and on exchange rate movements outside the control of the domestic government. In computing the real from the nominal, one needs a base year against which monetary changes are to be assessed.

The real exchange rate (RER) is obtained by eliminating the effect of the changes in the purchasing power of the two currencies involved. The measure of inflation could be provided by the Consumer Price Index (CPI) or Wholesale Price Index (WPI). These indices are also called deflator.

First: Calculation of Real Exchange Rate

1. Deflate the nominal exchange rate to get the cost of one foreign currency at constant prices of the domestic currency.

2. Compute the real exchange rate by adjusting for the foreign country inflation. In fact, also the foreign currency may loose some purchasing power during the same period and, therefore, the cost of it has to be adjusted accordingly. Consider CPI as a measure of deflation.

$$RER(t) = OER(t) * \frac{CPIW(t)}{CPID(t)}$$

where:

RER = Real Exchange Rate
OER = Official Exchange Rate
CPIW = Consumer Price Index of World (Foreign Countries)
CPID = Domestic Consumer Price Index
(t) = Year t

The previous formula gives the real cost of a unit of foreign exchange, after having taken into account domestic and external inflation.

Second: Calculation of Real Effective Exchange Rate

Almost in every country, foreign trade is taxed and, in many countries, import and export taxes are among the important sources of revenue for the government budget. Sometimes, imports and exports are subject also to quantitative restrictions which give origin to the smuggling black markets.

It is important to note that the import tax has the role to make more expensive the imports, that is, to increase the exchange rate for the imports. Similarly, subsidies designed to make the exports more attractive have the function to increase the exchange rate for the exporters. The foreign trade taxation is an instrument in the hands of Government for adjusting the exchange rate.

The overall taxation policy of the foreign trade gives origin to an effective exchange rate which is different from the nominal and real exchange rate. This difference, which can be considered as a premium attached by the Government to the foreign currencies, can be estimated through the following formula:

PRIM = (CIF + TARIM + FOB + SUB)/(CIF +FOB)

and then

REER = RER * PRIM

where:

| | |
|---|---|
| PRIM | = percentage of premium on the exchange rate |
| CIF | = value of imports |
| TARIM | = total taxes on imports |
| FOB | = value of exports |
| SUB | = subsidies or taxes on exports |
| REER | = real effective exchange rate |

## 3.6 Calculating Import/Export Parity Prices

The social price for an agricultural commodity is a border price. The border price is the price at which foreign suppliers would deliver the commodity to the domestic market or the price that the foreign consumers would pay domestic suppliers to deliver the commodity to their markets. In the absence of actual imports or exports of the domestically produced commodity, world price equivalents must be estimated.

For correctly comparing two different prices the following conditions should be met:

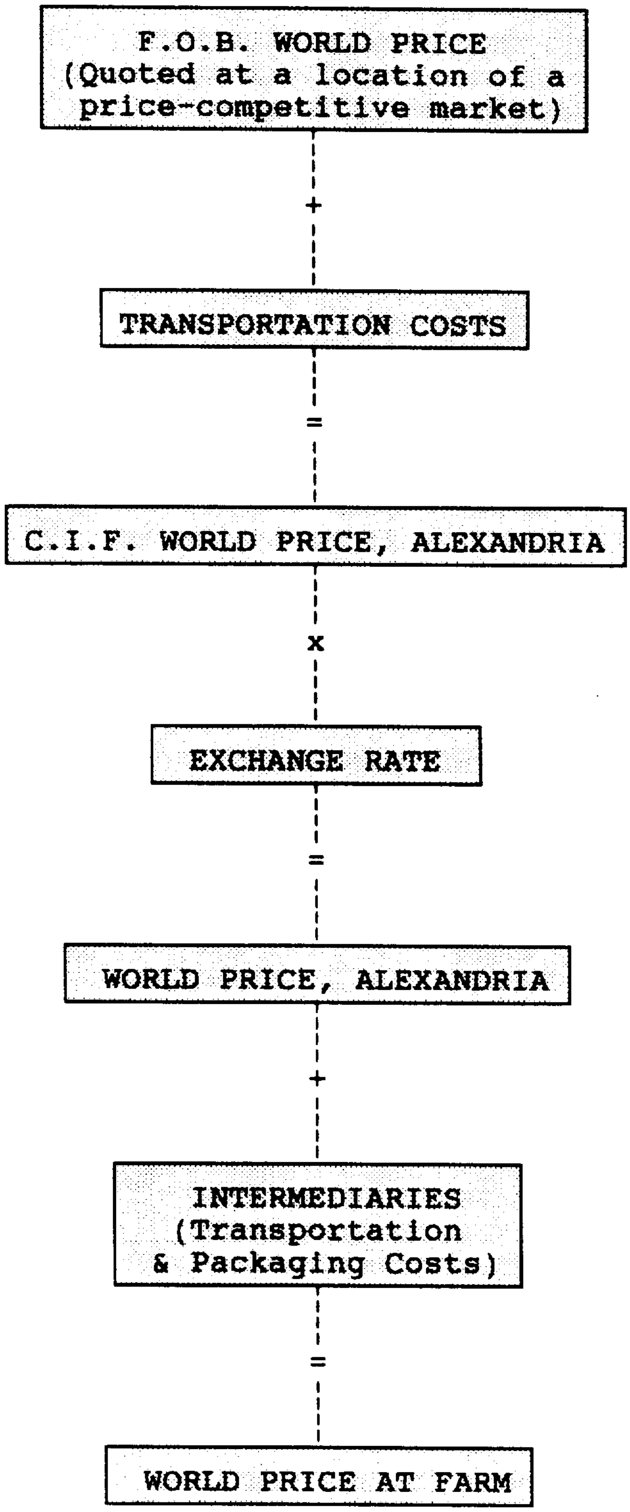
- the commodities are exactly comparable in physical terms;
- the commodities are compared at the same location.

If the first condition is not achievable, adequate allowance is to be given to compensate for differences in quality. The second condition requires a precise accounting of transport, handling, and marketing costs. The equivalent international price for the same commodity at the same location is also defined as "import/export parity price".

The f.o.b (free on board) and c.i.f (cost, insurance, and freight) prices for a given economy serve as reference prices because they represent what the commodity can earn as an export or what it costs the economy as a import. When the international, or world, price is translated into domestic currency at a given exchange rate, the resulting price is called the border price.

The following two schemes illustrate the steps of calculating import and export parity price respectively. The schemes are followed by two examples for calculating import and export parity price. The first table presents an example for import parity price for Egyptian wheat in 1990, while the second table presents another example for export parity price of Egyptian cotton in 1990.

Scheme of Calculating Import Parity Price



Scheme of Calculating Export Parity Price

$/TON C.I.F. WORLD PRICE, ALEXANDRIA

x

EXCHANGE RATE

=

LE/TON WORLD PRICE, ALEXANDRIA

−

TRANSPORTATION COST

=

WORLD PRICE, AT GIN

−

TRANSPORTATION TO FARM

=

WORLD PRICE AT FARM

Example of Import Parity Price of Egyptian Wheat in 1990

| Item | Unit | Price |
|---|---|---|
| World price (FOB), U.S Gulf | $/Ton | 138.00 |
| Add<br>Freight and insurance cost U.S Gulf to Alex | $/Ton | 32.00 |
| Get<br>World price at Alexandria | $/Ton | 170.00 |
| Multiply<br>Market exchange rate | LE/$ | 2.70 |
| Get<br>Border price at Alexandria | LE/Ton | 459.00 |
| Add<br>Transport and Marketing costs | LE/Ton | 26.00 |
| Get<br>Border price at mills | LE/Ton | 485.00 |
| Add<br>Value of by-product | LE/Ton | 0.00 |
| Deduct<br>Processing margin and transport cost | LE/Ton | 6.00 |
| Get<br>Border price before milling | LE/Ton | 479.00 |
| Consider<br>Conversion allowance | % | 100.00 |
| Get<br>Border price at farmgate | LE/Ton | 479.00 |

Example of Export Parity Price of Egyptian Cotton in 1990

| Item | Unit | Price |
|---|---|---|
| World price (CIF) | $/Ton | 3059.00 |
| Deduct<br>Freight and insurance cost | $/Ton | 32.00 |
| Get<br>World price at Alexandria | $/Ton | 3027.00 |
| Multiply<br>Market exchange rate | LE/$ | 2.70 |
| Get<br>Border price at Alexandria | LE/Ton | 8172.90 |
| Deduct<br>Transport and Marketing costs | LE/Ton | 12.30 |
| Get<br>Border price at mills | LE/Ton | 8160.60 |
| Add<br>Value of by-product | LE/Ton | 45.00 |
| Deduct<br>Processing margin and transport cost | LE/Ton | 82.00 |
| Get<br>Border price before milling | LE/Ton | 8132.60 |
| Consider<br>Conversion allowance | % | 2.67 |
| Get<br>Border price at farmgate | LE/Ton | 3045.92 |

## 3.7 Sensitivity Analysis

Sensitivity analysis provides a way of assessing the impact of changed assumptions and errors in estimating profitability. It can be applied to both private and social estimations. In principle, all social parameters can be subjected to sensitivity analysis. However, the social estimates of long-run world prices for output, the cost of labour, and the cost of capital are usually the most uncertain and receive the most attention in sensitivity analysis.

## 3.8 Farm-Level Budgets and Analysis

The PAM analyst is concerned with the price and quantity used of each input in order to measure the effects of price distortions or to assess the potential impacts of input substitution.

The farm budget is the most basic source of information for any analysis concerned with costs of agricultural production or the role of inputs. A farm budget is a list of the costs of production. Preferably it displays both the quantity and the unit price of each input. All prices should be standardized to a common time period.

The more detail the list of inputs, the more useful the farm budget. To be useful, the budget must identify the locality of the farm and the yield of crop(s). It is even more useful if the local farm gate price of the output is given, so that regional-average or national-average prices do not have to be applied.

The major item that varies in its treatment is land costs. Some budgets exclude them, on the ground that the farmer owns his land. If the budget is to be used in studies of economic protection rates, then the implicit land rent must be added.

In some kinds of analysis it is necessary to know how crops are combined and rotated. In other words, a description of prevailing farming system is needed.

### Selection of Representative Crop Activities

Choice of farm activities are determined by the scope of agricultural issues identified by the government. If the research focus on the impact of government policies of tax/subsidy on the agricultural sector, one or two representative budgets for each crop should be sufficient.

If the research focuses on a single crop or technology, a more detailed specification of commodity production is needed and a large number of representative farms should be used.

If the research focuses on sectoral income distribution, the farm scale becomes an important issue. If the focus on regional growth the region-specific commodity systems become essential.

### Multiple Commodities

Sometimes two or more crops are grown simultaneously on a particular parcel because of some mutually beneficial relationship. Sometimes, also, agronomic considerations require crop rotations on a particular parcel of land. For example if cotton cultivation is limited by agronomic constraints to two every three years.

The sustainable unit area approach can be used in the case of multiple commodities. According to this approach a representative land unit (for example one hectare) includes all agricultural practices required by the representative system. In case of cotton rotation a representative hectare includes two-thirds of a hectare of cotton and one-third of a hectare of an alternative crop. Similarly, intercrop systems will be based on shares of area occupied by the various crops.

### Permanent Crops

Permanent crops, such as tree crops, present another group of problems for budget estimates. A sustainable unit area can be built, so that the representative area included different stages of the crop life cycle. Each year one a three-year crop cycle (sugarcane for example) is represented in one-third of a unit of area in the representative crop budget.

The problem with the sustainable unit area calculations for permanent crops is the omission of the time related costs and revenue. For example it calculates profits as if they were available every year. To avoid such difficulty, revenue and costs for each year are then discounted to a present value of the use of land over the project cycle.

## <u>3.9</u> <u>The Policy Analysis Matrix and Agricultural Planning</u>

The PAM analyses can form an integral part of three types of agricultural policy analysis:

- agricultural prices;
- public investment projects; and
- public agricultural research allocations.

Policy makers typically want to know how agricultural policies affect farm incomes, where new public investments in agriculture should be made, or why public funds should be spent on one line of agricultural research instead of another. If a planning agency were assigned responsibility for all three policy areas, the PAM could assist that agency in setting its research agenda.

**The PAM and Price Policy Analyses**

For price policy analysis, the PAM shows the extent to which policies and market failures have influenced the levels of revenues and costs facing producers in some recent base year. The PAM demonstrates empirically the relationships among different policies and market failures that cause private prices to diverge from their social values. The accounting framework is a consistent means of tabulating information required for price policy analysis.

**The PAM and Investment Policy Analysis**

A critical element in deciding on a strategy for a sequence of public investments is to know the social profitabilities of the existing agricultural systems. Hence it is critical for planners to know how socially profitable or not systems before the investment.

If the planning agency has constructed PAMs for the country's major agricultural systems, these matrices can provide results that aid in the process of determining the allocation of public investment in agriculture. Calculation of domestic resource cost ratios (DRCs) allows the comparison of efficiency among systems that produce unlike outputs. These DRCs offer useful information to investment planners.

It is worth to notice that the efficiency results given by PAMs must be complemented with complete social benefit-cost analyses of the most promising projects, selected on the basis of the baseline social profits and expected improvements from the investments. Evaluation of alternative projects, therefore, can use the PAM baseline results to discover which systems are currently socially profitable.

**The PAM and Agricultural Research Policy Analysis**

Almost all public expenditure for agricultural research intend to improve crop yields or to reduce input needs, thereby raising profits in existing agricultural systems. Since the new technologies would be used in the future under differing economic environments, complementary analyses should include projections of changes in world prices and factor prices along with technological changes arising from agricultural research.

The baseline PAMs show how well current systems are operating. The technological changes (yield increases or cost reductions) needed to arrive at improved private or social profits can then be determined.

### 3.10 Strengths and Weaknesses of the PAM

The major strength of the PAM is that its results, in the form of a simple accounting matrix, are easily understood by policy makers. Consequently, PAM output is more likely to receive consideration than the output of less transparent models. However, there are some difficulties and limitations to this form of partial analysis. Following are the most important limitations and weaknesses of the PAM:

- The analysis is static as it is carried out at one point in time only, and the choice of time period can have an important effects on the results of the analysis;

- The PAM does not link different crop activities endogenously as it implies that a change in the profitability of one farm activity will not change the input-output relationship in another activity or even the level of inputs into another activity;

- The analysis assumes a fixed input-output relationship. This implies that the same quantities of inputs are used under differing price scenarios. In other words, it ignores the impact of relative prices on the level of physical inputs. This is because the PAM does not include any elasticity estimates;

- The PAM approach, as with any social cost-benefit analysis, makes many assumptions with respect to the nature of free markets and their prices;

## IV. THE CASE STUDY

The PAM methodology was used to analyze the important crops in Egypt, namely: bean, rice, wheat, cotton, corn, sugarcane, and short berseem. The harvested area of these seven crops amounts approximately 80% of the total harvested area.

Since farmers are following cropping patterns rather than single crops, PAM was, also, used to analyze the most important cropping patterns in Egypt. The analyzed cropping patterns are six, namely: wheat & corn, wheat & rice, bean & corn, sugarcane, and short berseem & cotton.

All mentioned crops have a border price except short berseem. Wheat, corn, and sugarcane are importable, while cotton, rice, and bean are exportable. Import parity prices were calculated for importable goods and export parity prices were, also, calculated for exportable goods. Social price for short berseem was derived on the basis of equivalent goods (concentrates).

As the commodity system includes different activities (or stages), PAM was used, in this case study, to analyze only the production stage. To run such analysis the following data have been collected,for the seven crops, and tabulated as follows:

- Table 1: Farm-Level input-output data;
- Table 2: Farm-Level private or market prices.

Such data are just enough to calculate farm-level private budget. Social prices are needed in order to calculate farm budget at social prices. Additional data related to social prices were collected and assumed. Mentioned data and assumptions were tabulated in the following tables:

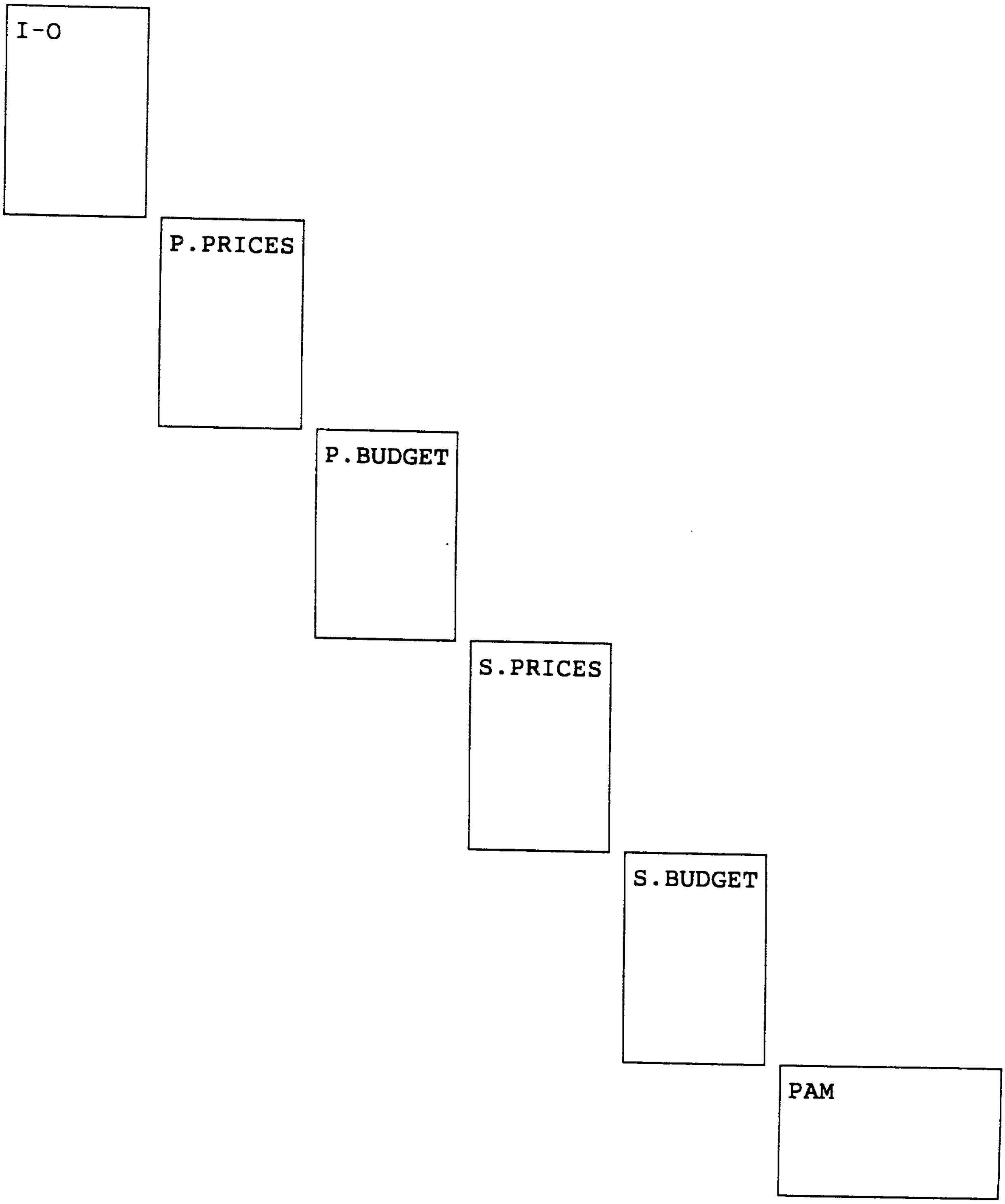
- Table 23: Assumptions for social prices calculations;
- Table 24: Indicative data for import/export parity prices calculations;
- Table 25: Assumptions for sensitivity analysis.

Other tables are working tables to be used for calculations. It is worth to mention that all tables are laid out in the spreadsheet (LOTUS 123), and organized in a "diamondback" format (see diagram in next page).

The LOTUS TEMPLATE file to be used for the case study calculations is "PAMEGYTM.wk1". You can use the functions F5 (GOTO) and then F3 (NAMES) to move around the spreadsheet.

## 4.1 Organization of the Spreadsheet

The working tables are located on the diagonal of the spreadsheet as follows:



## 4.2 Calculating Cots and Revenue at Private Prices

The tables on the diagonal used to compute private budgets, for single crops, are the following:

(1) Upper left hand corner, an I-O table;

(2) Down and to the right, a table of private prices;

(3) Further down and to the right, commodity budgets at private prices.

Data to be used for the calculations of the private budget are contained in the I-O table and private prices table. Private budget table is obtained by multiplying quantities from I-O table by prices from privata prices table.

The necessary cell entries can most easily be obtained with the judicious use of Windows. The following steps illustrate the creation and use of Windows:

1. Create a horizontal, unsychronized window that divides the screen in half. Two commands are required:

| | | |
|---|---|---|
| First: | /WWH | I-O |
| Then : | /WWU | P. BUDGET |

The {GOTO} and {NAMES} functions, [F5] and [F3], require that Lotus be in the READY mode. Hence the first step is to position the cursor in the appropriate data table before any formulas are entered. If the private budget table is in the lower window, use [F6] to jump to the upper window and [F5] and [F3] to find the correct table.

2. Use [F6] to jump back to the lower window and position to cursor in the appropriate private budget cell. Begin to create the necessary formula with a + for a single cell.

3. Use [F6] to jump back to the upper window and locate the cell address that should go into the formula which is, in this case, the quantity of UREA N.15.5% from I-O table. When the appropriate cell has been highlighted, press [Enter]. The cursor will return to cell on which it was placed before jumping to the private budget window. Lotus will write the cell address of the I-O table into the Private budget.

4. Type * and Use [F6] to jump back to the upper window and locate the cell address that should go into the formula which is, in this case, the private price of UREA N.15.5% from P.PRICE table. When the appropriate cell has been highlighted, press [Enter]. The cursor will return to cell on which it was placed before jumping to the private budget window. Lotus will write the cell address of the P.PRICE table into the Private budget.

5. To remove zeros press: /WGZY

6. To copy the formula to other cells of the private budget press / copy from UREA N.15.5% to BY-PRODUCT (including total revenue).

7. To calculate TOTAL REVENUE put the cursor in the appropriate private budget cell. Begin to create the necessary formula with @SUM and open a bracket.

8. Locate the cell address that should go into the @SUM( which is, in this case, the MAIN PRODUCT. Type period (.) and locate the cell address to the last cell of that sum which is, in this case, BY-PRODUCT. Close the brackets and press [Enter]. The cursor will return to cell on which it was placed and Lotus will write the cell address of TOTAL REVENUE. Copy the formula to other crops of the private budget.

9. To calculate TOTAL COST(execl. land cost) type @SUM( and move the cursor to UREA N.15.5% and press period. Move cursor to the last item of the cost structure which is, in this case, WATER. Close the bracket and press [Enter]. Copy the formula to other crops of the private budget.

10. To calculate PROFIT (execl. land cost) type + and move the cursor to TOTAL REVENUE. Type - and move the cursor to TOTAL COST (execl. land cost) and press [Enter]. Copy the formula to other crops of the private budget.

11. To calculate NET PROFIT(incl. land cost) type + and move the cursor to PROFIT(execl. land cost). Type - and move the cursor to LAND COST cell. Press [Enter]. Copy the formula to other crops of the private budget.

12. Save the file by pressing:
/ File Save PAMEGYTM Replacement

The results of private profitability calculations are shown in the table 3.

## 4.3 Calculating Cots and Revenue at Social Prices

The new social prices table (S.PRICES) and social budget table (S.BUDGET) simply continue along the diagonal below and to the right of private budget table (P.BUDGET).

Follow the same steps as in private budget.

The results of the social profitability calculations are shown in table 5.

## 4.4 Entering Data Into the PAM

Data for the PAMs are contained in the private and social budgets (P.Budget and S.Budget). The necessary cell can most easily be obtained with the judicious use of Windows. The following steps illustrate creation and use of windows:

1. Create a horizontal, unsychronized window that divides the screen in half. Two commands are required:

| | | |
|---|---|---|
| First: | /WWH | P.BUDGET |
| Then : | /WWU | PAM |

The {GOTO} and {NAMES} functions, [F5] and [F3], require that Lotus be in the READY mode. Hence the first step is to position the cursor in the appropriate data table before any formulas are entered. If the PAM table is in the lower window, use [F6] to jump to the upper window and [F5] and [F3] to find the correct budget table.

2. Use [F6] to jump back to the lower window and position to cursor in the appropriate PAM cell. Begin to create the necessary formula with a + for a single cell or @SUM for a range such as the cost of tradable inputs.

3. Use [F6] to jump back to the upper window and locate the cell address that should go into the formula. The cursor will return to cell on which it was placed before jumping to the PAM window. When the appropriate cell has been highlighted, press [Enter]. Lotus will write the cell address of the budget into the PAM. (Note: in case of the @SUM function, you will have to complete the process of identifying a range by typing in a closing. Otherwise, Lotus will beep to let you know the formula is incomplete.)

4. Although it would be possible to fill in the profits cell in the same way, it is probably better to complete the arithmetic of the PAM by writing a formula that subtracts tradable input and domestic costs from the value of output. Not only does this provide a check on the figures in the budget, The correct formula will be retained when the PAM is copied for other commodities.

5. Complete the PAM by writing in the formula that subtracts the social value of output from the private value of output. Copy this formula into the other cells in the Policy Effects row.

## 4.5 Computing Coefficients

The results from the previous PAM will be used to calculate the Nominal Protection Coefficient (NPC) on tradable outputs, Nominal Protection Coefficient on tradable inputs (NPI), Effective Protection Coefficient (EPC), and the Domestic Resource Cost Coefficient(DRC).

### Nominal Protection Coefficient (NPC)

The nominal protection coefficient on tradable outputs, defined by the ratio of private commodity prices and social commodity prices, can be used to compare impact of government policy (or market failures that are not corrected by efficient policy) between different crops

The formula for the NPC is:

```
+ revenue in private prices / revenue in social prices
```

### Nominal Protection Coefficient on Tradable Inputs (NPI)

The nominal protection coefficient on tradable inputs, defined by the ratio of tradable inputs cost in private prices and tradable inputs cost in social prices, can be used to compare impact of government policy (or market failures that are not corrected by efficient policy) between different crops.

The formula for the NPI is:

```
+ tradable inputs in p.prices / tradable inputs in s.prices
```

**Effective Protection Coefficient (EPC)**

The effective protection coefficient, defined by the ratio of value added in private prices to value added in social prices, is another measure of incentives to the farmer. The EPC indicates the combined effects of policies in the tradable commodities markets (inputs and outputs).

The formula for the EPC is:

```
+ (revenue - cost of tra.inputs / (revenue - cost of tra.inputs
      in private prices)                in social prices)
```

**Domestic Resource Cost (DRC)**

The domestic resource cost measures the efficiency, or comparative advantage, of crop production. Where the opportunity cost of land can be clearly identified with another alternative, the DRC is calculated by including the cost of land in the form of the next best alternative. The resulting DRC reflects the country's comparative advantage, not only with respect to capital and labour, but within agriculture as well.

The formula for the DRC is:

```
+ (labour cost + land cost) / (revenue - costs of trad.inputs)
```

The costs and revenue must be in social prices and hence the sources of the cell addresses is the social price row in the PAMs.

The accuracy of most of the values of the table can be checked by direct comparison with the private and social budgets.

The results of the PAMs for single crops are shown in Tables 6, 7, 8, 9, 10, 11, 12, 13, and 14 for bean, rice, wheat, cotton, corn, sugarcane, and berseem respectively.

Also, the results of the PAMs for cropping patterns are shown in tables 15, 16, 17, 18, and 19 for wheat &corn, wheat & rice, bean & corn, bean & rice, and cotton & short berseem respectively.

Table 20 presents a summary of protection and efficiency coefficients (NPCs, NPIs, EPCs, and DRCs) for single crops and crop rotations (cropping patterns). Table 21 presents import parity price calculations, while table 22 shows export parity price calculations.

## 4.6 Interpretation of Results

The interpretation of results will focus on the results of single crops. Similar interpretation could be derived for crop rotations.

### (a) Output Transfers

The results of the analysis show that the private value of bean, rice, wheat, cotton, and sugarcane currently less than the social value. On the other hand, the private value of corn and short berseem currently exceeds the social value.

Because the domestic price of corn and short berseem are held above the world market price, farmers producing these commodities are receiving a transfer from the rest of the economy of 42.12 and 41.72 LE per feddan respectively. The picture for the other crops are completely different as farmers are taxed since they are receiving less than it should by 364.92, 29.87, 12.45, 1129.89, and 1709.50 for bean, rice, wheat, cotton, and sugarcane respectively.

The NPCs for corn and short berseem are 1.04 and 1.10 respectively. This means that private revenue are 4% and 10% above what they would be if there were no intervention. The NPCs for other crops are less than one which means that they are taxed. The picture is more clear for cotton and sugarcane as the production is completely purchased by the government at a low price. As the NPCs for cotton and sugarcane are 0.56 and 0.58 respectively, it means that the prices received by farmers growing cotton and sugarcane are less by 44% and 42% respectively than they would be if the delivery system was not existing.

### (b) Input Transfers

All input transfers are negative except for short berseem which means that farmers are paying, for tradable inputs, less than it should be if there is no intervention. In other words, farmers are subsidized in tradable inputs except for berseem.

The NPIs for all crops are less than one except for berseem. The least NPI is 0.24 for cotton which means that the prices paid by farmers growing cotton are less by 76% than they would be if there is no subsidy on the tradable inputs.

NPIs for other subsidized crops are 0.61, 0.67, 0.62, 0.56, 0.52 for bean, rice,wheat, corn, and sugarcane. Such figures mean that farmers are paying for their tradable inputs less than it should be by 39%, 33%, 38%, 44%, and 48% respectively.

### (c) Effective Protection Coefficients

The effective protection coefficient (EPC) displays the effect of policy on the value added. The results of the analysis show that the EPCs for rice, wheat, corn and short berseem were 1.01, 1.05, 1.15, and 1.03 respectively implying that value added was 1%, 5%, 15%, and 3% respectively higher than it would be in the absence of policies.

On the other hand, the EPCs for bean, cotton, and sugarcane were 0.74, 0.61, and 0.59 respectively implying that value added was 26%, 39%, and 41% respectively lower than it would be in the absence of policies

### (c) Domestic Resource Coefficients

The Domestic Resource Coefficient (DRC) displays the comparative advantage. The results of the analysis show that the DRCs for bean, cotton, and sugarcane are less than one implying that there is a comparative advantage in the production of these crops. As an example, the DRC for cotton is 0.75 which means efficient use of domestic resources to earn a unit of foreign exchange.

POLICY ANALYSIS CASE-STUDY
EGYPT 1990

This screen illustrates the options available to you in using this spreadsheet - namely the tables containing the data and calculations.

Most entries in the sheet are blank - you are asked to complete the tables. The names and ranges of the tables are given below.

********************************************************************
REMEMBER:

- TO ACESS ANY PARTICULAR TABLE, FIRST PRESS F5;
- THEN PRESS F3, WHICH WILL GIVE YOU A LIST OF NAMES;
- THEN HIGHLIGHT THE NAME YOU REQUIRE, AND PRESS ENTER

********************************************************************

(To see more of this screen, use the arrow keys)

| | | |
|---|---|---|
| I-O: | (A1..J50) | the main input volume table for crops |
| P.PRICES: | (K51..S100) | private prices for inputs/outputs |
| P.BUDGET: | (T101..AA156) | crps' budget at private prices |
| S.PRICES: | (AB157..AJ206) | calculated social prices |
| S.BUDGET: | (AK207..AR262) | crops' budget at social prices |
| P.BUDGET C.R: | (AS263..AY319) | crops rotation budget at private prices |
| S.BUDGET C.R: | (AZ320..BF376) | crops rotation budget at social prices |
| PAM BEAN: | (BG377..BQ390) | production pol. anal. matrix for bean |
| PAM RICE: | (BR391..CB404) | production pol. anal. matrix for rice |
| PAM WHEAT: | (CC405..CM418) | production pol. anal. matrix for wheat |
| PAM COTTON: | (CN419..CX432) | production pol. anal. matrix for cotton |
| PAM CORN: | (CY433..DI446) | production pol. anal. matrix for corn |
| PAM S.CANE: | (DJ447..DT460) | prod. pol. anal. matrix for sugar cane |
| PAM S.BERSEEM: | (DU461..EE474) | prod. pol. anal. matrix for s.berseem |
| PAM WHEAT&CORN: | (EF475..EP488) | prod. pol. anal. matrix for wheat&corn |
| PAM WHEAT&RICE: | (EQ489..EA502) | prod. pol. anal. matrix for wheat&rice |
| PAM BEAN&CORN: | (FB503..FL516) | prod. pol. anal. matrix for bean&corn |
| PAM BEAN&RICE: | (FM517..FW530) | prod. pol. anal. matrix for bean&rice |
| PAM COTN&BERS: | (FX531..GG544) | prod. pol. anal. mat. for cotton&bers. |
| COEFF SUMMARY: | (GH545..GL573) | summary of protec. and efficiency coeff |
| IMPORT P.PRICE: | (GM574..GQ605) | calculations of import parity price |
| EXPORT P.PRICE: | (GR606..GV636) | calculations of export parity price |
| ASSUMPTIONS: | (GW637..HD720) | basic data for use with the case study |
| SENS.ANALYSIS: | (HE721..HN743) | govern. reform programs and new prices |

TABLE 1: FARM-LEVEL INPUT/OUTPUT DATA 1990

| I-O (1990) | UNITS | BEAN | RICE | WHEAT | COTTON | CORN | SUG. CANE | SHORT BERSEEM |
|---|---|---|---|---|---|---|---|---|
| TRADABLE INPUTS | | | | | | | | |
| FERTILIZER | | | | | | | | |
| UREA N. 15.5% | KG/FED | 100.000 | 266.000 | 500.000 | 400.000 | 600.000 | 1000.000 | 0.000 |
| SUPER PHOSPHATE | " | 200.000 | 100.000 | 100.000 | 100.000 | 100.000 | 100.000 | 0.000 |
| POTASIUM SULPHATE | " | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 100.000 | 0.000 |
| INCETICIDES | UNIT | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 0.000 |
| SEED | | | | | | | | |
| DELIVERED | KG/FED | 28.000 | 45.000 | 47.500 | 70.000 | 0.000 | 0.000 | 0.000 |
| PURCHASED | " | 50.000 | 15.000 | 27.500 | 0.000 | 35.000 | 1000.000 | 25.000 |
| DOMESTIC FACTORS | | | | | | | | |
| LABOUR | | | | | | | | |
| LAND PREPARATION | MANDAY/FED | 4.000 | 4.000 | 4.750 | 9.000 | 4.000 | 6.000 | 3.250 |
| PLANTING | " | 1.500 | 1.000 | 0.250 | 3.500 | 1.000 | 5.000 | 1.000 |
| IRRIGATION | " | 1.000 | 10.500 | 4.500 | 8.000 | 5.000 | 17.000 | 2.000 |
| FERTILIZER | " | 1.500 | 1.000 | 2.000 | 2.000 | 2.000 | 2.000 | 0.000 |
| WEEDING & PLOWING | " | 4.000 | 17.750 | 0.000 | 38.000 | 7.000 | 18.000 | 0.000 |
| HARVES. & THRESHING | " | 10.500 | 13.000 | 17.500 | 19.000 | 10.000 | 25.500 | 14.000 |
| TRANSPORTATION | " | 1.000 | 2.500 | 1.000 | 1.000 | 2.000 | 20.000 | 1.000 |
| MACHINARY | | | | | | | | |
| LAND PREPARATION | HRS/FED | 4.000 | 8.000 | 4.000 | 4.000 | 5.900 | 6.000 | 3.000 |
| IRRIGATION | HRS/FED | 12.000 | 30.000 | 10.000 | 21.000 | 25.000 | 48.000 | 15.000 |
| PEST CONTROL | UNIT | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| HARVES. & THRESHING | HRS/FED | 4.000 | 4.000 | 4.000 | 5.000 | 4.000 | 0.000 | 0.000 |
| TRANSPORTATION | UNIT | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |
| WATER | 1000 M3 | 3.000 | 3.500 | 2.500 | 4.500 | 2.500 | 12.000 | 1.500 |
| YIELD | | | | | | | | |
| MAIN PRODUCT | TON/FED | 1.236 | 3.050 | 2.180 | 0.820 | 2.340 | 40.680 | 9.756 |
| BY PRODUCT | TON/FED | 1.613 | 1.700 | 2.900 | 1.788 | 2.175 | 0.000 | 0.000 |
| LAND | FEDDAN | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 | 1.000 |

TABLE 2: FARM-LEVEL PRIVATE PRICES 1990

| PRIVATE PRICES (1990) | UNITS | BEAN | RICE | WHEAT | COTTON | CORN | SUG. CANE | SHORT BERSEEM |
|---|---|---|---|---|---|---|---|---|
| TRADABLE INPUTS | | | | | | | | |
| FERTILIZER | | | | | | | | |
| UREA'N.15.5% | LE/KG | 0.132 | 0.132 | 0.132 | 0.132 | 0.132 | 0.132 | 0.132 |
| SUPER PHOSPHATE | " | 0.129 | 0.129 | 0.129 | 0.129 | 0.129 | 0.129 | 0.129 |
| POTASIUM SULPHATE | " | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.305 | 0.305 |
| INCETICIDES | LE | 5.630 | 3.800 | 1.690 | 14.700 | 0.400 | 2.160 | 0.000 |
| SEED | | | | | | | | |
| DELIVERED | LE/KG | 0.839 | 0.550 | 0.533 | 0.084 | 0.000 | 0.000 | 0.000 |
| PURCHASED | " | 0.690 | 0.367 | 0.473 | 0.000 | 0.427 | 0.058 | 1.234 |
| DOMESTIC FACTORS | | | | | | | | |
| LABOUR | | | | | | | | |
| LAND PREPARATION | LE/MANDAY | 5.410 | 5.560 | 5.410 | 5.470 | 5.560 | 5.470 | 5.490 |
| PLANTATION | " | 5.410 | 5.560 | 5.410 | 5.470 | 5.560 | 5.470 | 5.490 |
| IRRIGATION | " | 5.410 | 5.560 | 5.410 | 5.470 | 5.560 | 5.470 | 5.490 |
| FERTILIZER | " | 5.410 | 5.560 | 5.410 | 5.470 | 5.560 | 5.470 | 5.490 |
| WEEDING & PLOWING | " | 5.410 | 5.560 | 5.410 | 5.470 | 5.560 | 5.470 | 5.490 |
| HARVES. & THRESHING | " | 5.410 | 5.560 | 5.410 | 5.470 | 5.560 | 5.470 | 5.490 |
| TRANSPORTATION | " | 5.410 | 5.560 | 5.410 | 5.470 | 5.560 | 5.470 | 5.490 |
| MACHINARY | | | | | | | | |
| LAND PREPARATION | LE/HR | 7.000 | 7.000 | 7.000 | 7.000 | 7.000 | 7.000 | 7.000 |
| IRRIGATION | LE/HR | 2.500 | 2.500 | 2.500 | 2.500 | 2.500 | 2.500 | 2.500 |
| PEST CONTROL | LE | 3.700 | 1.600 | 1.490 | 5.300 | 0.300 | 0.300 | 0.000 |
| HARVES. & THRESHING | LE/HR | 9.000 | 9.000 | 9.000 | 9.000 | 9.000 | 0.000 | 0.000 |
| TRANSPORTATION | LE | 17.500 | 24.000 | 20.000 | 10.800 | 15.300 | 86.500 | 7.000 |
| WATER | LE/1000M3 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| YIELD | | | | | | | | |
| MAIN PRODUCT | LE/TON | 690.360 | 367.000 | 473.290 | 1668.000 | 426.800 | 58.000 | 48.400 |
| BY PRODUCT | LE/TON | 54.040 | 24.480 | 90.240 | 31.080 | 32.480 | 0.000 | 0.000 |
| LAND | LE | 86.180 | 72.000 | 81.950 | 122.600 | 66.500 | 160.400 | 38.130 |

TABLE 3: PRODUCTION FARM BUDGET AT PRIVATE PRICES

| REVANUES AND COSTS AT PRIVATE PRICES | BEAN | RICE | WHEAT | COTTON | CORN | SUG.CANE | SHORT BERSEEM |
|---|---|---|---|---|---|---|---|
| TRADABLE INPUTS | | | | | | | |
| FERTILIZER | | | | | | | |
| UREA,N.15.5% | 13.200 | 35.112 | 66.000 | 52.800 | 79.200 | 132.000 | 0.000 |
| SUPER PHOSPHATE | 25.800 | 12.900 | 12.900 | 12.900 | 12.900 | 12.900 | 0.000 |
| POTASIUM SULPHATE | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 30.500 | 0.000 |
| INCETICIDES | 5.630 | 3.800 | 1.690 | 14.700 | 0.400 | 2.160 | 0.000 |
| SEED | | | | | | | |
| DELIVERED | 23.492 | 24.750 | 25.318 | 5.880 | 0.000 | 0.000 | 0.000 |
| PURCHASED | 34.500 | 5.505 | 13.007 | 0.000 | 14.945 | 58.000 | 30.850 |
| DOMESTIC FACTORS | | | | | | | |
| LABOUR | | | | | | | |
| LAND PREPARATION | 21.640 | 22.240 | 25.698 | 49.230 | 22.240 | 32.820 | 17.843 |
| PLANTATION | 8.115 | 5.560 | 1.353 | 19.145 | 5.560 | 27.350 | 5.490 |
| IRRIGATION | 5.410 | 58.380 | 24.345 | 43.760 | 27.800 | 92.990 | 10.980 |
| FERTILIZER | 8.115 | 5.560 | 10.820 | 10.940 | 11.120 | 10.940 | 0.000 |
| WEEDING & PLOWING | 21.640 | 98.690 | 0.000 | 207.860 | 38.920 | 98.460 | 0.000 |
| HARVES. & THRESHING | 56.805 | 72.280 | 94.675 | 103.930 | 55.600 | 139.485 | 76.860 |
| TRANSPORTATION | 5.410 | 13.900 | 5.410 | 5.470 | 11.120 | 109.400 | 5.490 |
| MACHINARY | | | | | | | |
| LAND PREPARATION | 28.000 | 56.000 | 28.000 | 28.000 | 41.300 | 42.000 | 21.000 |
| IRRIGATION | 30.000 | 75.000 | 25.000 | 52.500 | 62.500 | 120.000 | 37.500 |
| PEST CONTROL | 3.700 | 1.600 | 1.490 | 5.300 | 0.300 | 0.300 | 0.000 |
| HARVES. & THRESHING | 36.000 | 36.000 | 36.000 | 45.000 | 36.000 | 0.000 | 0.000 |
| TRANSPORTATION | 17.500 | 24.000 | 20.000 | 10.800 | 15.300 | 86.500 | 7.000 |
| WATER | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL REVENUE | 940.424 | 1160.966 | 1293.468 | 1423.316 | 1069.356 | 2359.440 | 472.190 |
| MAIN PRODUCT | 853.285 | 1119.350 | 1031.772 | 1367.760 | 998.712 | 2359.440 | 472.190 |
| BY PRODUCT | 87.140 | 41.616 | 261.696 | 55.556 | 70.644 | 0.000 | 0.000 |
| TOTAL COST(execl. land cost) | 344.957 | 551.277 | 391.705 | 668.215 | 435.205 | 995.805 | 213.013 |
| LAND COST | 86.180 | 72.000 | 81.950 | 122.600 | 66.500 | 160.400 | 38.130 |
| PROFIT (execl. land cost) | 595.467 | 609.689 | 901.763 | 755.100 | 634.151 | 1363.635 | 259.178 |
| NET PROFIT(incl. land cost) | 509.287 | 537.689 | 819.813 | 632.500 | 567.651 | 1203.235 | 221.048 |

TABLE 4: ESTIMATED FARM-LEVEL SOCIAL PRICES

| SOCIAL PRICES (1990) | UNITS | BEAN | RICE | WHEAT | COTTON | CORN | SUG.CANE | SHORT BERSEEM |
|---|---|---|---|---|---|---|---|---|
| TRADABLE INPUTS | | | | | | | | |
| FERTILIZER | | | | | | | | |
| UREA,N15.5% | LE/KG | 0.248 | 0.248 | 0.248 | 0.248 | 0.248 | 0.248 | 0.248 |
| SUPER PHOSPHATE | " | 0.291 | 0.291 | 0.291 | 0.291 | 0.291 | 0.291 | 0.291 |
| POTASIUM SULPHATE | " | 0.738 | 0.738 | 0.738 | 0.738 | 0.738 | 0.738 | 0.738 |
| INCETICIDES | LE | 7.525 | 5.079 | 2.259 | 19.649 | 0.535 | 2.887 | 0.000 |
| SEED | | | | | | | | |
| DELIVERED | LE/KG | 0.986 | 0.377 | 0.479 | 3.046 | 0.409 | 0.100 | 0.044 |
| PURCHASED | " | 0.986 | 0.377 | 0.479 | 3.046 | 0.409 | 0.100 | 0.662 |
| DOMESTIC FACTORS | | | | | | | | |
| LABOUR | | | | | | | | |
| LAND PREPARATION | LE/MANDAY | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 |
| PLANTATION | " | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 |
| IRRIGATION | " | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 |
| FERTILIZER | " | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 |
| WEEDING & PLOWING | " | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 |
| HARVES. & THRESHING | " | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 |
| TRANSPORTATION | " | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 | 8.500 |
| MACHINARY | | | | | | | | |
| LAND PREPARATION | LE/HR | 10.500 | 10.500 | 10.500 | 10.500 | 10.500 | 10.500 | 10.500 |
| IRRIGATION | LE/HR | 3.750 | 3.750 | 3.750 | 3.750 | 3.750 | 3.750 | 3.750 |
| PEST CONTROL | LE | 5.550 | 2.400 | 2.235 | 7.950 | 0.450 | 0.450 | 0.000 |
| HARVES. & THRESHING | LE/HR | 13.500 | 13.500 | 13.500 | 13.500 | 13.500 | 0.000 | 0.000 |
| TRANSPORTATION | LE | 26.250 | 36.000 | 30.000 | 16.200 | 22.950 | 129.750 | 10.500 |
| WATER | LE/'000M3 | 20.000 | 20.000 | 20.000 | 20.000 | 20.000 | 20.000 | 20.000 |
| YIELD | | | | | | | | |
| MAIN PRODUCT | LE/TON | 985.600 | 376.794 | 479.000 | 3045.918 | 408.800 | 100.023 | 44.123 |
| BY PRODUCT | LE/HEML | 54.040 | 24.480 | 90.240 | 31.080 | 32.480 | 0.000 | 0.000 |
| LAND | LE | | | | | | | |

TABLE 5: PRODUCTION BUDGET AT SOCIAL PRICES

| REVANUES AND COSTS AT SOCIAL PRICES | BEAN | RICE | WHEAT | COTTON | CORN | SUG.CANE | SHORT BERSEEM |
|---|---|---|---|---|---|---|---|
| TRADABLE INPUTS | | | | | | | |
| FERTILIZER | | | | | | | |
| UREA,N.15.5% | 24.800 | 65.968 | 124.000 | 99.200 | 148.800 | 248.000 | 0.000 |
| SUPER PHOSPHATE | 58.200 | 29.100 | 29.100 | 29.100 | 29.100 | 29.100 | 0.000 |
| POTASIUM SULPHATE | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 73.800 | 0.000 |
| INCETICIDES | 7.525 | 5.079 | 2.259 | 19.649 | 0.535 | 2.887 | 0.000 |
| SEED | | | | | | | |
| DELIVERED | 27.597 | 16.956 | 22.753 | 213.214 | 0.000 | 0.000 | 0.000 |
| PURCHASED | 49.280 | 5.652 | 13.173 | 0.000 | 14.308 | 100.023 | 16.546 |
| DOMESTIC FACTORS | | | | | | | |
| LABOUR | | | | | | | |
| LAND PREPARATION | 34.000 | 34.000 | 40.375 | 76.500 | 34.000 | 51.000 | 27.625 |
| PLANTATION | 12.750 | 8.500 | 2.125 | 29.750 | 8.500 | 42.500 | 8.500 |
| IRRIGATION | 8.500 | 89.250 | 38.250 | 68.000 | 42.500 | 144.500 | 17.000 |
| FERTILIZER | 12.750 | 8.500 | 17.000 | 17.000 | 17.000 | 17.000 | 0.000 |
| WEEDING & PLOWING | 34.000 | 150.875 | 0.000 | 323.000 | 59.500 | 153.000 | 0.000 |
| HARVES. & THRESHING | 89.250 | 110.500 | 148.750 | 161.500 | 85.000 | 216.750 | 119.000 |
| TRANSPORTATION | 8.500 | 21.250 | 8.500 | 8.500 | 17.000 | 170.000 | 8.500 |
| MACHINARY | | | | | | | |
| LAND PREPARATION | 42.000 | 84.000 | 42.000 | 42.000 | 61.950 | 63.000 | 31.500 |
| IRRIGATION | 45.000 | 112.500 | 37.500 | 78.750 | 93.750 | 180.000 | 56.250 |
| PEST CONTROL | 5.550 | 2.400 | 2.235 | 7.950 | 0.450 | 0.450 | 0.000 |
| HARVES. & THRESHING | 54.000 | 54.000 | 54.000 | 67.500 | 54.000 | 0.000 | 0.000 |
| TRANSPORTATION | 26.250 | 36.000 | 30.000 | 16.200 | 22.950 | 129.750 | 10.500 |
| WATER | 60.000 | 70.000 | 50.000 | 90.000 | 50.000 | 240.000 | 30.000 |
| TOTAL REVENUE | 1305.341 | 1190.838 | 1305.916 | 2553.208 | 1027.236 | 4068.936 | 430.466 |
| MAIN PRODUCT | 1218.202 | 1149.222 | 1044.220 | 2497.652 | 956.592 | 4068.936 | 430.466 |
| BY PRODUCT | 87.140 | 41.616 | 261.696 | 55.556 | 70.644 | 0.000 | 0.000 |
| TOTAL COST(execl. land cost) | 599.952 | 904.530 | 662.019 | 1347.813 | 739.343 | 1861.760 | 325.421 |
| LAND COST | | | | | | | |
| PROFIT (execl. land cost) | 705.389 | 286.308 | 643.897 | 1205.395 | 287.893 | 2207.176 | 105.045 |
| NET PROFIT(incl. land cost) | 705.389 | 286.308 | 643.897 | 1205.395 | 287.893 | 2207.176 | 105.045 |

TABLE 6: PRODUCTION BUDGET AT PRIVATE PRICES FOR CROP ROTATIONS

| REVANUES AND COSTS AT PRIVATE PRICES (CROP ROTATIONS) | WHEAT & CORN | WHEAT & RICE | BEAN & CORN | BEAN & RICE | SUGAR CANE | S.BERSEEM & COTTON |
|---|---|---|---|---|---|---|
| TRADABLE INPUTS | | | | | | |
| FERTILIZER | | | | | | |
| UREA,N.15.5% | 145.200 | 101.112 | 92.400 | 48.312 | 132.000 | 52.800 |
| SUPER PHOSPHATE | 25.800 | 25.800 | 38.700 | 38.700 | 12.900 | 12.900 |
| POTASIUM SULPHATE | | | | | 30.500 | 0.000 |
| INCETICIDES | 2.090 | 5.490 | 6.030 | 9.430 | 2.160 | 14.700 |
| SEED | | | | | | |
| DELIVERED | 25.318 | 50.068 | 23.492 | 48.242 | 0.000 | 5.880 |
| PURCHASED | 27.953 | 18.513 | 49.445 | 40.005 | 58.000 | 30.850 |
| DOMESTIC FACTORS | | | | | | |
| LABOUR | | | | | | |
| LAND PREPARATION | 47.938 | 47.938 | 43.880 | 43.880 | 32.820 | 67.073 |
| PLANTATION | 6.913 | 6.913 | 13.675 | 13.675 | 27.350 | 24.635 |
| IRRIGATION | 52.145 | 82.725 | 33.210 | 63.790 | 92.990 | 54.740 |
| FERTILIZER | 21.940 | 16.380 | 19.235 | 13.675 | 10.940 | 10.940 |
| WEEDING & PLOWING | 38.920 | 98.690 | 60.560 | 120.330 | 98.460 | 207.860 |
| HARVES. & THRESHING | 150.275 | 166.955 | 112.405 | 129.085 | 139.485 | 180.790 |
| TRANSPORTATION | 16.530 | 19.310 | 16.530 | 19.310 | 109.400 | 10.960 |
| MACHINARY | | | | | | |
| LAND PREPARATION | 69.300 | 84.000 | 69.300 | 84.000 | 42.000 | 49.000 |
| IRRIGATION | 87.500 | 100.000 | 92.500 | 105.000 | 120.000 | 90.000 |
| PEST CONTROL | 1.790 | 3.090 | 4.000 | 5.300 | 0.300 | 5.300 |
| HARVES. & THRESHING | 72.000 | 72.000 | 72.000 | 72.000 | 0.000 | 45.000 |
| TRANSPORTATION | 35.300 | 44.000 | 32.800 | 41.500 | 86.500 | 17.800 |
| WATER | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL REVENUE | 2362.824 | 2454.434 | 2009.780 | 2101.390 | 2359.440 | 1895.506 |
| MAIN PRODUCT | 2030.484 | 2151.122 | 1851.997 | 1972.635 | 2359.440 | 1839.950 |
| BY PRODUCT | 332.340 | 303.312 | 157.784 | 128.756 | 0.000 | 55.556 |
| TOTAL COST(execl. land cost) | 826.910 | 942.982 | 780.162 | 896.234 | 995.805 | 881.228 |
| LAND COST | 148.450 | 153.950 | 152.680 | 158.180 | 160.400 | 160.730 |
| PROFIT (execl. land cost) | 1535.914 | 1511.452 | 1229.618 | 1205.156 | 1363.635 | 1014.278 |
| NET PROFIT(incl. land cost) | 1387.464 | 1357.502 | 1076.938 | 1046.976 | 1203.235 | 853.548 |

TABLE 7: PRODUCTION BUDGET AT SOCIAL PRICES FOR CROP ROTATIONS

| REVANUES AND COSTS AT SOCIAL PRICES (CROPPING ROTATIONS) | WHEAT & CORN | WHEAT & RICE | BEAN & CORN | BEAN & RICE | SUGAR CANE | S.BERSEEM & COTTON |
|---|---|---|---|---|---|---|
| TRADABLE INPUTS | | | | | | |
| FERTILIZER | | | | | | |
| UREA,N.15.5% | 272.800 | 189.968 | 173.600 | 90.768 | 248.000 | 99.200 |
| SUPER PHOSPHATE | 58.200 | 58.200 | 87.300 | 87.300 | 29.100 | 29.100 |
| POTASIUM SULPHATE | 0.000 | 0.000 | 0.000 | 0.000 | 73.800 | 0.000 |
| | | | | | | 0.000 |
| INCETICIDES | 2.794 | 7.338 | 8.060 | 12.604 | 2.887 | 19.649 |
| SEED | | | | | | |
| DELIVERED | 22.753 | 39.708 | 27.597 | 44.553 | 0.000 | 213.214 |
| PURCHASED | 27.481 | 18.824 | 63.588 | 54.932 | 100.023 | 16.546 |
| DOMESTIC FACTORS | | | | | | |
| LABOUR | | | | | | |
| LAND PREPARATION | 74.375 | 74.375 | 68.000 | 68.000 | 51.000 | 104.125 |
| PLANTATION | 10.625 | 10.625 | 21.250 | 21.250 | 42.500 | 38.250 |
| IRRIGATION | 80.750 | 127.500 | 51.000 | 97.750 | 144.500 | 85.000 |
| FERTILIZER | 34.000 | 25.500 | 29.750 | 21.250 | 17.000 | 17.000 |
| WEEDING & PLOWING | 59.500 | 150.875 | 93.500 | 184.875 | 153.000 | 323.000 |
| HARVES. & THRESHING | 233.750 | 259.250 | 174.250 | 199.750 | 216.750 | 280.500 |
| TRANSPORTATION | 25.500 | 29.750 | 25.500 | 29.750 | 170.000 | 17.000 |
| MACHINARY | | | | | | |
| LAND PREPARATION | 103.950 | 126.000 | 103.950 | 126.000 | 63.000 | 73.500 |
| IRRIGATION | 131.250 | 150.000 | 138.750 | 157.500 | 180.000 | 135.000 |
| PEST CONTROL | 2.685 | 4.635 | 6.000 | 7.950 | 0.450 | 7.950 |
| HARVES. & THRESHING | 108.000 | 108.000 | 108.000 | 108.000 | 0.000 | 67.500 |
| TRANSPORTATION | 52.950 | 66.000 | 49.200 | 62.250 | 129.750 | 26.700 |
| WATER | 100.000 | 120.000 | 110.000 | 130.000 | 240.000 | 120.000 |
| TOTAL REVENUE | 2333.152 | 2496.754 | 2332.577 | 2496.179 | 4068.936 | 2983.674 |
| MAIN PRODUCT | 2000.812 | 2193.442 | 2174.794 | 2367.423 | 4068.936 | 2928.118 |
| BY PRODUCT | 332.340 | 303.312 | 157.784 | 128.756 | 0.000 | 55.556 |
| TOTAL COST(execl. land cost) | 1401.362 | 1566.549 | 1339.295 | 1504.482 | 1861.760 | 1673.234 |
| LAND COST | | | | | | |
| PROFIT (execl. land cost) | 931.790 | 930.205 | 993.282 | 991.697 | 2207.176 | 1310.440 |
| NET PROFIT(incl. land cost) | 931.790 | 930.205 | 993.282 | 991.697 | 2207.176 | 1310.440 |

TABLE 8: PRODUCTION POLICY ANALYSIS MATRIX FOR BEAN

POLICY ANALYSIS MATRIX FOR BEAN (ALL PER FEDDAN)

| | TRADABLE | | DOMESTIC FACTORS | | | | | |
|---|---|---|---|---|---|---|---|---|
| | REVANUES | INPUTS | LABOUR | WATER | LAND | PROFITS | | |
| PRIVATE PRICES | 940.424 | 102.622 | 242.335 | 0.000 | 86.180 | 509.287 | NPC | 0.720 |
| SOCIAL PRICES | 1305.341 | 167.402 | 372.550 | 60.000 | 643.897 | 61.492 | NPI | 0.613 |
| EFFECTS OF | | | | | | | EPC | 0.736 |
| DISTORTIONS | -364.917 | -64.780 | -130.215 | -60.000 | -557.717 | 447.795 | | |
| | | | | | | | DRC | 0.946 |

TABLE 9: PRODUCTION POLICY ANALYSIS MATRIX FOR RICE

POLICY ANALYSIS MATRIX FOR RICE (ALL PER FEDDAN)

| | TRADABLE | | DOMESTIC FACTORS | | | | | |
|---|---|---|---|---|---|---|---|---|
| | REVANUES | INPUTS | LABOUR | WATER | LAND | PROFITS | | |
| PRIVATE PRICES | 1160.966 | 82.067 | 469.210 | 0.000 | 72.000 | 537.689 | NPC | 0.975 |
| SOCIAL PRICES | 1190.838 | 122.755 | 711.775 | 70.000 | 535.731 | -249.423 | NPI | 0.669 |
| EFFECTS OF | | | | | | | EPC | 1.010 |
| DISTORTIONS | -29.872 | -40.688 | -242.565 | -70.000 | -463.731 | 787.112 | | |
| | | | | | | | DRC | 1.234 |

TABLE 10: PRODUCTION POLICY ANALYSIS MATRIX FOR WHEAT

POLICY ANALYSIS MATRIX FOR WHEAT (ALL PER FEDDAN)

| | TRADABLE | | DOMESTIC FACTORS | | | | | |
|---|---|---|---|---|---|---|---|---|
| | REVANUES | INPUTS | LABOUR | WATER | LAND | PROFITS | | |
| PRIVATE PRICES | 1293.468 | 118.915 | 272.790 | 0.000 | 81.950 | 819.813 | NPC | 0.990 |
| SOCIAL PRICES | 1305.916 | 191.284 | 420.735 | 50.000 | 705.389 | -61.492 | NPI | 0.622 |
| EFFECTS OF | | | | | | | EPC | 1.054 |
| DISTORTIONS | -12.448 | -72.369 | -147.945 | -50.000 | -623.439 | 881.305 | | |
| | | | | | | | DRC | 1.055 |

TABLE 11: PRODUCTION POLICY ANALYSIS MATRIX FOR COTTON

POLICY ANALYSIS MATRIX FOR COTTON (ALL PER FEDDAN)

| | TRADABBLE | | DOMESTIC FACTORS | | | | | |
|---|---|---|---|---|---|---|---|---|
| | REVANUES | INPUTS | LABOUR | WATER | LAND | PROFITS | | |
| PRIVATE PRICES | 1423.316 | 86.280 | 581.935 | 0.000 | 122.600 | 632.501 | NPC | 0.557 |
| SOCIAL PRICES | 2553.208 | 361.163 | 896.650 | 90.000 | 647.760 | 557.635 | NPI | 0.239 |
| EFFECTS OF DISTORTIONS | -1129.892 | -274.883 | -314.715 | -90.000 | -525.160 | 74.865 | EPC | 0.610 |
| | | | | | | | DRC | 0.746 |

TABLE 12: PRODUCTION POLICY ANALYSIS MATRIX FOR CORN

POLICY ANALYSIS MATRIX FOR CORN (ALL PER FEDDAN)

| | TRADABBLE | | DOMESTIC FACTORS | | | | | |
|---|---|---|---|---|---|---|---|---|
| | REVANUES | INPUTS | LABOUR | WATER | LAND | PROFITS | | |
| PRIVATE PRICES | 1069.356 | 107.445 | 327.760 | 0.000 | 66.500 | 567.651 | NPC | 1.041 |
| SOCIAL PRICES | 1027.236 | 192.743 | 496.600 | 50.000 | 535.731 | -247.838 | NPI | 0.557 |
| EFFECTS OF DISTORTIONS | 42.120 | -85.298 | -168.840 | -50.000 | -469.231 | 815.489 | EPC | 1.153 |
| | | | | | | | DRC | 1.297 |

TABLE 13: PRODUCTION POLICY ANALYSIS MATRIX FOR SUGARCANE

POLICY ANALYSIS MATRIX FOR SUG. CANE (ALL PER FEDDAN)

| | TRADABBLE | | DOMESTIC FACTORS | | | | | |
|---|---|---|---|---|---|---|---|---|
| | REVANUES | INPUTS | LABOUR | WATER | LAND | PROFITS | | |
| PRIVATE PRICES | 2359.440 | 235.560 | 760.245 | 0.000 | 160.400 | 1203.235 | NPC | 0.580 |
| SOCIAL PRICES | 4068.936 | 453.810 | 1167.950 | 240.000 | 1607.194 | 599.982 | NPI | 0.519 |
| EFFECTS OF DISTORTIONS | -1709.496 | -218.250 | -407.705 | -240.000 | -1446.794 | 603.253 | EPC | 0.587 |
| | | | | | | | DRC | 0.834 |

TABLE 14: PRODUCTION POLICY ANALYSIS MATRIX FOR SHORT BERSEEM

POLICY ANALYSIS MATRIX FOR SHORT BERSEEM (ALL PER FEDDAN)

| | TRADABLE | | DOMESTIC FACTORS | | | | | |
|---|---|---|---|---|---|---|---|---|
| | REVANUES | INPUTS | LABOUR | WATER | LAND | PROFITS | | |
| PRIVATE PRICES | 472.190 | 30.850 | 182.163 | 0.000 | 38.130 | 221.048 | NPC | 1.097 |
| SOCIAL PRICES | 430.466 | 16.546 | 278.875 | 30.000 | 302.310 | -197.265 | NPI | 1.864 |
| EFFECTS OF DISTORTIONS | 41.724 | 14.304 | -96.713 | -30.000 | -264.180 | 418.313 | EPC | 1.066 |
| | | | | | | | DRC | 1.477 |

TABLE 15: PRODUCTION POLICY ANALYSIS MATRIX FOR WHEAT AND CORN

POLICY ANALYSIS MATRIX FOR WHEAT & CORN ROTATION (ALL PER FEDDAN)

| | TRADABLE | | DOMESTIC FACTORS | | | | | |
|---|---|---|---|---|---|---|---|---|
| | REVANUES | INPUTS | LABOUR | WATER | LAND | PROFITS | | |
| PRIVATE PRICES | 2362.824 | 226.360 | 600.550 | 0.000 | 148.450 | 1387.464 | NPC | 1.013 |
| SOCIAL PRICES | 2333.152 | 384.027 | 917.335 | 100.000 | 2207.176 | -1275.385 | NPI | 0.589 |
| EFFECTS OF | | | | | | | EPC | 1.096 |
| DISTORTIONS | 29.672 | -157.667 | -316.785 | -100.000 | -2058.726 | 2662.849 | | |
| | | | | | | | DRC | 1.654 |

TABLE 16: PRODUCTION POLICY ANALYSIS MATRIX FOR WHEAT AND RICE

POLICY ANALYSIS MATRIX FOR WHEAT & RICE ROTATION ( ALL PER FEDDAN)

| | TRADABLE | | DOMESTIC FACTORS | | | | | |
|---|---|---|---|---|---|---|---|---|
| | REVANUES | INPUTS | LABOUR | WATER | LAND | PROFITS | | |
| PRIVATE PRICES | 2454.434 | 200.982 | 742.000 | 0.000 | 891.813 | 619.639 | NPC | 0.983 |
| SOCIAL PRICES | 2496.754 | 314.039 | 1132.510 | 120.000 | 1325.883 | -395.678 | NPI | 0.640 |
| EFFECTS OF | | | | | | | EPC | 1.032 |
| DISTORTIONS | -42.320 | -113.057 | -390.510 | -120.000 | -434.070 | 1015.317 | | |
| | | | | | | | DRC | 1.181 |

TABLE 17: PRODUCTION POLICY ANALYSIS MATRIX FOR BEAN AND CORN

POLICY ANALYSIS MATRIX FOR BEAN & CORN ROTATION ( ALL PER FEDDAN)

| | TRADABLE | | DOMESTIC FACTORS | | | | | |
|---|---|---|---|---|---|---|---|---|
| | REVANUES | INPUTS | LABOUR | WATER | LAND | PROFITS | | |
| PRIVATE PRICES | 2009.780 | 210.067 | 570.095 | 0.000 | 152.680 | 1076.938 | NPC | 0.862 |
| SOCIAL PRICES | 2332.577 | 360.145 | 869.150 | 110.000 | 2207.176 | -1213.893 | NPI | 0.583 |
| EFFECTS OF | | | | | | | EPC | 0.912 |
| DISTORTIONS | -322.797 | -150.078 | -299.055 | -110.000 | -2054.496 | 2290.832 | | |
| | | | | | | | DRC | 1.615 |

TABLE 18: PRODUCTION POLICY ANALYSIS MATRIX FOR BEAN AND RICE

POLICY ANALYSIS MATRIX FOR WBEAN & RICE ROTATION ( ALL PER FEDDAN)

| | TRADABBLE | | DOMESTIC FACTORS | | | | | |
|---|---|---|---|---|---|---|---|---|
| | REVANUES | INPUTS | LABOUR | WATER | LAND | PROFITS | | |
| PRIVATE PRICES | 2101.390 | 96.442 | 711.545 | 0.000 | 158.180 | 1135.223 | NPC | 0.842 |
| SOCIAL PRICES | 2496.179 | 290.157 | 1084.325 | 130.000 | 1310.440 | -318.743 | NPI | 0.332 |
| EFFECTS OF DISTORTIONS | -394.788 | -193.715 | -372.780 | -130.000 | -1152.260 | 1453.966 | EPC | 0.909 |
| | | | | | | | DRC | 1.144 |

TABLE 19: PRODUCTION POLICY ANALYSIS MATRIX FOR COTTON AND SHORT BERSEEM

POLICY ANALYSIS MAR COTTON & SHORT BERSEEM ROTATION ( ALL PER FEDDAN)

| | TRADABBLE | | DOMESTIC FACTORS | | | | | |
|---|---|---|---|---|---|---|---|---|
| | REVANUES | INPUTS | LABOUR | WATER | LAND | PROFITS | | |
| PRIVATE PRICES | 1895.506 | 117.130 | 764.098 | 0.000 | 160.730 | 853.548 | NPC | 0.635 |
| SOCIAL PRICES | 2983.674 | 377.709 | 1175.525 | 120.000 | 993.282 | 317.158 | NPI | 0.310 |
| EFFECTS OF DISTORTIONS | -1088.168 | -260.579 | -411.428 | -120.000 | -832.552 | 536.391 | EPC | 0.682 |
| | | | | | | | DRC | 0.878 |

TABLE 20: PROTECTION AND EFFICIENCY COEFFICIENTS

SUMMARY OF PROTECTION AND EFFICIENCY COEFFICIENTS

| | NPC | NPI | EPC | DRC |
|---|---|---|---|---|
| BEAN | 0.720 | 0.613 | 0.736 | 0.946 |
| RICE | 0.975 | 0.669 | 1.010 | 1.234 |
| WHEAT | 0.990 | 0.622 | 1.054 | 1.055 |
| COTTON | 0.557 | 0.239 | 0.610 | 0.746 |
| CORN | 1.041 | 0.557 | 1.153 | 1.297 |
| SUG. CANE | 0.580 | 0.519 | 0.587 | 0.834 |
| S.BERSEEM | 1.097 | 1.864 | 1.066 | 1.477 |
| WHEAT & CORN | 1.013 | 0.589 | 1.096 | 1.654 |
| WHEAT & RICE | 0.983 | 0.640 | 1.032 | 1.174 |
| BEAN & CORN | 0.862 | 0.583 | 0.912 | 1.615 |
| BEAN & RICE | 0.842 | 0.332 | 0.909 | 1.144 |
| COTTON & S.BERSEEM | 0.635 | 0.310 | 0.682 | 0.878 |

TABLE 21: IMPORT PARITY PRICE CALCULATIONS

| IMPORT PARITY PRICE CALCULATIONS | UNIT | WHEAT | CORN | SUG. CANE |
|---|---|---|---|---|
| WORLD PRICE (FOB) | $/TON | 138.000 | 112.000 | 518.000 |
| ADD | | | | |
| FREIGHT & INSURANCE | $/TON | 32.000 | 32.000 | 32.000 |
| WORLD PRICE AT ALEX. | $/TON | 170.000 | 144.000 | 550.000 |
| MARKET EXCH.RATE | LE/$ | 2.700 | 2.700 | 2.700 |
| BORDER PRICE AT ALEX. | LE/TON | 459.000 | 388.800 | 1485.000 |
| ADD | | | | |
| TRANSPORT & MARKETING COSTS | LE/TON | 26.000 | 26.000 | 14.300 |
| BORDER PRICE AT MILLS | LE/TON | 485.000 | 414.800 | 1499.300 |
| ADD | | | | |
| VALUE OF BY-PRODUCT | LE/TON | 0.000 | 0.000 | 0.000 |
| DEDUCT | | | | |
| PROCESSING MARGIN & TRANSPORT COST | LE/TON | 6.000 | 6.000 | 590.000 |
| BORDER PRICE BEFORE MILL. | LE/TON | 479.000 | 408.800 | 909.300 |
| CONVERSION ALLOWANCE | % | 100.000 | 100.000 | 11.000 |
| BORDER PRICE AT FARMGATE | LE/TON | 479.000 | 408.800 | 100.023 |

TABLE 22: EXPORT PARITY PRICE CALCULATIONS

| EXPORT PARITY PRICE CALCULATIONS | UNIT | COTTON | RICE | BEAN |
|---|---|---|---|---|
| WORLD PRICE (CIF) | $/TON | 3059.000 | 278.000 | 409.000 |
| DEDUCT | | | | |
| FREIGHT & INSURANCE | $/TON | 32.000 | 32.000 | 32.000 |
| WORLD PRICE AT ALEX. | $/TON | 3027.000 | 246.000 | 377.000 |
| MARKT EXCH.RATE | LE/$ | 2.700 | 2.700 | 2.700 |
| BORDER PRICE AT ALEX. | LE/TON | 8172.900 | 664.200 | 1017.900 |
| DEDUCT | | | | |
| TRANSPORT & MARKETING COSTS | LE/TON | 12.300 | 12.300 | 12.300 |
| BORDER PRICE AT MILLS | LE/TON | 8160.600 | 651.900 | 1005.600 |
| ADD | | | | |
| VALUE OF BY-PRODUCT | LE/TON | 54.000 | 6.000 | 0.000 |
| DEDUCT | | | | |
| PROCESSING MARGIN & TRANSPORT COST | LE/TON | 82.000 | 87.000 | 20.000 |
| BORDER PRICE BEFORE MILL. | LE/TON | 8132.600 | 570.900 | 985.600 |
| CONVERSION ALLOWANCE | % | 2.670 | 66.000 | 100.000 |
| BORDER PRICE AT FARMGATE | LE/TON | 3045.918 | 376.794 | 985.600 |

TABLE 23: ASSUMPTIONS FOR SOCIAL PRICES CALCULATIONS

ASSUMPTIONS FOR SOCIAL PRICES CALCULATIONS

I. SOCIAL PRICES FOR TRADABLE INPUTS

| | | | |
|---|---|---|---|
| 1. OFFICIAL EXCHANGE RATE | = | 2.020 | LE/US$ |
| 2. MARKET EXCHANGE RATE | = | 2.700 | LE/US$ |
| 3. BORDER PRICE AT FARMGATE OF N.15.5% | = | 248.000 | LE/TON |
| 4. BODER PRICE AT FARMGATE OF SUPER PHOSPHATE | = | 291.000 | LE/TON |
| 5. BORDER PRICE AT FARMGATE OF POTAS.SULPHATE | = | 738.000 | LE/TON |
| 6. SHADOW PRICE FOR INSECTICIDES = PRIVATE PRICE * MARKET EX.RATE/ OFFICIAL EX.RATE | | | |
| 7. SOCIAL PRICE FOR SEED IS THE SAME AS FOR MAIN PRODUCT | = S.PRICE* | 1.000 | |
| 8. SHADOW PRICE FOR LABOR = THE BEST WAGE PREVAILED IN THE SECTOR | = | 8.500 | LE/M.DAY |
| 9. SHADOW PRICE FOR MACHINARY PRIVATE PRICE OF MACHINARY RENT * 150% (50% INCREASE OF OIL COST) | = P.PRICE* | 1.500 | |
| 10. SHADOW PRICE FOR WATER | = | 20.000 | LE/'000M3 |
| 11. SOCIAL PRICES OF MAIN PRODUCTS = IMPORT/EXPORT PARITY PRICES | | | |
| 12. SOCIAL PRICES OF BY-PRODUCTS | = P.PRICE* | 1.000 | |

13. OPPORTIUNITY COST OF LAND =
PROFIT EXCLUDING LAND COSTS OF THE SECOND BEST CROP THAT COMPETE DIRECTLY FOR AGRICULTURAL RESOURCES WITH THE CROP

14. FOLLOWING ARE CROPS' DURATION IN MONTHS:

| BEAN | RICE | WHEAT | COTTON | CORN | S.CANE | S.BERSEEM |
|---|---|---|---|---|---|---|
| 7 | 4 | 7 | 9 | 4 | 12 | 3 |

II. SOCIAL PRICE FOR SHORT BERSEEM

GIVEN:

- ONE TON OF CONCENTRATE + 10 TONS OF WHEAT STRAW ARE SUBSTITUTABLE FOR 10 TONS OF BERSEEM
- ONE TON OF BERSEEM ADDS 0.4 KG. OF NITROGEN TO THE SOIL

FOLLOWING ARE SOCIAL PRICE CALCULATIONS FOR SHORT BERSEEM:

| | | |
|---|---|---|
| SOCIAL PRICE OF CONCENTRATE | 350.000 | LE/TON |
| SOCIAL PRICE OF WHEAT STRAW | 90.240 | LE/TON |
| SOCIAL PRICE OF BERSEEM | 44.024 | LE/TON |
| N.15.5% OF ONE TON BERSEEM | 0.400 | KG. |
| SOCIAL PRICE OF N.15.5% | 0.248 | LE/KG |
| VALUE OF NITROGEN ADDED | 0.099 | LE/TON |
| NET SOCIAL PRICE OF BERSEEM | 44.123 | LE/TON |

TABLE 24: INDICATIVE DATA FOR IMPORT/EXPORT PARITY PRICES

DATA FOR IMPORT/EXPORT PARITY PRICES

I. DATA FOR IMPORTABLE GOODS

| | UNIT | WHEAT | CORN | S.CANE |
|---|---|---|---|---|
| WORLD PRICE FOB | $/TON | 138.000 | 112.000 | 518.000 |
| FREIGHT & INSURANCE | $/TON | 32.000 | 32.000 | 32.000 |
| TRANS. & MARKETING | LE/TON | 26.000 | 26.000 | 14.300 |
| VALUE OF BY-PRODUCT | LE/TON | 0.000 | 0.000 | 0.000 |
| PROCESS. MARGIN & TRANS. | LE/TON | 6.000 | 6.000 | 590.000 |
| CONVERSION ALLOWANCE | % | 100.000 | 100.000 | 11.000 |

II. DATA FOR EXPORTABLE GOODS

| | UNIT | COTTON | RICE | BEAN |
|---|---|---|---|---|
| WORLD PRICE CIF | $/TON | 3059.000 | 278.000 | 409.000 |
| FREIGHT & INSURANCE | $/TON | 32.000 | 32.000 | 32.000 |
| TRANS. & MARKETING | LE/TON | 12.300 | 12.300 | 12.300 |
| VALUE OF BY-PRODUCT | LE/TON | 54.000 | 6.000 | 0.000 |
| PROCESS. MARGIN & TRANS. | LE/TON | 82.000 | 87.000 | 20.000 |
| CONVERSION ALLOWANCE | % | 2.670 | 66.000 | 100.000 |

TABLE 25: SENSITIVITY ANALYSIS

SENSITIVITY ANALYSIS

EGYPTIAN GOVERNMENT IS TARGETING TO PHASE OUT INPUTS SUBSIDIES THROUGH A PACKAGE OF POLICY REFORM PROGRAMS. SOME OF THESE PROGRAMS ARE:

| | | | |
|---|---|---|---|
| **I. ELEMINATION OF INDIRECT SUBCIDY OR EXCHANGE RATE SUBSIDY** | | | |
| - INCREASE EXCHANGE RATE FROM LE | 2.700 | TO | 3.300 |
| **II. ELEMINATION OF INPUTS SUBSIDY** | | | |
| - PRIVATE PRICES OF N.15.5% INCREASED FROM LE | 0.132 | TO | 0.248 |
| - PRIVATE PRICES OF SUPER PHOSPHATE INCREASED FROM LE | 0.129 | TO | 0.291 |
| - PRIVATE PRICES OF POTASIUM SULPHATE INCREASED FROM LE | 0.305 | TO | 0.460 |
| - PRIVATE VALUE OF PESTCIDES INCREASED BY 20% | = P.PRICE | * | 1.200 |
| **III. INCREASING CROPS FARMGATE PRICES TO THE WORLD PRICES** | | | |
| INCREASE FARMGATE PRICES OF COTTON TO BE 60 % OF ITS WORLD PRICES | | | |
| | = P.PRICE | * | 1.600 |

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