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INPUT INTERVENTIONS AND PRODUCTION EFFICIENCY IN PHILIPPINE AGRICULTURE

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This article primarily examines the efficiency implications of government interventions affecting major farm inputs in the Philippines, namely, minimum wage legislations, interest rate regulations, foreign exchange controls and tariffs, as well as specific programs on hybrid seed production, fertilizer subsidies, liberalized credit, and irrigation development. While these interventions encompass a variety of instruments that have throughout the years become increasingly prevalent, they are hypothesized to have various adverse effects on production efficiency in Philippine agriculture.

Introduction

Like in most developing economies, Philippine agricultural development strategy evolved from two sets of rather conflicting policies. On the other hand, the strategy was based on an industry led theory of economic development granting priority to industrialization in the hope that other sectors would benefit from so-called "trickle down" effects. On the other hand, it was molded from a set of distributional policies said to have originated in reaction to onerous conditions in the countryside prior to Martial Law. Pressures and changing market conditions, however, time and again bore non-compromising additions and modifications to the list of policy instruments in force, resulting in the patchwork of uncoordinated and unmanageable market interventions currently plaguing Philippine agriculture.

This paper assesses the economic implications of government policies and programs affecting agricultural inputs in the Philippines. The analysis proceeds on the basis of three premises: (a) government interventions pertaining to agricultural inputs have in the past been extensive; (b) the government shall continue to find it useful to

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employ a variety of such interventions in the future; and (c) the use of some of these measures is legitimate provided that their consequences on efficiency have been extensively analyzed. With these in mind, this study investigates the extent to which specific farm input interventions could have — through resulting price distorting effects — led to inefficiencies in the agricultural output mix. In so doing, it utilizes an index that would show the relative extent to which a given magnitude of price distortion could have contributed to production inefficiency.[1] Values of this index are estimated for different regions in the agricultural sector during crop year (CY) 1976, a typical crop year in view of past regional production patterns and trends. Sensitivity analysis is also employed to examine the distortive nature of specific farm input policies and programs. In each case, results are evaluated in terms of implications on regional development and production efficiency.

In view of the limitations of the method used, the analysis does not consider other important aspects as effects of interventions on income distribution, employment, trade, and growth. Neither does it examine the effects of introducing new interventions in the system as corrective measures to the distortionary influences of prevailing interventions. Instead, the paper assesses ex-post static effects within a partial equilibrium framework. Ultimately, it aims to discern actions that could guide the government in its implementation of farm input policies and programs so that they may more effectively meet the government's welfare objectives and constraints, given the country's comparative cost advantages.

Conceptual and Empirical Framework

In this study, interventions are regarded as definitive components of an existing distorted situation, one wherein all dynamic adjustments are presumed to already have taken place and along which social inefficiency prevails. In order to establish the relative efficiency impact of a given input price distortion, this study constructs a so-called Efficiency Cost Index. This is arrived at from the Domestic Resource Cost technique increasingly used in economic

[1] In economics, price distortions are usually identified through differentials between private and social unit values. Note that the word "differential" is used here as a purely descriptive term, while "distortion" is used to denote that a differential has efficiency implications as are deducible from certain positive statements in welfare theory. In other words, this distinction implies that though every distortion presupposes a differential, not every differential need be distortionary. (For an extensive elaboration of this, particularly for the input markets, see Magee [1976]). This study however, assumes that any properly identified price differential constitutes a distortion and is therefore a definite source of efficiency and welfare loss.

literature to assess production efficiency.[2]

The Domestic Resource Cost Technique

Essentially, the Domestic Resource Cost technique computes a ratio (the DRC) that compares the social cost (in terms of domestic factors) that an activity entails with the net foreign exchange value added that it generates. The DRC for an activity j assumed to produce one output q, for instance, can be expressed as follows:

$$(1) \qquad DRC_j = \frac{\sum_s f_{sj}\, v_s + E_j}{q_j p_j - (M_j + R_j)} = \frac{DC_j}{NVA_j}$$

where f_{sj} is the quantity of the primary factor s used in the production of q; v_s is the shadow price of s (in domestic currency); E_j is the net external cost or benefit (if negative) imparted by activity j to the rest of the economy (in domestic currency); q_j is the quantity of q produced by j; p_j is the world price of q (expressed in foreign currency); M_j is the value in world prices of tradable inputs used in j (expressed in foreign currency); R_j is the foreign currency value of repatriated earnings from foreign factors used in the production of q; DC_j is the social cost of domestic resources employed in j (in domestic currency); and NVA_j is j's value added at world prices, equivalent to the net foreign exchange earned or saved (in foreign currency).

Intrinsically, the DRC relates to a measure of the relative efficiency with which an activity converts domestic resources into net foreign exchange. Its use as such, however, requires that it be compared with some estimate of the economy's "real" cost of supplying foreign exchange or the "shadow" exchange rate (here v_{fx}). Accordingly, j is relatively socially efficient when

$$(2) \qquad DRC_j < v_{fx}\text{, or } DRC_j / v_{fx} < 1.$$

DRC_j/v_{fx} is commonly called the DRC coefficient.[3]

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[2] For a historical review of the antecedents of the DRC concept, see Bruno (1972). A concise evaluation of the DRC measure viz., its assumptions, limitations, and applications in various aspects of economic analysis is given in Pearson, *et al.* (1976) and Bruno (1965).

[3] The condition in (2) can also be interpreted to imply that activity j should earn or save net foreign exchange with less domestic resource cost than is incurred on the average by other activities in the economy. This is so because v_{fx} represents the weighted average efficiency with which tradable activities in the economy transform domestic factors into foreign exchange. DRC_J, therefore, is equivalent to an exchange rate indicating the social value of domestic resources that activity j actually requires for producing or saving one unit of net foreign exchange. v_{fx}, on the other hand, is the exchange rate measuring the cost the society is willing to incur to obtain that same unit of net foreign exchange. Hence, if DRC_j is less than v_{fx}, the society will — by expanding j — stand to gain in welfare (Pearson, *et al.* (1976)).

The DRC concept bears close ties with international trade considerations of comparative advantage (Bruno, 1965). It has been used empirically to evaluate the comparative advantage of existing activities as well as to choose among investment alternatives. Assessment of comparative advantage, however, requires that the DRC ratios of activities be compared in relation to the shadow price of foreign exchange. The smaller an activity's DRC vis a vis v_{fx}, the greater is its assessed degree of comparative advantage. Thus, activity r has comparative advantage over j if

$$(3) \qquad \frac{DRC_r}{v_{fx}} < \frac{DRC_j}{v_{fx}}$$

This means that, for improved economic efficiency, r should be expanded while j contracted.[4]

In empirical analysis, it is sometimes more convenient to employ a modified form of the DRC measure (DRC') in which both DC and NVA are expressed in domestic currency using the official exchange rate (v_{ox}). Multiplying NVA_j in (1) by v_{ox} (expressed as a ratio of local to foreign currency), we obtain:

$$(4) \qquad DRC'_j = \frac{\sum_s f_{sj} v_s + E_j}{[q_j p_j - (M_j + R_j)]\, v_{ox}} = \frac{DRC_j}{v_{ox}}.$$

With this, the criterion for relative social efficiency becomes:

$$(5) \qquad \frac{DRC'_j}{v_{fx}/v_{ox}} < 1.$$

As it stands, the DRC measure has been gaining wide acceptance as an effective tool in economic research. In the Philippines, recent

[4] A point of clarification with respect to internal ranking through the use of the *DRC* is in order. Superficial analysis of the way the *DRC* is constructed might lead one to believe that all one has to do is to rank activities by their DRCs without the need to identify a reference point. As a general rule, such an approach would be incorrect. A great deal of arbitrariness in the ranking would occur if an appropriate base were not determined. No such arbitrariness, however, would take place in the ranking of the relative position of the DRCs vis-a-vis the accounting exchange rate. If an accounting rate cannot be identified, it may still be possible to indicate comparative advantage among activities by comparing their DRC ratios provided it is assumed that the activities in question are so small that they are unable to alter relative prices. For a summary discussion of this point, see Bruno (1972).

studies have used it to examine comparative advantage and protection in both manufacturing (Bautista and Power, 1979) and agriculture (Herdt and Lacsina, 1976; Armas and Cryde, 1980; Rodriguez, 1982).

The Efficiency Cost Index

The Efficiency Cost Index (ECI) arrived at in this study makes extensive use of the DRC formulation described above. Before going into technical details, however, it is first necessary to point out that the concept of efficiency cost used simply pertains to the economic loss that arises when a distorted market price causes producers to shy away from activities exhibiting comparative advantage. The extent of this loss for a particular sector at a given point in time can thus be deduced from an index measuring the degree to which the distortion may have diverted production efforts away from the sector's economic optimum. In cases where distortions characterizing the existing situation cannot be removed or are inherent constraints to the maximum level of efficiency which the economy can in fact attain, this optimum is classified as a "second-best" one.[5]

To clarify this point, Figure 1 presents the framework employed by Hagen (1958) to demonstrate the effect of a constant

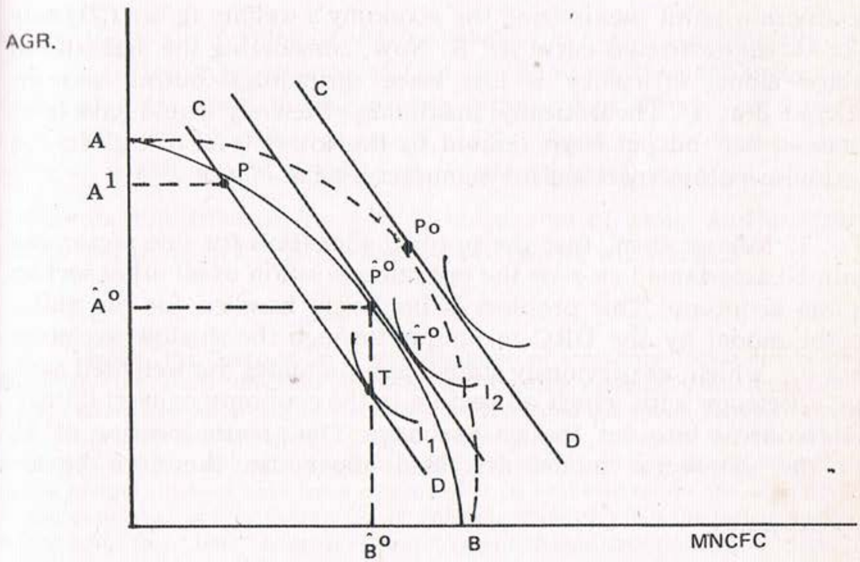

Figure 1

[5]This "second-best" classification is found in Bhagwati and Ramaswami (1963) and Srinivasan and Bhagwati (1978). Also, for a comprehensive review and synthesis of the diverse contributions to the theoretical literature on distortions, the "second-best" position, and welfare, see Bhagwati (1971).

wage differential between two sectors — agriculture and manufacturing. The differential, set against manufacturing, is presumed to cause both a divergence between the domestic rate of product transformation and the domestic price ratio as well as a contraction of the economy's production possibility frontier.[6] $AP^{\circ}B$ is the production possibility curve drawn on the assumption that wages for homogeneous labor in both sectors are uniform. P° is the production point yielding maximum welfare given $AP^{\circ}B$ and the international price ratio at CD. $A\hat{P}^{\circ}B$ is the curve assumed for the wage differential drawn concave to the origin. The wage differential, aside from reducing production possibilities, will cause the private profitability of transforming agricultural output into manufactures to be understated. Hence, the economy is led to produce at a point such as P where the domestic price ratio at CD (assumed identical to the international price ratio) is steeper than the domestic rate of transformation (DRT). With P, the economy consumes at T and attains the welfare level I_1. Given this, the economy would have been better off had it instead produced at $\hat{P}^{\circ}$ (with welfare level I_2 at $\hat{T}^{\circ}$) where equality between the international price ratio, DRT, and the domestic rate of commodity substitution along the restricted production possibility curve would have been maintained. Point $\hat{P}^{\circ}$ in fact constitutes the "second-best" allocation for this model since it defines the exact production point maximizing the economy's welfare (given CD) subject to the restricted curve $A\hat{P}^{\circ}B$. Now, considering the agricultural sector alone, efficiency is lost since agricultural output is overexpanded at A'. Theoretically, maximum efficiency would have been attained had output been limited to the lower level $\hat{A}^{\circ}$, given the optimum output specified for manufacturing at $\hat{P}^{\circ}$ (i.e. $\hat{B}^{\circ}$).

It follows then, that the optimal allocation for one sector can only be ascertained vis-a-vis the optimum position of all other sectors in the economy. This problem is implicitly handled for the multisector model by the DRC technique through the shadow exchange rate v_{fx} which, as previously stated, approximates the weighted average efficiency with which all sectors in the economy convert domestic resources into net foreign exchange. The precise location of $\hat{A}^{\circ}$ for the two-sector model described above can therefore be ap-

[6] Hagen's framework, moreover, assumes that the economy possesses a well-behaved social utility function and that the wage differential does not in itself alter the quantities of resources available, the technological possibilities under which the economy operates, or the trading conditions it faces in external markets. So long as these remain unchanged, all the distortion will entail will be a reorganization of production due to reshuffling of available resources between the two sectors.

proached through the DRC by valuing all the primary and intermediate inputs of the activities in A' at their "second-best" shadow prices, and relating it to v_{fx}.[7]

Consider now a model consisting of n production activities (j = 1, 2 . . . n) directly employing two primary factors -- labor (L) and capital (K) — and an intermediate input (I) to produce tradable outputs $q_1, q_2 \ldots q_n$, respectively. Outputs are assumed to face the fixed international prices $p_1, p_2 \ldots p_n$, expressed in foreign currency. L and K may be priced at their "second-best" wage and rental values $\hat{w}^{\circ}$ and $\hat{r}^{\circ}$ (corresponding to factor valuations reflecting the "second-best" allocation) or at their private values w and r (corresponding to prices actually obtained in the market), depending on whether social or private costs are examined. The value of I, in turn, is assumed decomposable into its foreign (or tradable) and domestic constituents.

For j, I's private value is its user's cost (net of explicit and subsidies) inclusive of tariffs and taxes:

$$(6) \qquad U_{ij} = i_j p_i = M_j v_{ox} + l_{ij} w_i + k_{ij} r_i + T_j$$

where U_{ij} is the private or user's cost of I in j; i_j is the quantity of I in j; p_i is the market price of I; M_j is the value of tradable components of i_j (at given border prices, expressed in foreign currency); v_{ox} is the official exchange rate; l_{ij} is the physical labor component of i_j; w_i is the market price l_{ij}; k_{ij} is the capital component of i_j; r_i is the market price of k_{ij}; and T_j is the sum of direct and indirect tariffs and taxes in U_{ij}. Equivalently, (6) can be written as:

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[7] Ideally, the "second-best" shadow price of a primary factor can be defined for the trade theoretic DRC as the factor's marginal contribution of foreign exchange when this contribution is assessed at the actual distorted situation (Srinivasan and Bhagwati, 1978). Alternatively, it can be defined as the converted border value of the output that the factor could have produced had it, at the margin, instead have been employed in its best alternative use, equivalent to the converted border value of such output sacrificed when the factor is withdrawn from this "best" alternative employment (Scandizzo and Bruce, 1980). A tradable intermediate input, in turn, would have a "second-best" value equal to its border cost plus the real cost of domestic resources expended in bringing the input from the border to the user at his price. Working backwards, the "second-best" value of a tradable intermediate input would simply be the cost paid by the user, less all direct and indirect taxes, plus all direct and indirect subsidies inherent in this cost. Nontradables could likewise be valued according to their tradable and primary factor components, identified by working back through the input-output chain.

(7) $$U_{ij} = M_j v_{fx} + l_{ij} w_i + k_{ij} r_i + T_j + V_j$$

where $M_j v_{fx}$ is the value of tradable components in i_j expressed in domestic currency using the shadow exchange rate and $V_j = (M_j v_{ox} - M_j v_{fx})$ isolates the (implicit) resource transfer due to a distorted exchange rate on tradable components costs. I's social value (W_{ij}), in turn, is its user's cost before taxes plus the value of all isolated subsidies (S_j) in U_{ij}, after valuing primary factors in i at their "second-best" shadow prices ($\hat{w}_i^\circ$ for l_{ij} and $\hat{r}_i^\circ$ for k_{ij}) and the cost of tradable components at the shadow exchange rate:

(8) $$W_{ij} = M_j v_{fx} + l_{ij} \hat{w}_i^\circ + k_{ij} \hat{r}_i^\circ + S_j \; .$$

Assuming away external benefits (E_j) and repatriated earnings (R_j)[8] the "second-best" DRC $(D\hat{R}C_j^\circ)$ for j can thus be defined for our model as:

(9) $$D\hat{R}C_j^\circ = \frac{\sum_s f_{sj} \hat{v}_s^\circ}{q_j p_j - M_j} = \frac{l_j \hat{w}^\circ + k_j \hat{r}^\circ + (l_{ij} \hat{w}_i^\circ + k_{ij} \hat{r}_i^\circ + S_j)}{q_j p_j - M_j}$$

where $\hat{v}_s^\circ$ is the "second-best" shadow price for the factor input s and l_j and k_j are the quantities of the direct factor inputs L and K in j. Note that $D\hat{R}C_j^\circ$ can be estimated for all j.

As was earlier implied, the set of "second-best" DRC coefficients $(D\hat{R}C_j^\circ / v_{fx})$ for all j would reveal the path of resource allocation directly leading to the production point deemed optimal for the sector comprising j, assuming that distortions defining the existing allocation are to be accepted as constraints. In effect, this set technically describes the direction and location of the "second-best" solution, i.e. it indicates how production in the sector should have been organized for the sector to attain the level of resource allocative efficiency implied, say, by point $\hat{P}^\circ$ in Figure 1.

Now, several "variant" DRC measures can likewise be constructed for the model by replacing the shadow prices of the inputs in (9) with their distorted counterparts. These measures, alternately considering the prevailing price distortion for L, K, and I, respectively, are as follows:

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[8] See equation (1), page 85.

(10) (a) Variant for labor price distortion:

$$DRC_j^L = \frac{l_j w + k_j \hat{r}^\circ + (l_{ij}\hat{w}_i^\circ + k_{ij}\hat{r}_i^\circ + S_j)}{q_j p_j - M_j}$$

(11) (b) Variant for capital price distortion:

$$DRC_j^K = \frac{l_j \hat{w}^\circ + k_j r + (l_{ij}\hat{w}_i^\circ + k_{ij}\hat{r}_i^\circ + S_j)}{q_j p_j - M_j}$$

(12) (c) Variant for intermediate input price distortion:

$$DRC_j^I = \frac{l_j \hat{w}^\circ + k_j \hat{r}^\circ + (l_{ij} w_i + k_{ij} r_i + T_j + V_j)}{q_j p_j - M_j}$$

Note that these variants, unlike the "second-best" measure, are not intended to express social efficiencies. Rather, each is used to isolate the partial impact that an input's distorted market price has (at a given point in time) in diverting the private incentive to engage in an activity away from what would have been necessary to exploit its comparative advantage. Intuitively, one can expect that when the market (social) price of an input exceeds its social (market) price, activities relatively intensive in that input would tend to be more discouraged (encouraged) than those using less of it. Resources on the whole will be misallocated. In effect, the set of variant DRC coefficients for all j (i.e. DRC_j/v_{fx} for all j) for a given distortion at a certain point in time indicates the path of allocation induced by the distortion when its influence on output in the sector comprising j is separately examined. When compared with the set of "second-best" coefficients, these variants indicate the extent to which a given price distortion causes output in the sector to depart from the mix identified as "most" efficient.

From this, the derivation of the Efficiency Cost Index becomes quite straightforward. Since the index is supposed to indicate the degree to which a given distortion diverts production efforts in each activity away from that required for full exploitation of comparative advantage, it could simply be constructed as the weighted sum of the absolute values of the difference between each activity's "second-best" and variant DRC coefficients, with the activity's contributed share to the sector's net foreign exchange value added used as weights. Thus, if $(DRC_1^L/v_{fx}, DRC_2^L/v_{fx} \ldots DRC_n^L/v_{fx})$ represents the set of coefficients for the price distortion prevailing in the labor market and $(D\hat{R}C_1^\circ/v_{fx}, D\hat{R}C_2^\circ/v_{fx} \ldots D\hat{R}C_n^\circ/v_{fx})$ represents the set of social coefficients, then the Efficiency Cost Index (ECI) for the distortion would be:

$$(13) \qquad ECI^L = \sum_j e_j \frac{\left| D\hat{R}C^\circ_j - DRC^L_j \right|}{v_{fx}}$$

where $e_j = (q_j p_j - M_j)/\sum_j (q_j p_j - M_j)$ and $\sum_j e_j = 1.$[9] Correspondingly, the respective indices for a given degree of capital and intermediate price distortion would be:

$$(14) \qquad ECI^K = \sum_j e_j \frac{\left| D\hat{R}C^\circ_j - DRC^K_j \right|}{v_{fx}}$$

$$(15) \qquad ECI^I = \sum_j e_j \frac{\left| D\hat{R}C^\circ_j - DRC^I_j \right|}{v_{fx}}$$

By definition, larger index values imply greater efficiency costs.

Note that weights are incorporated into the indices to account for each activity's relative importance in the sector in terms of contribution to net foreign exchange. Also, taking the absolute values of the coefficient differences allows all deviations of equivalent magnitudes in any direction to be treated equally, thereby preventing such deviations from numerically offsetting each other. This, of course, bears the value assertion that they should be treated so.

[9] Eq. (13) can also be derived from a procedure aggregating domestic costs and net foreign exchange returns for the three activities and taking the absolute values of the differences between social and private wages. Using all previous notations, we have:

$$l/v_{fx} \left(\frac{\sum_j [l_j \hat{w}^\circ + k_j \hat{r}^\circ + (l_{ij} \hat{w}^\circ_i + k_{ij} \hat{r}^\circ_i + S_j)]}{\sum_j (q_j p_j - M_j)} - \frac{\sum_j [l_j w + k_j \hat{r}^\circ + (l_{ij} \hat{w}^\circ_i + k_{ij} \hat{r}^\circ_i + S_j)]}{\sum_j (q_j p_j - M_j)} \right) =$$

$$l/v_{fx} \left(\frac{\sum_j l_j \; |\hat{w}^\circ - w|}{\sum_j (q_j p_j - M_j)} \right) = l/v_{fx} \sum_j \left(\frac{(q_j p_j - M_j)}{(q_j p_j - M_j)} \cdot \frac{l_j \; |\hat{w}^\circ - w|}{\sum_j (q_j p_j - M_j)} \right) =$$

$$l/v_{fx} \; \sum_j e_j \frac{l_j \, |\hat{w}^\circ - w|}{(q_j p_j - M_j)} = \sum_j e_j \frac{\left| D\hat{R}C^\circ_j - DRC^L_j \right|}{v_{fx}}$$

One important advantage of the index is that it can be constructed for different types of input distortions as well as for different regions in the economy. Of course, it must be remembered that the ECI measures are only valid under the same rigid assumptions specified for the DRC coefficient including, for example, the assumptions that incremental production costs, determined by a given technology and an assumed set of input coefficients and relative factor prices, remain constant.

Analysis of Results[10]

In empirically examining input interventions and production efficiency in Philippine agriculture, this section begins by identifying, through the DRC coefficient, regional patterns of efficiency or comparative advantage. Concomitantly, it investigates whether such patterns had been promoted or inhibited by the overall incentive mix. It then assesses the extent to which distortions in farm labor, short-term capital, fertilizer, irrigation, and seed prices could have induced regional inefficiencies in the composition of agricultural output. Finally, it conducts sensitivity analysis to test the impact of price and policy changes on comparative advantage. On the whole, this section evaluates the government's different farm input policies and programs and pinpoints factors to be considered in its future intervention strategies.

Production Efficiency and the Incentive Mix

Table 1 lists social DRC coefficients by crop and region, along with measures of actual area harvested and private and social profitabilities for CY 1976. In general, the DRC values displayed indicate that the country possesses greater comparative advantage in sugar (overall DRC of .49) than in rice (.83) while exhibiting comparative disadvantage in corn (1.53) production. Indeed, for all regions concerned, raw sugar invariably surpassed the other two crops in terms of cost efficiency, consuming only from 40 per cent to 74 per cent of the domestic resource cost incurred by corn to generate a marginal unit of net foreign exchange. Similarly, rice required only from 19 per cent to 38 per cent of the domestic resource cost expended by corn.

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[10] Three crops — rice, corn, and sugar — have been selected to represent Philippine agriculture. Private data used in estimating the subsequent measures were obtained from extensive farm surveys independently conducted by the Bureau of Agricultural Economics (BAEcon), the Philippine Council for Agricultural Research (PCAR) and the Philippine Sugar Commission (Philsucom) for CY 1976. Data used to derive assumed social values and costs were mostly gathered from government agencies and their publications. For details concerning procedures, assumptions, and sources used to compute data inputs, the reader is referred to Cryde (1983).

Table 1 — DRC Coefficient Ratios, Areas Harvested and Net Private and Social Profitabilities: By Crop and Region, CY 1976

Crop/Region	DRC Coefficient Ratios (DRC/v_{fx})	Actual Area Harvested (000 has.)	Net Private Profit (NPP) (pesos/ha.)	Net Social Profit (NSP/v (pesos/ha.)
Paddy/Rice				
Ilocos	0.66	342.59	212.60	1118.92
Cagayan	0.72	418.70	231.82	723.77
Central Luzon	0.72	464.72	1052.96	1034.91
Southern Tagalog	1.23	461.08	188.44	(603.94)
Bicol	0.75	338.59	228.13	530.54
Western Visayas	0.72	448.73	381.64	799.92
Central Visayas	0.76	89.60	377.61	687.80
Eastern Visayas	0.73	181.20	559.66	717.65
Western Mindanao	0.72	140.29	314.77	747.39
Northern Mindanao	0.71	316.17	201.63	637.50
PHILIPPINES	0.83	3201.67 [a]	112.16	460.38
Unmilled Corn				
Cagayan	1.25	351.78	158.03	(247.34)
Bicol	1.68	155.78	(48.14)	(499.40)
Western Visayas	3.71	214.04	(568.48)	(1211.16)
Central Visayas	3.54	475.73	(392.71)	(1073.88)
Eastern Visayas	1.80	142.98	(83.30)	(720.98)
Western Mindanao	1.68	211.14	(39.44)	(488.97)
Northern Mindanao	1.44	386.14	28.59	(285.91)
Southern Mindanao	0.77	945.92	113.03	358.18
PHILIPPINES	1.53	2883.51 [b]	(22.44)	(594.88)
Raw Sugar				
Ilocos	0.49	1.23	(211.08)	7284.67
Central Luzon	0.52	67.83	(340.54)	8364.98
Southern Tagalog	0.49	67.00	1435.77	14443.33
Western Visayas	0.47	321.81	(223.09)	11894.74
Eastern Visayas	0.47	27.00	(105.56)	10265.21
PHILIPPINES	0.49	484.87 [c]	(211.47)	11479.32

[a]Excludes paddy area harvested in Southern Mindanao (377,650 has.)

[b]Excludes corn areas harvested in Ilocos (43,380 has.), Central Luzon (50,720 has.) and Southern Tagalog (270,370 has.).

[c]Excludes sugar areas harvested in Bicol (5,800 has.), Central Visayas (45,142 has.), and Southern Mindanao (17,342 has.)

Sources of Basic Data:

Basic data used to derive the above measures were primarily drawn from farm survey worksheets prepared from agricult surveys conducted in 1974 and 1977. Paddy data were obtained from the CY 1976 comprehensive farm management survey joi undertaken by the Bureau of Agricultural Economics (BAEcon) and the Philippine Council for Agricultural Research (PCA This survey presents average costs and returns data for paddy by region, farm type, seed variety, and season. Sugar data were li wise extracted from cost survey worksheets prepared by the Research and Development Crew of the Philippine Sugar Commi (Philsucom) in 1976 and 1977. Corn data, on the other hand, were pieced together from BAEcon and PCAR publications as well from 1974 survey data extrapolated to CY 1976 on the basis of official indices. Regional corn costs, moreover, were intrapol on the basis of input coefficients derived from Hiwatig (1977), PCAR (1976), and Rodriguez (1982).

Analysis of the DRC ratios on an intracrop level, in turn, discloses varying degrees of interregional comparative advantage. Rice, for instance, was grown with greatest advantage in Ilocos (.66) with almost twice the efficiency of its only inefficient region, Southern Tagalog (1.23). In contrast, corn only displayed comparative advantage in Southern Mindanao (.77) with close to five times the efficiency of its most inefficient region, Central Visayas (3.54). Sugar, in turn, exhibited the least variability in its DRC estimates, with the traditionally sugar growing regions of Western and Eastern Visayas tying with computed DRC of .47 compared with Central Luzon's .56.

Aside from reflecting inherent physical differences in regional productive capacities, the observed moderate variability in rice and extreme variability in corn estimates can perhaps be partly attributed to regional differences in the rate of absorption of the new seed technology. Indeed, while the dispersion of HYV rice during the early 1970s had been quite widespread, farmer acceptance of hybrid corn seed was mainly concentrated in specific areas in Mindanao (Bureau of Plant Industry). It appears then that the rapid diffusion of HYV seed had an equalizing and overall beneficial effect on rice's regional comparative advantage, suggesting that government's hybrid corn program may still possess potential for uplifting corn's comparative disadvantage. For sugar, the variation in DRCs estimated may have been slight plausibly because recent agronomic innovations of this sort may have not been important.

How do actual cropping patterns compare with established patterns of production efficiency? By crop, area harvested data demonstrate significant departures from efficiency inasmuch as regions with larger areas do not necessarily record lower DRCs. Such data, however, may be strongly indicative of such factors as the existence of specialized land or the prevalence of multiple cropping activity rather than cropping patterns induced by private incentives. On this ground, it is perhaps more appropriate to examine our measures of net private and social profitability.

In general, comparison of private and social profit data strongly indicates a perversity in the direction of private incentives. Contrary to social trends, rice's net private returns exceed those of sugar for all regions concerned, except Southern Tagalog, by as much as 400 per cent. Even the overall net private profit for rice per hectare falls below its social value by over 75 per cent. For sugar, the incentive structure is such that its net social profitability is eventually transformed into a private loss. Finally, corn seems to have been favored by the incentive mix although its overriding inefficiency failed to convert its net social loss into a net private profit.

This perversity in the structure of private incentives undoubtedly warrants closer attention. Moreover, because of its complexities, it would be interesting to examine the relative importance of different farm input price measures in affecting farm output decisions. Before tackling this issue, however, a general assessment of farm input versus output policy is in order. For this purpose, this study adopts a procedure developed by Josling (1975) in his calculation of producer subsidy equivalents (PSE).[11]

On the whole, the estimated PSEs suggest that farm output and intermediate input pricing policies have effectively taxed sugar and paddy while subsidizing corn (Table 2). Not surprisingly, these trends closely conform with the overall incentive pattern portrayed in Table 1, suggesting that government price policies may significantly influence agricultural output decisions through their consequences on private profits. More interesting for this study, however, is the incentive structure depicted by the nominal rates. Values and rankings of such rates on output, for one, indicate that the government's output price policies have been the main source of disparity between the structure of private incentives and the pattern of social efficiency for all crops. The closeness in values and rankings between the nominal rates on output and the PSEs, moreover, implies that this disparity had not been significantly counteracted by explicit transfers from the input side. More importantly, while the generally more favorable nominal input subsidy rates for paddy and sugar at the very least suggest that intermediate input subsidies have slightly offset the output price bias against these crops, the intracrop rankings of such rates reveal that these subsidies have extensively discouraged the regional efficiency of paddy and encouraged, both absolutely and relatively, the inefficiency of corn. Within the context of comparative advantage, it is therefore unlikely that these subsidies could have on the whole been of any great economic benefit. More likely, their effect has been to aggravate the perversity in private incentives due to policies regulating output price.

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[11] In brief, the PSE method first adds net input subsidies to the farm gate value of output then compares it with the output's border value equivalent at farm gate to obtain the effective rate of producer subsidization. While the method has the advantage of describing accurately the net extent of taxes and subsidies on producers of agricultural products, it has the disadvantage that it can only account for explicit transfers.

Table 2 — Producer Subsidy Equivalents by Crop and Region, CY 1976
(in per cent)

Crop/Region	Nominal Tax/ Subsidy Rate on Farm Output	Nominal Subsidy Rate on Intermediate Farm Inputs	Producer Subsidy Equivalent
Paddy Rice			
Ilocos	(5.81)	9.08	(3.86)
Cagayan	(6.97)	10.31	(4.56)
Central Luzon	(4.72)	7.44	(3.15)
Southern Tagalog	(6.20)	10.75	(3.60)
Bicol	(5.06)	12.92	(1.93)
Western Visayas	(8.16)	10.46	(5.73)
Central Visayas	(1.19)	15.01	2.34
Eastern Visayas	(3.49)	17.07	(0.63)
Western Mindanao	(4.12)	7.88	(2.09)
Northern Mindanao	(5.19)	14.63	(1.74)
PHILIPPINES	(5.13)	8.66	(2.74)
Unmilled Corn			
Cagayan	4.22	1.94	4.72
Bicol	7.97	2.73	8.86
Western Visayas	7.96	2.56	10.20
Central Visayas	6.09	2.19	7.73
Eastern Visayas	11.78	2.03	12.34
Western Mindanao	4.29	2.28	5.15
Northern Mindanao	8.80	1.81	9.34
Southern Mindanao	8.58	1.85	9.14
PHILIPPINES	8.04	2.21	8.88
Raw Sugar			
Ilocos	(31.16)	(2.64)	(31.64)
Central Luzon	(33.12)	(0.55)	(33.96)
Southern Tagalog	(32.52)	0.04	(32.51)
Western Visayas	(34.15)	4.33	(32.43)
Eastern Visayas	(33.67)	(0.98)	(34.05)
PHILIPPINES	(33.72)	3.73	(32.53)

Source of Basic Data: See Table 1.

The Relative Efficiency Impact of Farm Input Price Distortions

Table 3 enumerates ECI estimates by major farm input and region for input price distortions in CY 1976. As previously explained, the ECI is a partial indicator of the relative extent to which a given magnitude of input price distortion may have caused crop-

Table 3 — Efficiency Cost Index (ECI) Estimates for Distortions in the Prices of Major Farm Inputs, by Region CY 1976

Region	All Farm Inputs (excluding land)	Farm Labor	Short-term Capital	Fertilizer	Seed	National Irrigation
Ilocos	1.24	1.74	0.13	0.23	0.30	0.19
Cagayan	0.59	0.60	0.12	0.27	0.39	0.17
Central Luzon	1.10	0.60	0.11	0.25	0.20	0.14
Southern Tagalog	1.60	0.92	0.12	0.28	0.19	0.10
Bicol	0.30	1.04	0.15	0.22	0.63	0.22
Western Visayas	1.53	0.55	0.17	0.72	0.06	0.13
Central Visayas	1.36	1.29	0.41	1.90	0.40	0.16
Eastern Visayas	0.98	0.68	0.15	0.39	0.21	0.10
Western Mindanao	0.23	0.74	0.18	0.44	0.39	0.19
Northern Mindanao	0.42	0.90	0.14	0.33	0.42	0.18
Southern Mindanao	0.35	1.45	0.20	0.82	0.07	0.00
PHILIPPINES	1.00	0.82	0.16	0.56	0.19	0.12

Sources of Basic Data: See Table 1.

ping patterns to deviate from comparative advantage. In this study's case, the estimates average such deviations for different crops by region using the crop's shares of net foreign exchange value added as weights. For easier comparison, however, the figures are expressed in relation to the index for all farm inputs (excluding land) in the Philippines, which was designated a value of 1.0.

Analysis of the indices shows wide variations in ECI values. Horizontally, it is evident that the ECIs for labor greatly exceed those of the other inputs in all regions except in Western and Central Visayas, where fertilizer estimates prevail. Indeed, the overall estimates reveal that the effect of labor price distortion (ECI of .82) successively surpassed that of distortions in the prices of fertilizer (.56), seed (.19), short-term capital (.16), and irrigation (.12). Vertically, it is observed that the overall ECI values are relatively low in the Mindanao regions (.23–42), variable in the Luzon regions (.30–1.60)and high in the Visayas (.98–1.53). In terms of variability, the widest range is noted among fertilizer estimates (.22–1.90) followed consecutively by the range of figures for farm labor (.55–1.74), seed (.06–.63), short-term capital (.11–.41), and irrigation (.00–.22) inputs.

These variations in ECIs imply that the input price distortions prevailing in CY 1976 had a widely diverse partial impact on the short-run size and composition of regional output. Insofar as the output structures induced may indeed represent departures from comparative advantage, we can conclude that these distortions had likewise been disparate in their consequences on regional production efficiency. Distortions in labor and fertilizer prices in particular had been extremely potent in this respect. One alarming observation, however, is that regional ECIs for all farm inputs are generally higher than the averages for individual inputs, suggesting that distortions from the input side had reinforced more rather than offset each other in discouraging the "efficient" output mix. We can moreover trace a strong discrimination against the efficiency of the traditionally sugar-growing regions of Visayas followed by a somewhat scattered bias among the predominantly paddy regions of Luzon and a low bias against the paddy and corn regions of Mindanao. Apart from revealing the overriding nature of the inefficiency involved, this may imply that distortions in input prices had on the whole maintained if not aggravated the output bias against sugar and in favor of corn elicited by trends in output prices.

Sensitivity Analysis: The Efficiency Implications of Specific Farm Input Policies and Programs

The foregoing analysis examined the relative efficiency impact of prevailing input price distortions in Philippine agriculture. It was premised that such distortions mainly arise from government interventions in the input markets. This portion, in turn, appraises such interventions within the context of production efficiency, by assessing the extent to which input policies and programs could have affected the production structures of this study's three crops. This is done through sensitivity analysis of the DRC measure to changes in selected cost parameters.[12]

Table 4 presents DRC elasticities by crop and region assuming a 1 per cent change in the cost of selected inputs as well as in the

[12] Principally, analysis of the DRC's sensitivity to cost changes allows for direct assessment of the partial impact of such changes on comparative advantage. Indirectly, it enables comparison of the relative importance of specific cost items in determining the social DRC. In this sense, sensitivity analysis can also be employed to evaluate government policies and programs from a comparative advantage viewpoint. Although they may not substantially alter comparative advantage, these interventions can nonetheless interfere with production efficiency by causing private signals to deviate from social trends.

Table 4 — Estimated DRC Sensitivities to Input Cost Changes: By Crop and Region, CY 1976
(in per cent)

Crop/Region	Labor Cost	Short-term Capital Cost	Fertilizer Cost	Seed/Cane points Cost	Irrigation Cost	Tradable Component Cost
Paddy/Rice						
Ilocos	0.161	0.080	0.048	0.022	0.024	0.071
Cagayan	0.128	0.062	0.026	0.035	0.026	0.081
Central Luzon	0.080	0.066	0.052	0.025	0.027	0.087
Southern Tagalog	0.083	0.049	0.024	0.028	0.020	0.077
Bicol	0.153	0.078	0.030	0.072	0.029	0.093
Western Visayas	0.133	0.068	0.048	0.045	0.028	0.086
Central Visayas	0.135	0.062	0.052	0.019	0.021	0.083
Eastern Visayas	0.140	0.057	0.020	0.039	0.025	0.055
Western Mindanao	0.200	0.069	0.032	0.045	0.031	0.094
Northern Mindanao	0.156	0.067	0.038	0.048	0.029	0.082
PHILIPPINES	0.141	0.078	0.051	0.036	0.023	0.096
Unmilled Corn						
Cagayan	0.121	0.067	0.134	0.013	—	0.138
Bicol	0.167	0.073	0.126	0.021	—	0.153
Western Visayas	0.165	0.015	0.826	0.018	—	0.810
Central Visayas	0.154	0.098	0.651	0.018	—	0.649
Eastern Visayas	0.165	0.067	0.100	0.013	—	0.127
Western Mindanao	0.116	0.072	0.202	0.015	—	0.210
Northern Mindanao	0.125	0.066	0.121	0.013	—	0.146
Southern Mindanao	0.219	0.111	0.178	0.014	—	0.155
PHILIPPINES	0.152	0.077	0.216	0.013	—	0.209
Raw Sugar						
Ilocos	0.096	0.085	0.042	0.001	—	0.060
Central Luzon	0.081	0.074	0.063	0.012	0.000	0.072
Southern Tagalog	0.079	0.080	0.087	0.001	—	0.085
Western Visayas	0.038	0.104	0.194	0.008	0.019	0.133
Eastern Visayas	0.048	0.117	0.196	0.010	0.003	0.132
PHILIPPINES	0.050	0.095	0.161	0.007	0.013	0.119

Source of Basic Data: See Table 1.

aggregate cost of tradable components. As expected these estimates vary regionally among inputs and across crops. Comparative advantage in rice, for instance, generally manifests greater sensitivity to seed and irrigation cost changes than either of the other two crops. Similarly, DRC coefficients for corn respond most readily to change in labor, fertilizer, and tradable component costs while those for sugar register greatest sensitivities to interest expenses. Between rice and sugar, however, the former records greater elasticities to labor, seed, and irrigation costs while the latter displays greater responsiveness to the costs of capital, fertilizer, and tradable components. Most likely, these sensitivities attest to the relative importance of labor, seed, and irrigation in rice (than sugar) and the higher capital, fertilizer, and tradable input intensities in sugar (than rice). Elasticities in corn, in turn, more probably denote the high opportunity values of the inputs resulting from inefficient corn production.

Examined on an input basis, the estimates reveal that labor is one of the more fundamental cost determinants of comparative advantage in rice and corn. Government initiatives to promote self-sufficiency in these crops therefore question the logic of recent accelerated increases in legal agricultural minimum wages and mandatory allowances. Evidences indicate that these rapid increases have exerted upward pressure in private labor costs uncompensated by alternative adjustments in other components of private profit on labor productivity. *Ceteris paribus*, this implies that wage policy has not only restricted sector output but more so the output of such highly wage sensitive priority crops as rice and corn, making the social cost of promoting such crops all the more expensive.

With regards to trade policy, the DRC elasticities to tradable component cost changes indicate the degrees of import dependence involved in crop production along with the responsiveness of output decisions to, say, modifications in the effective exchange rate. Surprisingly, unmilled corn records the highest sensitivity values implying that corn requires more intensive application of farm inputs with high percentages of imported components than sugar and paddy. At the very least, this suggests a significant tradeoff between government efforts to expand corn output and save foreign exchange as well as points to a substantial in-transfer of limited foreign exchange from the other two crops into corn at the expense of efficiency. Also, granted that such policies have since the early 1970s been dominated by protective import controls and tariffs that have not only accelerated increases in the effective exchange rate on tradable farm inputs but also raised their domestic prices above border unit costs, it can be contended that trade policies have not only gradually eroded the input incentive of peso overvaluation but more so provided disincentives to agriculture as a whole through protection of domestic industry.

Whereas trade and wage policies have raised private production costs, input programs have provided net incentives to farmers through explicit and implicit subsidies. Of particular interest is the government's fertilizer subsidy program. Table 4 indicates that both corn's and sugar's DRCs are extremely responsive to changes in fertilizer costs. As such, subsidy transfers from the government into the fertilizer industry should have a strong bearing on the extent to which producers exploit comparative advantage in these crops. Inasmuch as they widen the gap between private and social costs, these transfers per se can be inferred to have worsened inefficiency in corn production while in part encouraging sugar growers to pursue their absolute advantage. Note, however, that the program only extends direct subsidy support to high cost importers and inefficient manufacturers in the fertilizer industry. As such, user subsidies can only be regarded as indirect farm incentives when viewed within the constraint of protection in local fertilizer manufacturing. Furthermore, subsidy transfers are presumably passed on to farmers through restricted markups over and above dealership costs. Thus, while retail prices are considered controlled, they may vary by location depending on dealership and other marketing expenses. This may partly account for the wide regional variation in fertilizer ECI estimates in Table 3. More important, this suggests that the effectiveness of the fertilizer subsidy program in, say, expanding corn output could be greatly enhanced through cost-saving improvements in the inputs transport and distribution network. Finally, it was only in mid-1976 that the government began to subsidize commercial crop fertilizer by adopting a uniform pricing scheme on equal grade fertilizer in place of a two-tier scheme only subsidizing food crops. Evidently, the prior scheme had been a serious obstacle to the efficiency of agricultural production, in view of sugar's high sensitivity to fertilizer prices.

Since the DRCs for rice and corn are somewhat sensitive to changes in short-term capital costs, credit subsidies may likewise produce a significant impact on the short-term production efficiencies of these crops. Note, however, that interest on short-term capital is a slightly more important cost determinant of comparative advantage in sugar than in rice and corn. This may be due to the generally higher capital intensity involved in the production of sugar output. Alternatively, these differences in capital intensities as well as sensitivities to short-term interest costs among crops may be contingent upon the crop's relative dependence or absorption of institutional and noninstitutional production loans. With respect to this, studies have shown that despite recent government effort to redirect institutional credit resources from commercial to food crops, sugar has consistently obtained the major share of such credit while rice and corn have had to increasingly rely heavily on the usurious and informal market.[13] Thus, while the magnitude of government support to rice and corn credit may have not been lacking, measures to sustain the growth of such credit had been insufficient. This is unfortunate since the high elasticity values of rice and corn imply that improved accessibility to subsidized credit would significantly improve their comparative advantages. Rather than suggest even greater credit support to the crops, all these indicate that steps need be undertaken to improve the penetration of formal credit into rice and corn farms. This would be especially important since such programs have more recently been employed to introduce yield enhancing agronomic innovations into food production.

Finally, the low elasticities for seed and irrigation can be said to grossly obscure the significance of these inputs on comparative advantage. Seed, for sure, should not merely be considered a specific cost item, but also an input that may embody technological change. Irrigation facilities, on the other hand, are fixed investments that may be prerequisite to the successful diffusion of the new seed technology. Together, these may strengthen crop comparative advantage regardless of the short-run effects of such cost changes on the DRC. Of course, while rehabilitation and construction of irrigation facilities may be desirable, more equitable methods for assessing irrigation fees in place of the current flat rate need be surveyed to reduce any undue strain on efficient crops. Suggested methods in the literature include fees in proportion to irrigated output, and fees in proportion to water used (Tagarino and Torres, 1976). Of course, while such pricing procedures may have their advantages and disadvantages, it may very well be that improvements in the diffusion of subsidized HYV seed as well as in the quality and equity of irrigation facilities may restructure long-run comparative advantage and thereby present a more effective approach than mere input price incentives to the government's food self sufficiency objective. Indeed, favorable changes in comparative advantage are presently imperative if the economy expects to sufficiently recover losses incurred on past government interventions and constraints.

Conclusions and Policy Recommendations

Throughout this paper, this study had traced various aspects of government interventions in Philippine agriculture and had found a pattern of private incentives or disincentives different from what would prevail given the country's comparative advantages. More pre-

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[13] See for instance, TBAC (1978, 1981).

cisely, incentives have been found to have favored socially unprofitable food crops such as corn at the expense of socially efficient crops. Though primarily stemming from constraints on output price, this perversity in the incentive mix, moreover, has been shown to have been independently fostered and altogether aggravated by measures distorting input prices. More potent in this respect have been policies affecting farm wages and fertilizer costs. While the rationale for state interventions to pursue social and political objectives had not been questioned, the approaches used have been variably criticized as unjustifiable, uncoordinated, and operationally deficient as far as production efficiency in agriculture is concerned.

Results in this study, for one, indicate that the government should institute less aggressive wage policies as these have unduly burdened producers at farm gate and more so those growing the apparently highly wage-sensitive priority food crops. Similarly, trade policy has been criticized to have been biased against agriculture as a whole as it had more recently comprised measures that have gradually eroded the input incentive of peso overvaluation and raised the user's cost of importable farm inputs, making the cost of promoting such trade-sensitive crops as sugar and corn all the more difficult and expensive. Fertilizer policy, in turn, though intended to provide incentives through subsidies, has been noted to have done so within the constraint of inefficiency in local fertilizer manufacturing and in the input's retail network. Fertilizer pricing strategies, moreover, have been severely biased against efficient and highly fertilizer-sensitive commercial crops, to the detriment of agricultural production efficiency.

With regards to credit policy, this study argues on the basis of sensitivity estimates that while subsidized short-term credit had been a highly potent instrument for encouraging food production, its effectiveness had been severely limited by inefficiencies in the credit distribution network. Rather than recommend even greater credit support to food, this study points out that the problem is more that of improving the penetration of formal, subsidized credit into the highly risky food farms. Finally, programs on hybrid seed production and irrigation are argued as imperative, in the dynamic sense, in the effort to raise comparative advantage in the food sector, despite their short-run static consequences on agricultural production efficiency. Surely, positive changes in comparative advantage would be necessary — in view of the government's food sector objectives — in order to sufficiently recover losses resulting from the government's past interventions and constraints.

On these grounds, this study concludes with a call for essential policy reconsiderations and institutional reforms. At the macrolevel, the overall growth strategy of the government should be reviewed. In particular, a redirection of efforts towards a bottom-up approach to development is recommended, with pricing policies less discriminatory against agriculture and more compatible with regional production efficiencies. At a more disaggregated level, there is need for a regional planning framework compatible with the national planning perspective. This would serve several purposes, such as: (a) to ensure that regional plans and production targets sum up to a coherent national strategy consistent with national objectives; (b) to ensure market and resource consistency among regions; and (c) to identify and highlight discrepancies among regions in the flow of agricultural support services. Accordingly, planning should have in mind quantitative guidelines for each region decided, of course, on the basis of regional resource endowments and potentials for realizing high returns to agricultural investments. The measures of comparative advantage in this study, for one, could serve as indicators to the productive capacities of various regions in producing certain crops. There is no doubt, however, that further research would be necessary to identify regions and areas within regions where land expansion in contrast to intensification of existing land to raise productivity is economically desirable. Also, given the food objective, areas where productivity improving technologies would be readily adapted would have to be located.

In effect, this study proposes that shifts in agricultural production involving changes in cropping patterns among and within regions be rationalized, along with appropriate provisions of agricultural support services. The drive to maintain self-sufficiency in rice will continue as a nationwide effort and any increase in rice production should be concentrated in regions displaying high comparative advantage, such as Ilocos, Cagayan, Central Luzon, and Western and Northern Mindanao. This will moreover require new investments in improved storage and distribution facilities in these locations. Since rice output, especially among HYVs are heavily dependent on irrigation, irrigation projects should be concentrated in such areas in more economic scales, rather than in the large systems that currently are criticized to propagate water wastage. Along with irrigation expansion, it can be anticipated that rainfed and upland soils would be released to other crops such as corn which is known to be suitably grown in such lands. It is preferable then that irrigation investments be concentrated in areas where rice has comparative advantage and corn is less disadvantaged, such as Mindanao and Cagayan, instead of only in the Luzon areas. It is also in these areas where dissemination of disease resistant high-yielding corn varieties and distribution of fertilizer supplies and extension services need be improved and intensified. With respect to sugar, it is observed that sugar production has in recent years spread into nontraditional sugar growing areas (Cagayan, Bicol, and Northern and Southern Mindanao) following construction of sugar mills during the sugar price boom. Accordingly, future licensing of sugar mills should be planned to ensure that the expansion of sugar areas does not use up areas more important for the objective of food self-sufficiency. Conversely, the large hectarages presently planted to corn in Western and Central Visayas would probably be better suited to sugar.

The heightened emphasis on regional specialization as a strategy for agricultural development is timely in the face of varying regional resources and comparative advantages. Success in this approach, however, implies that the regional development planning framework suggested above be complemented by a sufficient degree of decentralization in the implementation of plans. Of course, with decentralization, coordination between regional planning bodies and central agencies must be heightened to keep regional development in line with national objectives.

As the situation is perceived, the main national objective for agriculture continues to be that of achieving and maintaining self-sufficiency in food. Apparently, the general orientation of input subsidy schemes concerned with this objective has long been clarified. The major policy problem, however, is how to effectively distribute subsidized input and credit supplies to food farms. For this purpose, this study recommends that cooperatives or producer organizations be effectively mobilized. As input channels, these institutions would tighten the links between production, input distribution, credit, and marketing activities at the grassroot level. More importantly, as far as food farm credit is concerned, it would consolidate small farmer credit requirements, enabling the reduction of lending risks and spread of deliquency risks through the integration of credit and marketing activities.[14] Given such potential advantages,

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[14] In a recent TBAC study (1981), a large part of the success of private money lenders over their institutional counterparts in attracting food crop farmers despite higher effective interest charges had been attributed to their ability to integrate product with credit markets (e.g. through the linkage of palay trading, farming, and input dealership with money lending activities) along with the reduction in lending and information costs and default risks resulting from such integration. For instance, acceptance of loan repayments in kind by money lenders-palay traders had the effect of not only guaranteeing the creditors' future palay supply but also lowered the transaction costs of credit and palay marketing for both lenders and borrowers by making repayment terms more suitable to them. Moreover, such integration apparently gave private money lenders an edge over credit institutions in their collection efforts because of strict and more immediately felt measures adopted, in cases of delinquency or default, say, by money lender - input suppliers in their face to face dealings with debtors. In view of these findings, the study recommended that the presence of institutional credit in the food sector be enhanced by strengthening coordination among financial institutions via syndicated financing and a scheme mobilizing private money lenders as financial agents of lending institutions. What it does not consider, however, are the potentials of consolidating credit at the

it is here recommended that the government should lend greater support to the development of producer organizations, particularly so that they can assume important functions in the fields of input distribution and credit. Of course, the effectiveness of such an approach in promoting government objectives and programs would largely depend on the degree of coordination between producer organizations and government agencies. Concomitantly, this study recommends that such coordination be strengthened through improvements in the quality and administration of the agricultural extension system. Finally, given this more manageable institutional framework, this study recommends that a more accurate information network be introduced to monitor the effects of new government strategies transmitted to the farm through the extension system. Indeed, this last point would be timely in view of the rapidly changing international situation, as well as the dynamic effects of government interventions on comparative advantage in Philippine agriculture.

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