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AGRICULTURAL PRICE POLICY IN A DEVELOPING ECONOMY*

V. C. Shah

There is growing recognition of the crucial role which agriculture can play in accelerating the rate of growth of a developing country. This is reflected in the high priority given to agricultural development by planners and policy makers of the developing countries. The reason is that an increase in agricultural output is essential for meeting the rising demand for various agricultural products in an expanding economy—demand for foodgrains as a result of rising income, increasing population and growing urbanisation; demand for agricultural raw materials on the part of agriculture-based industries serving both domestic and export markets and demand for the export of primary commodities. Thus, an adequate and timely rise in the supply of agricultural products besides making a proportionately large contribution to the increase in national income, helps to maintain price stability and to achieve a viable balance of payments in a predominantly agricultural country.

The basic problem is how to expand agricultural production. There are three possible ways of raising agricultural output : (a) increase in supply of inputs for the farm sector, *i.e.*, land, labour, water, fertilizers, improved seeds and implements; (b) shift in production function incorporating better techniques of cultivation; and (c) removal of disequilibrium in the agricultural sector resulting from imperfections in the factor market. All policy measures, in the last analysis, stimulate agricultural development through these three methods.

Among the various means to achieve this end, agricultural price policy is a very useful instrument. The price incentive by assuring a reasonable profit margin tends to encourage farmers to increase their production. Moreover, empirical research has increasingly shown that farmers in developing countries do respond to changes in relative prices.¹ This is particularly so in regard to acreage response to variations in relative prices. However, empirical finding has indicated that in the subsistence economies there is no significant correlation between yield responses and changes in agricultural prices.² This is attributed to the cultivators' inability to purchase essential agricultural inputs, absence of incentives owing to the unfavourable institutional framework, lack of adequate supplies of inputs and the degree of risk and uncertainty inherent in weather conditions and technological changes.

The implication of the empirical finding is that agricultural price policy is a necessary but not a sufficient condition for stimulating agricultural development. To put it differently, the effectiveness of support price policy especially for raising yield per acre, depends on the availability of agricultural inputs other than land and

* The views expressed in no way reflect the official viewpoint.

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1. Raj Krishna, "Farm Supply Response in India-Pakistan : A Case Study of the Punjab Region," *The Economic Journal*, Vol. LXXIII, September, 1963, pp. 477-87.

2. Walter P. Falcon, "Farm Response to Price in a Subsistence Economy : The Case Study of West Pakistan," *American Economic Review*, Vol 54, May, 1964, p. 587.

labour, supply of finance to farmers and institutional incentives. This is particularly so in the densely populated developing countries like India where growth of the farm sector depends primarily on the rate of increase in the productivity of land because of the increasingly limited scope for extensive farming.

There is also a growing consensus that a policy aimed at supporting agricultural prices even in an environment in which actual market prices for agricultural products are generally high as may be the case in over-populated countries, has a useful role to play. This is because an environment of relative shortages and upward pressure on agricultural prices may not be expected to offer necessary incentive to an individual farmer to increase his output. This in turn may be due to the fact that at the micro-level, an individual cultivator may not be able to foresee the upward trend in agricultural prices for the next few years to come, although policy makers could anticipate such trends because of the overall view of the needs and supplies of agricultural products which they could take. A support price policy however could convince even the individual farmers that prices would not be allowed to fall below reasonable levels and would therefore offer an incentive to them to increase their production. In addition, such a support price policy could provide the necessary cushion to farmers against risk and uncertainty arising out of seasonal price fluctuations or abnormal increase in production due to favourable climatic conditions and/or introduction of new techniques of cultivation. In other words, such a policy by reducing risk and uncertainty improves the farmers' expectations regarding market prices which in turn determine their production decisions. The degree to which risk and uncertainty is reduced and to the extent to which expected market prices are influenced would of course depend on the level of support prices determined by the government.

If one accepts the desirability and necessity for a support price policy as one of the important instruments for stimulating agricultural development, one has to turn to a few crucial questions. Are there any objective criteria which should guide policy makers to determine the level of support prices? Should such a policy be based on subsidising agricultural inputs rather than raising the prices of agricultural commodities to ensure a reasonable profit margin to farmers? What should be the coverage of a price support policy? How should the policy makers take into account the supply response of farmers keeping in view the structure of demand for agricultural products? The purpose of this paper is to answer some of these critical questions.

BASIS FOR SUPPORT PRICES

The objective of guaranteeing a reasonable profit margin can be achieved either by subsidising farm inputs or by raising product prices or by a combination of both. The choice of the method for ensuring a reasonable profit margin has to be made after taking into account certain important factors. The method of farm input subsidy implies a burden on the budgetary resources of the Government, as also the method of supporting product prices in the market. The authorities have to make budget provision for the amount of subsidy or they may have to forego the surplus which the public sector enterprises producing and supplying farm inputs could earn by charging market prices to cultivators. A policy of subsidising one or two key inputs such as fertilizer or irrigation water may

encourage farmers to adopt subsidised input intensive techniques of production which in turn may distort the utilization pattern of factors of production in the economy. The interference with agricultural product prices also leads to distortions in the economy. Again, the policy of input subsidy may tend to maintain a relatively low level of farm prices and thereby stimulate consumption of agricultural products. Such an effect may not be desirable from the point of view of balance of payments. Whether such an effect on personal consumption of foodgrains is desirable or not has to be judged in the light of overall economic conditions prevailing in a developing country. It is possible however that in a subsistence economy a policy of input subsidy may have a greater incentive impact on cultivators to raise their production rather than a policy of increasing the product prices. Since many cultivators in a developing economy are not sufficiently knowledgeable about farm products market mechanism and since such market mechanism suffers from serious imperfections, the farmers may fail to avail themselves of the opportunities offered to them by an increase in product prices.³

So far as the basis for determining support prices is concerned, there are two main principles—the parity principle and the cost principle. The former is primarily designed to redistribute income in favour of the farmers and is concerned with farm product prices. The latter is aimed at stimulating agricultural output and can operate either through product prices or farm inputs or both. Since in a developing economy the main objective of a price support policy is to induce farmers to increase agricultural production a growth-oriented support price policy based on the cost principle is considered to be more appropriate.

The moot question is whether cost and parity are two really distinct principles for fixation of support prices. If both the principles tend to reduce the degree of risk and uncertainty faced by cultivators, the choice of one over the other may depend on the degree of incentive offered by the two principles. To put it differently, the choice may depend on the relative levels of support prices determined by the cost principle vis-a-vis the parity principle.

In the case of the parity principle, the support price is fixed on the basis of changes in the ratio of agricultural prices to industrial prices, given the parity between the two sets of prices in a 'base period'. The increase or decrease in support prices will therefore primarily depend on a rise or fall in industrial prices including prices of industrial products used as agricultural inputs. The parity principle does not explicitly take into account the impact of technological improvement on the cost of production of farmers. But technical progress in the farm sector continues to take place, given the favourable institutional environment and adequate supply of inputs and finance. Since support prices at a given point of time are linked with the past agricultural as well as past and current industrial prices, the degree of incentive the parity principle offers, depends partly on the rate at which farmers adopt improved techniques of cultivation over a period of time. These implications may be elaborated as follows. Assuming industrial prices to remain constant over a period of time, we may set up the equations

3. Mr. A. Simantov pointed out to me that in some of the less developed O.E.C.D. countries a farm input subsidy had frequently been very effective in promoting the application of improved techniques by a large number of farmers.

$$P_{bo} = \frac{R_{bo}}{O_{bo}} + \frac{C_{bo}}{O_{bo}} \dots\dots\dots(1)$$

$$P_{b1} = \frac{R_{b1}}{O_{b1}} + \frac{S_{b1}}{O_{b1}} + \frac{C_{n1}}{O_{b1}} \dots\dots\dots(2)$$

- where P_b = Support price based on the parity principle,
- R_b = Net return to the farmer,
- C_b = Cost of production,
- C_n = Cost of production under improved techniques,
- S_b = Reduction in cost of cultivation = $C_n - C_b$,
- O_b = Output

and subscripts o and 1 stand for two different 'periods'.

Since industrial prices are assumed to be constant, P_{bo} and P_{b1} will be the same in both the periods. However, net return to the farmers will increase because of the process of adopting new techniques of cultivation. This process will be set in motion partly as a result of P_b and partly as a result of other policy measures designed to create a favourable environment such as extension service, availability of fertilizers, irrigation facilities and improved seeds. The increase in the profit margin during the period will depend on the cost reduction power of new techniques actually adopted by the cultivators.

P_{b1} will, however, be higher than P_{bo} if industrial prices increase during the interval between two periods. Consequently, money income of the farmers would rise. In other words, the parity principle will ensure that the real income of the cultivators would not be affected adversely over a period of time even if industrial prices tend to rise. In fact, the real income of farmers would tend to rise as a result of fall in cost of production with the introduction of new techniques.

In the case of the cost principle, support price will be determined on the basis of cost of production determined by a package of improved technology which policy maker expects farmers to adopt.⁴ Another element which enters support price determination is compensation for risk and uncertainty inherent in crop failure and even in failure of new techniques. In addition, support price based on the cost principle will provide for a reasonable profit margin to the farmers.⁵ Thus

$$P_{g1} = \frac{R_{g1}}{O_{g1}} + \frac{Z_{g1}}{O_{g1}} + \frac{C_{g1}}{O_{g1}} \dots\dots\dots(3)$$

4. An important difference between the cost and parity principle is that the former would take into account changes in agricultural wages and other costs of production, whereas the latter would implicitly take care of changes in prices of only those farm inputs which are supplied by the industrial sector.

5. For an exposition of the cost principle or what is sometimes called forward-looking approach to support price policy, see B. P. Dutia, "Guidelines for Determining Support Prices for Agricultural Products," *Artha-Vikas*, Vol. 2, No. 1, January, 1966, and also V. M. Dandekar, "Minimum Support Prices for Foodgrains : Guidelines for a Policy and a Programme," *Artha-Vikas*, January, 1966. Raj Krishna, "Food Policy : Price Support Programme," *The Economic Times*, October 27, 1964.

where, P_g = Growth-oriented support price,

R_g = Net return to the farmers,

Z_g = Compensation for risk and uncertainty,

C_g = Cost of production under new technology.

The important question is how far the various elements of the cost approach can be determined on the basis of objective criteria. So far as R_g is concerned, a policy maker may take into account net profit earned by farmers in a normal year or in the base period. To this extent the cost approach will look to the past.

Compensation for risk and uncertainty, *i.e.*, Z_g , depends on the probability of crop failure owing to weather conditions, chances of failure of new techniques of cultivation, the degree of risk aversion of the cultivators and their ability to bear risk and uncertainty. These determinants of Z_g are not precisely quantifiable. In addition, the policy maker has to face the difficult question: risk and uncertainty compensation for whom—the most or the least efficient farmer, the rich or the poor farmer, or the representative farmer? These considerations point out that considerable degree of value judgment has to be exercised in estimating Z_g .

As stated earlier, a policy maker takes into account cost of production under a package of improved technology, *i.e.*, C_g . In a sense, this may be regarded as the hypothetical cost of production because the package of improved technology has not been actually adopted by all the farmers at the time of announcement of support price; but it is expected to be introduced over a period of time after the support price is fixed. It is therefore possible that support price based on the three elements, R_g , Z_g and C_g , might turn out to be lower than the current market prices. In such a situation, the incentive impact of P_g might be considerably weakened because the expected market price would be unduly depressed. To avoid this danger it may become necessary to relate in some way or the other P_g to the actual market price.

Is it possible to compare the level of support price based on the cost principle with that based on the parity principle? If a reasonable return to the farmer is related in some way to what he earns in the normal period, R_g and R_b may turn out to be equal. If so, the relative levels of P_g and P_b would depend on the relationship between $Z_g + C_g$ on the one hand and $C_n + S_b$ on the other. If the anticipated package of new technology is much more advanced than prevailing techniques of farming, C_g , the hypothetical cost of production, may be lower than C_n . So far as Z_g and S_n are concerned, it is difficult to predict their relationship. While S_n depends on the reduction in cost resulting from adoption of new techniques during the interval between period 0 and period 1, Z_g depends on the value judgment of a policy maker. To put it differently, whether the sum of $Z_g + C_g$ exceeds the cost of production in the base period, *i.e.*, C_b , would depend on the value judgment exercised in fixing Z_g and the degree of improvement in the techniques of cultivation expected by a policy maker to be adopted by farmers compared with the techniques of production in the base period.

So far it was assumed that industrial prices remain constant. However, this is not a realistic assumption. In fact, industrial prices are likely to be subject to upward trend in a developing economy. To this extent, therefore, the parity principle will tend to raise the level of P_b . In other words, it will ensure a certain level of real income. The cost principle on the contrary ensures a certain level of money income. Real income will tend to be lower than the money income guaranteed by the cost principle if industrial prices show a rising trend.⁶ In such an environment of rising industrial prices, the parity principle will have an edge over the cost principle if it is assumed that farmers do not suffer from money illusion.

At the operational level, the two approaches face perhaps the same difficulties. If the parity approach is confronted with problems of 'whose income' and 'what income', the cost approach has to face the problems of determining 'whose cost' and 'what cost'. In addition, as stated previously, the growth-oriented approach has also to tackle the question of determining 'whose risk and uncertainty compensation'.

SUPPLY RESPONSE AND PRICE SUPPORT

The problem of coverage of price support policy is important. If only one major agricultural commodity is subject to price support, it is very likely that the price incentive might increase its production at the cost of output of other competing products. Even under a favourable environment providing inducement to farmers to introduce new methods of cultivation, a price support policy confined to a single commodity might dampen the rate of absorption of new technology. There is also another important consideration. Since support policy is one of the instruments for implementing an agricultural programme as part of an over-all economic plan it is essential that support policy should encourage production of the major agricultural commodities both foodgrains and cash crops. Only then agriculture could support the growth of the industrial sector and contribute to the expansion of export industries based on agricultural raw materials. To put it differently, support price policy should aim at maintaining some equilibrium between the structure of agricultural production and the demand structure for agricultural goods.

In this context, it may be useful to analyse the impact of a support policy on supply of agricultural products. For this purpose, it is essential to take into account the implications of the theory of choice of products by a cash-cum-subsistence cultivator. In order to do so, let us assume that the relative price ratio between cash crops and foodgrains remains constant, although the support prices for them might be raised.

The theory of choice of products in a cash-cum-subsistence farm economy points out that given the prices of inputs, the relative prices of products and the production function, all the cultivators will not operate at the optimum level in the way in which industrial firms are expected to operate. This is mainly because

6. The impact of rising industrial prices on real income, under the cost principle, would be mitigated to some extent if prices of agricultural inputs provided by the industrial sector, also increase.

cultivators in a cash-cum-subsistence farm economy are faced with two different prices for the foodgrains which they could cultivate on their land.⁷ The selling price for foodgrains produced by the cultivators will normally be less than the purchase price of foodgrains—the difference depending on the market structure for foodgrains as shown in Figures 1 a to 1 d.

For the purpose of analysis, the cash-cum-subsistence farmers may be classified into various groups. A surplus cultivator will be one whose demand for foodgrains is less than the quantity he would produce, given the ratio of selling price of foodgrains to that of cash crops—QR in Figure 1 a. Given his production possibility curve and indifference map, such a cultivator will attain his consumption equilibrium at A and his production equilibrium at B. A balanced cultivator will be one whose demand for foodgrains for family consumption is just equal to the quantity he would produce at the given ratio of selling price for foodgrains to selling price for cash crops. This consumption as well as production equilibrium will be at the tangency between his production possibility curve and indifference curve, *i.e.*, at B. There will be a third category of cultivator who might be called a deficit cultivator. He is one whose demand for foodgrains for family consumption exceeds the quantity he would produce at the given ratio of selling price of foodgrains to selling price of cash crops.

For a deficit cultivator, however, the given ratio of selling price of foodgrains to selling price of cash crops will not be relevant for the simple reason that such a cultivator will face a higher price in the market for buying foodgrains. In other words, he will be faced with a higher ratio of buying price of foodgrains to selling price of cash crops—MN in Figure 1 a. The two price ratios, one relevant to the surplus and balanced cultivators and the other relevant to the deficit cultivators, will determine the minimum and maximum points of profitable production for a deficit cultivator. Within the zone B to C on the production possibility curve as indicated in Figure 1 a, a deficit cultivator will not be in equilibrium in the sense that his output will not be determined by the tangency between the price line and his production possibility curve, nor will his consumption pattern be determined by the tangency between the price line and his indifference map. Such cultivators might be regarded as self-sufficient deficit cultivators since they do not find it profitable to go to the market to purchase part of their consumption requirements for foodgrains.

Depending on the position of indifference curves, a deficit cultivator may however find it profitable to go to the market for purchasing foodgrains to supplement his own production for meeting the consumption requirements. Such a cultivator will attain his consumption equilibrium at D and his production equilibrium at C as shown in Figure 1 a. Such cultivators might be called non-self-sufficient deficit farmers since they have to purchase a part of their consumption requirements from the market.

To analyse the supply response of cash-cum-subsistence farmers in a dynamic situation, it may be useful to distinguish between three types of shift in the produc-

7. The static theory of choice of products by a cash-cum-subsistence farmer as shown in Figure 1, was developed for the first time, as far as I know, by B. P. Dutia in his Note on the "Theory of Choice of Products by a Cash-cum-Subsistence Grower," *Indian Economic Journal*, Vol. V, No. 2, October, 1957, pp. 215-221.

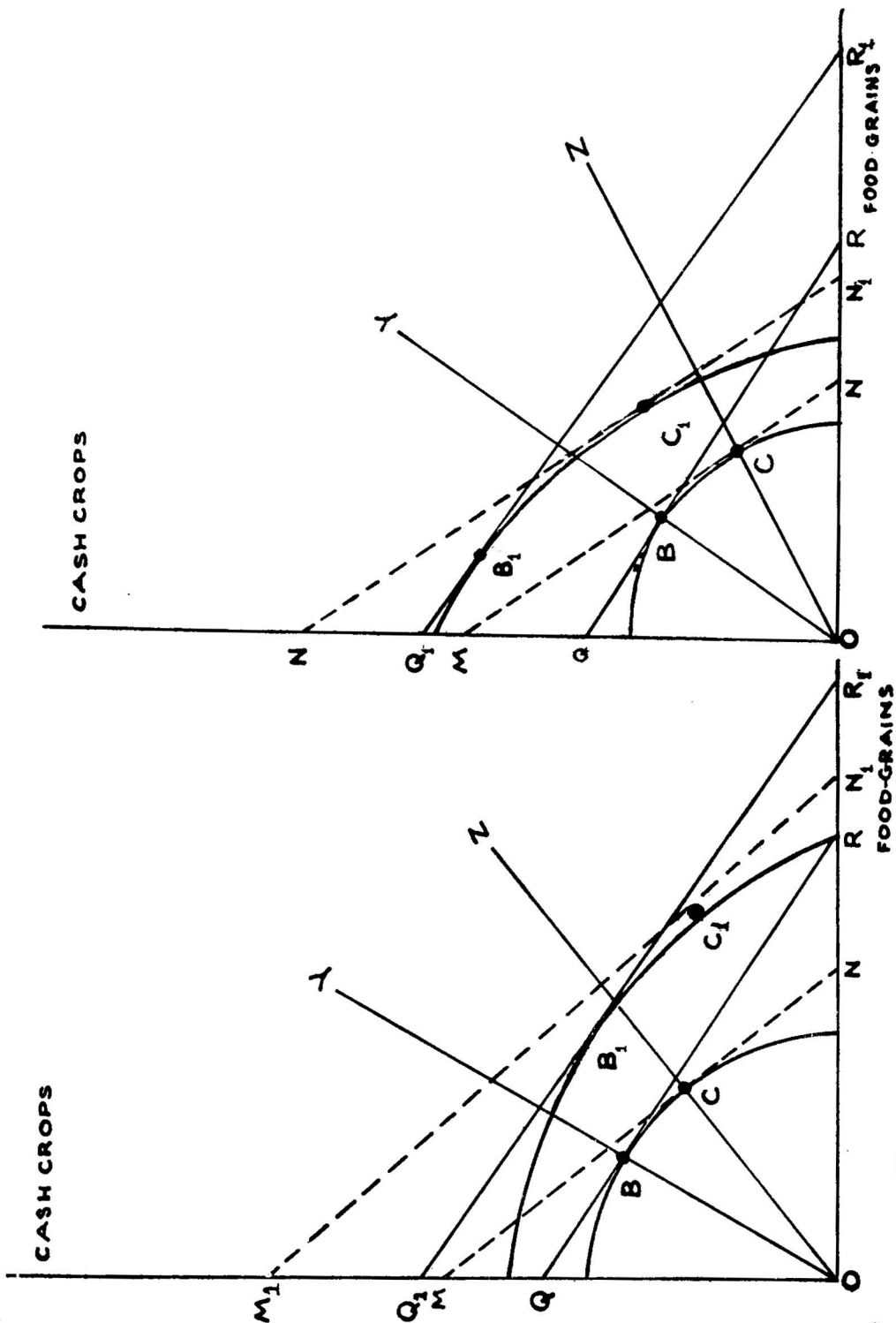


Figure 1 d (Shift of Production Function in favour of Cash Crops)

Figure 1 c (Shift of Production Function in favour of Foodgrains)

tion possibility curve. (a) A neutral shift implying the same marginal rate of transformation between foodgrains and cash crops as in the original production possibility curve. (b) A shift in favour of cultivation of foodgrains implying a more favourable marginal rate of transformation for foodgrains. (c) A shift in favour of production of cash crops implying a more favourable marginal rate of transformation for cash crops.

In the case of a neutral shift in the production possibility curve, the structure of agricultural output may not undergo a change if we assume that the indifference curves are homogeneous of first degree. Since price ratio is assumed to be constant, the relative profitability of producing cash crops and foodgrains does not change because of a neutral shift in the production possibility curve. Consequently, the proportion in which the two commodities would be produced would remain the same. In addition, homogeneous indifference curves of first degree imply that the income effect will not disturb the original proportion in which farmers' demand for foodgrains and cash crops was determined at the equilibrium point before the shift in the production function. In other words, given the price ratio, neutral shift of the production possibility curve and homogeneous indifference curves of first degree, the consumption path (wherever relevant) would be a straight line from the origin such as OY or OZ as indicated in Figure 1 b. Since the points of minimum limit of profitable production B, B₁, lie on the straight line OY and the points of maximum limit C, C₁, on the straight line OZ, the proportion of various categories of cultivators will not undergo any change.

A shift in the production possibility curve in favour of foodgrains implies that the cost of foodgrains in terms of cash crops declines. This in itself, given the same relative prices, will tend to raise foodgrains output proportionately more than in the case of a neutral shift assuming that the proportion of different types of farmers remains constant. However, this assumption is not realistic. The reason is that the point of minimum limit of profitable production on the new production possibility curve B₁ in Figure 1 c will lie to the right of the original point B. So also the point of maximum limit C₁ would be to the right of the original point C. Hence some of the deficit farmers would become surplus cultivators. They would tend to increase foodgrains output proportionately less than in the case of a neutral shift because, for the deficit farmers turned surplus cultivators, the lower ratio of selling prices of foodgrains to that of cash crops becomes relevant. It is also possible that some of the non-self-sufficient deficit farmers might become self-sufficient deficit farmers. To this extent, the demand for foodgrains in the market would fall leaving a larger marketable surplus for urban consumers and non-self-sufficient cultivators. There are thus two contradictory forces operating on the composition of agricultural production—the technical forces represented by a shift in the production possibility curve encouraging a proportionately larger output of foodgrains, whereas the change in the composition of cultivators in favour of surplus farmers' category tending to restrain the increase in foodgrains production.

When a shift in the production possibility curve in favour of cash crops takes place, the cost of cash crops in terms of foodgrains declines. This implies that compared with the neutral shift in production possibility curve, there will be a proportionately larger production of cash crops than that of foodgrains, assuming

the proportion of various categories of cultivators remains constant. But this proportion is likely to change as a result of the new point of minimum limit B_1 lying to the left of the original point B and that of maximum limit C_1 to the left of C in Figure 1 d. Some of the surplus and balanced cultivators may become deficit cultivators. Consequently, there would be a relatively greater output of foodgrains because, for the balanced and surplus farmers who become deficit cultivators, the higher ratio of buying price of foodgrains to selling price of cash crops becomes relevant. It is also likely that some of the self-sufficient cultivators may become non-self-sufficient and therefore the demand for foodgrains in the market might rise. In this case also there are two opposing forces operating on the structure of agricultural production—the technical forces favouring proportionately higher output of cash crops and the increase in the proportion of deficit cultivators tending to raise the production of foodgrains.

CONCLUSION

The analysis shows that to assess the impact of agricultural price policy on the level and composition of agricultural output, it is necessary to take into account two important factors. Firstly, it is essential to find out the nature and extent of shift in production possibility curve.⁸ Secondly, one should ascertain the changes in the proportion of the various types of cash-cum-subsistence farmers. This, however, is not an easy task. The theory of choice therefore underlines the fact that implementation of an agricultural price policy as an integral part of a development programme encounters many difficulties in actual practice.

As to the objective criteria for determining the level of support prices, the analysis suggests that there is no *a priori* ground for choosing one principle over the other.⁹ There is nothing so backward looking in the parity approach that it might fail to induce farmers in a developing economy to raise their production. Similarly, the cost approach is not that forward looking in the sense that it has not to depend on past for determining support price. Perhaps at the operational level, the parity principle may create less complications than the cost principle. The parity approach by linking the support price to the past prices avoids the danger of depressing the expected market prices—a danger which may exist in the case of the growth-oriented approach. In addition, if the experience of U.S.A. provides any guide, the parity approach might offer under certain conditions a powerful—perhaps an over-powerful—incentive to the farmers, to increase their output.

It may be emphasized that since the basic objective of agricultural support policy is to stimulate agricultural development and thereby the rate of growth of the economy as a whole, it is necessary that such a policy should not hinder the growth process itself. For this purpose, it is essential to analyse the implications of a support price from three points of view. In the first place, support

8. The theory of choice does, however, indicate the *direction* of changes in relative prices of cash crops and foodgrains, given the demand structure of agricultural commodities.

9. Neither principle provides any guideline for taking the consumer interests into account in fixing support prices. It may be pointed out however that the consideration of consumer interests has only a short run significance. For, if the support policy succeeds in stimulating agricultural output and if prices could be reduced whenever justified by changing economic conditions, consumer interests will not suffer in the medium or long run.

policy might affect the cost of production of agriculture-based industries, especially the export industries depending on agricultural raw materials. If the level of support price is too high, it might conflict with the objective of attaining a viable balance of payments. Secondly, agricultural price policy might influence the level of average agricultural earning which in turn will affect industrial wages. The relationship of average agricultural earning and industrial wage level may have repercussions on the competitive position of domestic industries and on the mobility of labour from the farm sector to the industrial sector. Lastly, a price support policy, whether based on the cost or the parity principle, will raise farm income and may even tend to bring about income redistribution in favour of cultivators. As income of farmers rises, both as a result of support policy and improved farm techniques, it becomes desirable to mobilise savings of the farm sector. Since the experience of a number of countries has shown that in the initial stages of economic development, the farm sector provides savings for investment in other sectors, a price support policy cannot serve the basic economic objectives if it fails to ignore its impact on savings. All these considerations point out that agricultural price policy should be an integral part of economic policy framework designed to accelerate the rate of growth of a developing economy.