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ABSTRACT

Agricultural Price Policies, Policy Goals and
Methods of Estimating Costs of Production

Basing agricultural price policies on costs of production is commonly applied, although with reservations by agricultural economists. Agricultural economists' concerns are centered on the problems with assigning values to the contributions of durable inputs and to the value of those inputs supplied by the farm operator and the operators' household. Some of these expressed reservations of agricultural economists can be reduced if focus is placed on the policy goal to be achieved in developing the production cost estimate. The policy goal affects the selection of the population on which the cost estimates are made and the items of cost to be included in the cost estimate.

Policies designed to provide incentives to producers must be targeted toward the costs of those producers supplying the major portions of output for the commodities in questions. Thus, the costs of an often relatively small number of large producers become heavily weighted. However, policies to sustain the income of selected groups of farmers must be based on the costs of production experienced by a large number of small farmers.

Costs estimates should distinguish between financial costs and economic costs. Structural differences occur in the cost structure among farmers. In setting prices, major attention should be given to the annual and capital replacement financial costs. Price policies cannot be directed to meet a specifically targeted economic cost.

Agricultural Price Policies, Policy Goals and Methods of Estimating Costs of Production

INTRODUCTION. Administered prices have become a widely applied aspect of food and agricultural policies in developed and developing countries (Tolley, et al.; Timmer, et al.). Commodity production cost estimates continue to find use in establishing price levels in agriculture in spite of protests from agricultural economists. Unit production costs are viewed as a poor base for setting commodity prices because they are based on historical experiences and costs are affected by market prices which are often influenced by remote foreign markets (Hardaker). Between-farm differences due to variation in size, production techniques and opportunity cost values assigned to specialized inputs makes aggregated production cost estimates meaningless (Pasour).

While basing administered prices on cost of production estimates can be faulted, the approach has intuitive and conceptual appeal which is lacking in most other bases for setting prices. The premise here is that some of the objections to cost of production pricing can be reduced if (a) the cost of production estimates are made with cognizance of the specific policy objective being pursued and (b) that the inclusion of certain items of cost and the method of estimating the cost contribution of other items is also conditioned by the targeted objective. Focusing attention on the policy objectives helps reduce the measurement problems and the resource mis-allocations which can result from cost of production based administered price programs.

POLICY OBJECTIVES. Agricultural policy objectives are classified as measures to (1) improve the distribution of income, whether between the farm and non-farm sectors or within the farming sector, (2) provide production incentives to farmers, (3) provide stabilization of agricultural prices and incomes for producers and consumers, (4) produce revenue for the government, and (5) facilitate the process of economic development. Prices are at the center of the equity, incentives and stability issues. While prices may have direct impact on the other objectives, other policy instruments are important as well.

If properly applied to include both seasonal and spatial differentials, government intervention into pricing agricultural products contributes to the stability goal. But, meeting the producer incentives and income distribution goals depends on the methods applied by governments to establish agricultural commmodity prices.

The conditions of agricultural production, food supply and demand, and needed agricultural policy interventions are substantially different among countries applying cost of production based price policies. Yet, the policy goals to be achieved by agricultural prices are often not explicitly established. Depending on whether agricultural policies are intended to improve the income position of farmers or affect the supply of selected products, different sets of producers must be considered in developing cost of production estimates. Further, which input costs are included in the production cost estimate and how these costs are estimated affects the level of price and the attainment of the policy goal. These two considerations will be discussed in turn.

SAMPLING FOR PRODUCTION COST ESTIMATES. Commodity cost of production estimates applied to farm management requires representation of different technologies and input application levels than cost and returns estimates used for policy analysis. The former requries that farm-specific characteristics be represented in the cost estimates while policy analyses should be based on average or typical levels of technology and input applications. However, averages or prevailing technologies can be variously defined; the policy goal sought determines the basis on which samples are drawn and average production costs are estimated.

Production incentives. Differences arise in the definition of average or typical commodity production costs used in agricultural pricing policies because of the prevailing size structure of the farming sector. Characteristically, a relatively small proportion of farmers operate a relatively large proportion of the land, and conversely. In Pakistan, as has been observed in many countries, 15 percent of the land is owned in units of five acres or less; but, this size group includes two-thirds of the owners of land. On the other hand, over one-half of the land, and likely the majority of production of most commodities comes from farms which are greater than 25 acres in size (Nulty).

Policies directed toward securing targeted levels of output for certain commodities must have prices based on costs of production incurred to produce the major portion of the output. Samples randomized by farm numbers would result in production cost estimates unduly weighted toward the large number of small producers. However, production costs estimates based on "probability proportional to size" concepts permit each unit of land to have an equal probability of being included in the sample (Krenz, 1980). Resulting cost estimates are superior for guiding output incentives, and when based on average practices, will provide the least-biased estimates of output levels.

Income distribution. For equity considerations, the distribution of income between the farm and non-farm sectors is important as well as the distribution of income among farmers. The costs of production experienced by the large number of small producers are most relevant to the policy goal. Average costs of production should be defined as the average per farm operator using typical practices since it is the incomes of a targeted set of farmers that are of concern.

In developing countries, farm size differences are great and even the techniques of production vary among size groups (Salam). Consequently, the cost structure for producing a given commodity is also subject to marked variation. Surveys for obtaining farm-level data on commodity production costs should be designed so that each targeted farm operator has an equal chance of being selected in the survey.

Alternatively, supply management policies must primarily consider production costs for the set of producers controlling the largest portion of total supply. If prices are to guide output, supply management policies are most efficient when based on the average costs per unit of land associated with the major part of total output. Adopting a sampling strategy for data collection consistent with the specific policy objective will help reduce the between farm variability in the structure and level of production costs. Clarification of policy objectives helps to define survey

strategy and results in administered prices which are more likely to accomplish their intended goal.

DEVELOPING PRODUCTION COST ESTIMATES. Problems encountered in basing prices on costs of production also depend on the way by which costs or values are assigned to particular production inputs. Items for which an established market price exists can be agreeably handled. But, for inputs and products which do not have an easily discovered market price, values become more subjective. Costs of durable capital assets must be allocated among commodities; the appropriate method for assigning value to the contribution of capital inputs and the contributions of operator and operator-family inputs is also debated. Further, even if the values of these inputs are agreeably assigned, differences occur as to which input costs should be included in the estimate of production costs on which a commodity price is to be based.

Estimating Costs. Again, decisions about including and valuing the contribution of various production inputs can be guided by the purposes for which these estimates are to be used. Some hold that the costs of all inputs should be included in cost of production estimates (Hardaker, et al.; Krishna). But, others argue that full cost pricing leads to income distribution inequities (Mellor).

The criticisms of full-cost accounting are based on differences between financial costs and economic costs (Gittinger). These differences have not been related back to cost theory even though the appeal for applying production costs to shaping agricultural price policies comes from the notions of this theory. Theory distinguishes two kinds of expenses--variable and overhead (fixed). The notions of fixed and variable costs are based on a time dimension; in the long run all costs become variable. The distinctions between financial costs and economic costs differ markedly from the categories of fixed and variable costs, however.

Accounting concepts are applied to estimating economic costs; depreciation can be viewed as either a financial cost or an economic cost concept (Davey). Either acquisition cost or current cost accounting techniques can be applied to estimate the economic cost of a depreciable asset (Lewis). Similarly, there are alternative ways to assign value to operator and operator-family labor and management. Land is perhaps the most difficult to value of all production inputs. The alternative methods of estimating economic costs hold the potential for sizable in production cost estimates.

Costs and Administered Prices. How prices signal changes in producer behavior is important when applying production cost estimates to agricultural pricing policy. Hence, it is useful to rethink how prices and receipts from production affect the farmer. Consider a farmer producing a given commodity. After reducing the total value of production by the amount of the products consumed in the household, the surplus is sold. From the receipts of product sales, farmers meet their immediate cash expenses incurred for such items as seed, fertilizer, fuel, water, hired labor, rents or payments for land and/or payments on indebtedness for capital inputs. Allowances must also be made for capital replacement. Some of these cash expenses are variable cost items and others are typically classified as fixed costs. After all cash expenses (annual and

capital replacement) are met, the farmer is left with a return to resources under his control. The residual of income over cash expenses is the return to the farmer's equity in land, equipment and the return to operator and operator family labor.

Table 1 shows that after cash expenses involving fixed and variable costs are met, the farmer is left with a return above annual cash costs of Rs 666.95. The next set of costs requiring immediate attention are those associated with replacement of capital items used up by the production process. Capital replacement costs, too, are cash costs but they differ from cash costs which must be met annually. While receipts in any one year may not be sufficient to meet capital replacement costs, it is necessary that during the life of the capital asset, receipts be sufficient to permit replacement of the depreciated asset if that technology is to be continued. If a farmer anticipates that receipts will not be sufficient to meet annual cash expenses, he would rationally choose not to produce. Any surplus of receipts over annual cash expenses can be considered as potential for capital replacement and to provide return to other factors of production. Over a period of years corresponding to capital assets' life, receipts must be sufficient to meet annual cash expenses and cash capital replacement costs. If these two categories of cash costs are not met, the farmer will either discontinue production or shift to an alternative production technology.

Already a mixture of valuing concepts have been applied. Annual cash costs are financial costs. Capital replacement costs are estimated following accounting concepts but, for policy application, should approximate economic costs as closely as possible. Even though various estimating procedures can be applied to capital replacement costs, they should also be considered as financial costs which must be met.

Certain annual cash costs may include payments for leasing or renting or on debts for purchases of capital assets and land. While these items may or may not affect enterprise selection on a given farm, they may reflect between-farm differences important to policy goals. Increases in the value of land and/or equity in other assets are not considered as part of the receipts or returns from the enterprises; hence, payments to increase the equity in those assets should not be counted as a production cost under any circumstances.

After meeting annual cash costs and capital replacement allowances, the farm is left with a residual of Rs 633.36 which can be considered as a (a) return to unpaid operator and operator-family labor, (b) a return on investments in the farm and its equipment, (c) a return to management and risk, and/or (d) income for household and family living allowances. The difference between the unit price of a commodity and the cash costs for annual production expenses and capital replacement can be allocated by an individual to any one or all of these residual claimants. Adjusting prices to increase the excess of receipts above cash costs may be considered as increasing farm family income, it may stimulate investment in capital equipment, it may be capitalized into increased land values or it may be used to improve the living standard of the household. No matter which of these claimants is the target of the agricultural policy, there is little the policy maker can do to ensure that a particular goal is met.

Table 1. Cost of Production per Acre of Wheat on Owner-Operated Farms in the Non-Canal Area of Gujranwala, 1979-80.

	Rupees per planted acre		
	Amount	Per Unit	Value/Acre
Value of Production			
Wheat, grain and straw	801.20 kg.	1.27	1137.70
Operator Annual Cash Expenses			
Seed	36.20 kg.	1.27	45.97
Fertilizer	54.16 kg.	2.43	131.85
Artisans			20.75
Hired labor, casual	40.49 hr.	2.91	117.82
Tractor operating expense	1.45 hr.	23.62	34.25
Thresher operating expense	1.30 hr.	2.80	3.64
Tubewell pumping expense	7.80 hr.	7.77	60.61
Water purchased			55.11
Variable Cash Expenses, Subtotal			470.00
Other Annual Cash Expenses			
Taxes and insurance			.75
Interest, nonland debt			--
Interest, land debt			--
Rent and lease costs			--
Total Annual Cash Expenses			470.75
Return Above Annual Cash Costs			666.95
Cash Account for Capital Replacement			
Tractor	1.45 hr.	7.42	10.76
Thresher	1.30 hr.	6.30	8.19
Tubewell	7.80 hr.	1.95	15.21
Other, miscellaneous			1.43
Total, Capital replacement			35.59
Total Cash Expenses			506.34
Return Above Cash Costs			633.36
Operator Contributed Input Costs			
Operator/family labor	41.44 hr.	4.30	178.19
Return to nonland capital			19.37
Return to land equity			500.00
Total, operator resource cost			697.56
Returns to Management and Risk			-64.20

Source:(Chaudry, et al.).

It is important to understand the structure of costs among producer size groups to evaluate how an administered price affects the production incentive or the equity goal. Smaller farmers often have a smaller percentage of purchased inputs (cash expenses) and have correspondingly higher percentages of operator-supplied inputs than is observed on larger farms. The primary difference is in the amount of capital replacement costs incurred by the two groups.

Therefore, administered prices which cover all cash costs provide short term incentives to producers. For those producers with fewer cash costs and which rely to a greater extent on farm-supplied inputs, the difference between the established price and their per unit cash costs represents a return to the inputs supplied by the producer. Production incentives are evident and incomes of these farmers are protected as well.

An administered price covering all cash costs enables the larger producer using more purchased inputs to meet the annual cash expenses and replace capital equipment which is consumed by the production process.

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