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where the co-operatives have been successful as well as stable, the value added generated and transferred to member farmers is about 30 to 40 per cent of the terminal market price.<sup>12</sup>

The above discussion shows that the co-operative intervention in groundnut in India will have to be planned carefully. This is particularly so in view of the likely amount of value added that can be transferred to the farmers through the co-operatives is very limited and much less than that in the successful and stable co-operatives such as sugar, fruits and dairy.

#### CONCLUSIONS

The paper finds that there is some scope of giving high returns to the groundnut growers and thereby increasing the area under groundnut through the formation of co-operatives. At the macro level, we have estimated that on an average the share of farmer's gross income in the total value generated in the groundnut system is about 85 per cent. Vertical integration through the co-operatives will increase the farmer's income to the maximum by only about 15 per cent. This picture compared with cotton marketing suggests that the stability of co-operatives in groundnut is not necessarily assured. In the stable co-operatives such as dairy, sugar and fruits and vegetables the percentage of value added passed on to the farmers is greater than 30 per cent.

A comprehensive study of this nature related to the oilseeds as a whole may perhaps indicate that a much higher share of value added can be transferred to the farmers by forming integrated oilseeds co-operative because the processing units for groundnut can also be utilized for other oilseeds with some alterations in the processing plant.

Another finding of the study is that the share of groundnut oil produced through solvent extractors in the total urban consumption is about 10 per cent. It might be important to examine how far the business of solvent extraction units affect groundnut oil prices in the urban areas particularly in the short run.

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#### DYNAMICS OF PRICE SPREAD COMPONENTS

V. V. Desai\*

Efficacy or efficiency of marketing of agricultural produce is assessed by the size of share which the producer obtains in the ultimate price paid by the consumers. The relationship between the producers' and consumers' price is manifested by what is known as the price spread. In fact, the price spread

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12. It is reported that the value added as a percentage of total cost is about 48 and 63 per cent respectively in sugar, and fruit and vegetable processing. Using this, the percentage of value added in the total value of output will be about 33 and 39 per cent respectively. See V.K. Gupta, D.P. Mathur and P. V. Krishna: Stages of Modernization in the Rice Milling Industry. Centre for Management in Agriculture. Indian Institute of Management. Ahmedabad, 1974.

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is a broad spectrum which discloses the proportions of various components of the marketing cost of the produce, and thus explains the variance between the prices received by the producers and paid by the consumers. In other words, the magnitude of variance represents the cost of marketing, which in turn, determines the producers' share in the consumers' price. In order to secure a sizable share to the producer, it would be imperative to minimize the variance as much as possible. The study in the dynamics of the components of the price spread of the particular produce, therefore, seems to be jejune and purposeful.

Macro level studies of price spread do not appear to be relevant or pertinent in pricing decisions. They conceal more than what they are expected to reveal. Spatially confined micro studies in price spreads of various agricultural commodities, which are lacking in the country at present, undeniably provide few surrogates useful in price fixation. In this context, an endeavour has been made in this paper to study (i) the structural relationship subsisting between the various components of the price spreads; and (ii) the impact of the dynamics of variations in the components on the producers' share.

#### METHODOLOGY

For the purpose of this study, six villages predominantly growing paddy and sugarcane were selected from the Coimbatore block in Tamil Nadu. In the initial stratification all the villages in the block were classified and ranked on the basis of proportions of paddy acreage as well as sugarcane acreage, and thus the first ten villages were selected for the study. Since the distance between the producing centres and the retail markets and availability of transport facilities are also significant determinants of the price spreads, only six villages were finally selected as indicated in Table I.

TABLE I—SIZE OF SAMPLE

(number of sample households)

Villages	Distance (km.)†	Paddy growers		Sugarcane growers	
		Small	Big	Small	Big
1. Madukkarai .. ..	20	5	8	6	6
2. Alathur .. ..	15	12	7	10	8
3. Passakuttai .. ..	12	8	8	6	10
4. Ramagampalayam*	11	3	5	5	4
5. Thekkalur* .. ..	8	7	2	8	2
6. Kuruyalur* .. ..	7	5	5	5	5
		40	35	40	35

\* No motorable road links.

Small: Not more than 2 hectares.

† Distance from Coimbatore market.

Big: Not less than 10 hectares.

From these sample villages, 150 cultivator households including both small (less than 2 hectares) and big (more than 10 hectares) were identified from the revenue records available with the village level officers. These cultivator households had achieved the cropping index above the normal. The data were collected not only from the sample cultivator households but also the concerned rice mills and *gur* making units as well as from the identifiable wholesalers and retailers in rice and *gur* at the Coimbatore market.

*Limitations and Assumptions*

The scope of this survey was confined to (a) the agricultural produce of paddy and sugarcane, being food and cash crops respectively; (b) the marketing of aforesaid crops between April and July 1979; and (c) the distribution through the private channels of marketing.

There were certain other limitations like selection of appropriate price, averaging of prices, etc. In order to simplify these inherent complications in the survey, the following assumptions were made:

(i) The difference between the purchase price of paddy paid by a rice mill and the selling price of rice was assumed to be the cost of processing where the mills were purchasing paddy from the growers.

(ii) In cases where the mills charge the rent for paddy processing, the rent minus income from sale of husk was assumed to be the cost of processing.

(iii) The prices ruling in the local market for the same variety of rice or *gur* were assumed to be the consumers' prices for those produce.

## CONCEPTUAL FRAMEWORK

*Structural Variations*

The cost of marketing of agricultural produce mainly comprises normal allowances made for wastage, dirt, weighing, etc., margins of intermediaries, transport cost and processing cost. Thus,

$M_{ci} = P_{ct_2} - P_{pt_1}$ $m_{ci} = \frac{P_{ct_2} - P_{pt_1}}{P_{ct_2}}$ $P_{si} = (1 - m_{ci})$	<p style="text-align: center;">Legend:</p> $M_{ci} = \text{cost of marketing of } i\text{th produce.}$ $P_{pt_1} = \text{producer's selling price.}$ $P_{ct_2} = \text{Consumer's retail price (} t_1 \text{ and } t_2 \text{ indicate time lag)}$ $P_{si} = \text{producer's share in the consumer's retail price of } i\text{th produce.}$ $m_{ci} = \text{percentage share of marketing cost of } i\text{th produce}$
<p>Now, if</p> $m_{ci_1} > m_{ci_2}, \text{ such that } m_{ci} = \frac{(P_{ct_2} + \Delta P_{ct_2}) - P_{pt_1}}{(P_{ct_2} + \Delta P_{ct_2})},$ <p>then <math>P_{si_1} &lt; P_{si_2}</math>; provided <math>\frac{P_{pt_1}}{P_{ct_2}} \neq 1</math>.</p>	

Thus, the producer's share varies inversely to the cost of marketing of the produce.

Again

$$P_{ct_2} = a P_{pt_1} + b W_{it} + c B_{it} + d C_{it}.$$

Here, it is assumed that each component is an independent variable which affects the dependent variable ' $P_{ct_2}$ ' in a linear manner. Hence the above equations were fitted with the least square method. The solutions to these equations would evince the structural variations in the price spreads.

Now

$$\begin{aligned}
 P_{ct2} &= \bar{X} + a P_{pt1} & W_{it} &= \text{normal allowances.} \\
 &= \bar{Y} + b W_{it} & B_{it} &= \text{margins of intermediaries.} \\
 &= \bar{Z} + c B_{it} & C_{it} &= \text{cost of processing.} \\
 &= \bar{U} + d C_{it} & & a, b, c \text{ and } d \text{ are constants.}
 \end{aligned}$$

### Dynamics of Variations in Cost Components

Since  $\Delta P_{ct2} = f(W_{it}, T_{it}, B_{it}, C_{it})$

'Sensitivity' relationships which highlight the sensitivity of the consumer's price with regard to the aforesaid components can be expressed as follows:

$$\begin{aligned}
 (i) \quad S_{pw} &= \frac{\Delta W_{it}}{\Delta P_{ct2}} \frac{P_{ct2}}{W_{it}} && \text{(sensitivity with reference to wastage allowance)} \\
 (ii) \quad S_{pt} &= \frac{\Delta T_{it}}{\Delta P_{ct2}} \frac{P_{ct2}}{T_{it}} && \text{(sensitivity with reference to transport cost)} \\
 (iii) \quad S_{pb} &= \frac{\Delta B_{it}}{\Delta P_{ct2}} \frac{P_{ct2}}{B_{it}} && \text{(sensitivity with reference to margins of traders)} \\
 (iv) \quad S_{pc} &= \frac{\Delta C_{it}}{\Delta P_{ct2}} \frac{P_{ct2}}{C_{it}} && \text{(sensitivity with reference to processing cost)}
 \end{aligned}$$

## RESULTS AND DISCUSSION

### (a) Structural Variations

The linear equations indicating the influence of various components of price spreads on the consumers' price have been presented in Table II for the sample households, big and small, cultivating paddy or sugarcane crops in two selected villages, *viz.*, Madukkarai and Ramagampalayam.<sup>1</sup> Three villages, namely Madukkarai, Alathur and Passakuttai are well-connected with roadways and have adequate transport facilities, whilst the remaining three villages are bereft of such necessary facilities.

TABLE II—STRUCTURAL VARIATIONS

	Paddy		Sugarcane	
	Small	Big	Small	Big
Linked village				
Madukkarai				
$\bar{X} + a P_{pt1}$	0.17+0.0018	0.19+0.0024	0.21+0.0213	0.22+0.0263
$\bar{Y} + b W_{it}$	0.08+0.0132	0.05+0.0087	0.03+0.0130	0.03+0.0430
$\bar{Z} + c B_{it}$	0.28+0.1356	0.25+0.2662	0.23+0.0654	0.21+0.0334
$\bar{U} + d C_{it}$	0.21+0.0168	0.23+0.1669	0.26+0.1136	0.27+0.2468
Non-linked village				
Ramagampalayam				
$\bar{X} + a P_{pt1}$	0.23+0.0313	0.16+0.0171	0.23+0.0418	0.21+0.0312
$\bar{Y} + b W_{it}$	0.10+0.0101	0.08+0.0131	0.07+0.0085	0.08+0.0465
$\bar{Z} + c B_{it}$	0.29+0.1637	0.26+0.1211	0.25+0.2117	0.24+0.2288
$\bar{U} + d C_{it}$	0.20+0.0287	0.21+0.3122	0.28+0.3176	0.31+0.3862

1. The results are presented only for one linked village—Madukkarai, and one non-linked village—Ramagampalayam to save space. The results for the remaining villages are available with the author.

Table II shows that the mean value of the intercept in the equation  $(\bar{X} + a P_{pt})$ , is relatively higher in respect of small farming households which are situated in poorly linked villages. Thus, the bottleneck of transport facilities does adversely affect the share of the producers, specially small farmers, in the price spread. It further provides evidence that the size of holdings and the nature of crops do have favourable influence on the producers' share.

According to the prevailing foodgrain marketing practices, the middlemen indulge in quantity discount on the pretext of several counts like dirt, moisture, etc. These allowances can be reasonably treated as the cost of normal wastage, the relationship of which is represented by the equation  $(\bar{Y} + b W_{it})$ . It is shown that the  $\bar{Y}$  component fluctuates between 8 per cent and 12 per cent in respect of paddy crops and between 3 per cent and 8 per cent in respect of sugarcane. There is some evidence in support of the size of holdings and the locational advantages.

One of the predominant components of the price spread is the aggregate margins of intermediate traders. How far this ingredient carries its impact on the consumers' prices is judged by the equation  $(\bar{Z} + c B_{it})$ . Not merely the farm size and location but also the nature of crops play a vital role in differentiating the margins, which vary between 24 per cent and 40 per cent as may be witnessed from Table II. So far as sugarcane crop is concerned, it is not much significant on account of direct sales made by cane growers in most of the cases. However, amongst the paddy cultivators, the mean value of the margin is low in the case of big farmers for apparent reasons.

Last but not of least significance is the component of processing cost in the price spread. Its linear relationship with the consumers' price is described by the equation  $(\bar{U} + d C_{it})$ . While the size and locational aspects do not manifest any significant range of change, the nature of crop does; in the case of paddy crop it has been low whereas for sugarcane crop it is relatively high.

#### (b) *Dynamics of Variations*

In order to examine the impact of rate of change in one parameter on the rate of change of average consumers' price, sensitivity analysis, as depicted earlier, was made and its results are presented in Table III. It may be seen that the rate of change in the component of wastage cost has an inverse effect on the price, *i.e.*, the lower the wastage cost, the greater the price. The values of  $S_{pw}$  have been relatively lower for sugarcane crop than for paddy crop.

Unlike this, the sensitivity of the consumers' price with respect to transport cost component was positive and direct. It was more sensitive in the case of sugarcane probably because it is a perishable produce. Any delay in transporting it from the farm to the factory results in reducing its recovery rate.

TABLE III—DYNAMICS OF VARIATIONS

	Paddy		Sugarcane	
	Small holdings	Big holdings	Small holdings	Big holdings
Madukkarai				
(i) $S_{pw}$	-0.1132	-0.1949	-0.0167	-0.0234
(ii) $S_{pt}$	+0.0437	+0.0336	+0.1875	+0.2137
(iii) $S_{pb}$	+0.3715	+0.3117	+0.1987	+0.1871
(iv) $S_{pc}$	+0.1868	+0.1645	+0.2374	+0.2466
Ramagampalayam				
(i) $S_{pw}$	-0.1217	-0.1572	-0.0312	-0.0213
(ii) $S_{pt}$	+0.0634	+0.0521	+0.1935	+0.1624
(iii) $S_{pb}$	+0.4263	+0.3829	+0.2112	+0.1735
(iv) $S_{pc}$	+0.2131	+0.2372	+0.2686	+0.2816

Obviously, the consumers' prices are highly sensitive towards the margins of intermediaries which are reflected by  $S_{pb}$  in Table III. Remarkably, the prices of paddy crops evince greater sensitivity to the changes in margins which are seemingly influenced by the size and locational aspects. In the case of sugarcane prices sensitivity appears to be somewhat subdued. Likewise, the prices show their direct and perceptible influence on processing costs. The mean values of  $S_{pc}$ , however, indicate high susceptibility in the case of sugarcane as compared to paddy.

#### CONCLUSIONS

The price spreads of agricultural produce are influenced by endogenous as well as exogenous factors. Few of them, like the size of farm holdings, location, type of produce, traders' margins and processing cost have been identified and their effect examined. This study leads to an inference that in the fixation of prices of agricultural produce, due weightage should be accorded, as far as possible, to the above-mentioned factors so that the producers could secure remunerative prices for their produce.

### COMPARATIVE EFFICIENCY OF ALTERNATIVE MILK MARKETING AGENCIES IN WESTERN MAHARASHTRA

Jagannathrao R. Pawar and Sitaram K. Sawant\*

With the increase in the demand for milk in the urban areas and concentration of milk production activity in the rural areas, a large number of government, co-operative and private milk marketing agencies have entered into the business of procurement, processing and distribution of milk. During the last two decades, the milk production activity has gained in importance in the rural areas of Western Maharashtra mainly because of re-

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