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A STUDY OF DIFFERENT ASPECTS OF PRICING OF SEED

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Introduction

A major contribution of the High-Yielding Varieties (HYVs) Programme is the interest it has awakened among the farmers to depend on certified seed as an important input to increase their production. The growth of the seed industry was rather slow in the initial stages from 1963 to 1965. There was then a rapid expansion from 1966 to 1969. However, the phase of rapid growth proved to be a short-lived phenomenon. The accumulation of excess or unsold stocks of hybrid jowar and hybrid maize seed during 1969 and 1970 resulted in huge storage losses to the seed agencies, and resulted in reduced seed production acreages of these crops in 1970-71, even though the total acreage has not been planted to HYVs. This situation attracted the attention of the leading economists in the country in 1969. A. M. Khusro pointed out that "as for high-yielding varieties, they were not there until the other day, and such improved varieties that did exist were not in good demand."¹

I

Factors Affecting Further Expansion

Many factors affect the rate of growth and expansion of the seed industry in India. Evolution of superior crop plant varieties, trained technicians to supervise the seed multiplication process, quality-conscious producers who can devotedly attend to multiplication of new varieties, availability of efficient seed processing equipment that can effectively and rapidly process large quantities of seed of several varieties, scientific storage in production, processing and distribution centres, accurate seed testing facilities, and a sound marketing system all are essential to stable growth of the seed industry. But in the final analysis, the economics of seed production vis-a-vis grain production and the relative price structure that will attract progressive producers to take up seed production as a regular activity is the chief factor responsible for the success or failure of seed development in the country.

Need for a Realistic Price Policy

A realistic price policy based on careful and accurate cost analysis will greatly accelerate the growth of the seed industry. The benefits of nucleus

1. Presidential Address—"Agricultural Revolution and the Price Mechanism, *Indian Journal of Agricultural Economics*, Vol. XXIV, No. 1, January-March, 1969.

seed developed at great cost by plant breeders will be lost to the farmer if adequate quantities are not multiplied while keeping high genetic purity and physical standards. The farmer's interest in such seed should be kept up by constant endeavours of the seed companies to supply high quality seed at competitive prices at locations within their reach. To achieve this objective the price policies that are followed at every stage of seed multiplication, processing, packaging, storage and distribution should be realistic enough to encourage as many farmers as possible to use certified seed. Therefore, a study of the price structure in all different stages of production is attempted below.

II

Price of Seed at Procurement Stage

The price paid by seed companies at procurement will greatly influence the final price at which seed is sold to the farmer-user. To produce quality seed, the producer must take extra care and adopt better farming methods than he would use for commercial grain production. It must be recognized that a large number of progressive farmers will be attracted to growing seed in preference to commercial grain only if the seed price reflects an adequate premium over the commercial grain price. A study of procurement prices of the National Seeds Corporation for maize and the premium earned by the farmer illustrates the adequacy of premium offered for these seeds. The details of cost of cultivation, procurement price, and the premium to the seed grower are shown in Table I.²

Additional Costs Involved in Seed Production

Purchase prices for cereals, vegetable, fodder, fibre and flower seed present different problems. As far as open-pollinated crop seeds such as paddy and wheat are concerned, the farmers are more familiar with seed production and the risk of rejection of crop for seed purpose is less than with other crops. Even in case of rejection for seed, the produce can be used as grain. The premium above commercial grain, therefore, can be less than that for other crop seed. In the case of hybrid crops, maintaining the female and male parental lines, roguing out the off-types, detasselling the female parent of maize, and synchronization of pollination of female and male parents of bajra and sorghum are sources of additional costs. Heavy manuring and irrigation, intense use of labour and additional plant protection operations are indispensable for obtaining economical seed returns in field crop seed such as maize, jowar and bajra.

Vegetable, flower, fibre and fodder seeds are at present largely grown under the contracts of private seed merchants. Production is confined to

2. Alvin G. Law, Gregg Young and P. R. Chetty : Seed Marketing, USAID/MSU, New Delhi, 1971, p. 64.

TABLE I—ECONOMICS OF MAIZE SEEDS

Item	Production cost (Rs./acre)	
	Seed	Commercial grain
Costs		
Land preparation	90	90
Fertilizer and labour	200	200
Seed	85	21
Sowing	30	30
Inspection fees	35	—
Plant protection	40	40
Irrigation	40	40
Roguing and detasselling	50	—
Weed control	40	40
Watch/ward	20	20
Harvest/transport	45	30
Shelling (male line only)	5	20
Processing (Rs. 25 per quintal for 7 quintals)	175	—
Certification materials	72	—
Total cost	927	531
Returns		
Seed 7 quintals @ Rs. 185/quintal	= Rs. 1,295	Grain 14 quintals @ Rs. 60/quintal = Rs. 840
Male line 2.5 quintals @ Rs. 50/quintal	= Rs. 125	
Under-sized seed	= Rs. 50	
	Rs. 1,470	
Less costs	= Rs. 927	Less cost = Rs. 531
Net return per acre	= Rs. 543	Rs. 309
Premium Rs. 543—Rs. 309 = Rs. 234 per acre.		

remote areas, and for want of uniform cultural practices the production is stagnated. On the other hand, if the problems of each crop are analysed and the producer is given the best alternative price for the seed crop, high quality seed will come to the pipeline for further processing and distribution. Each crop specialist should help map out the best areas in the country for seed production of these crops so as to intensify efforts to bring down the cost, increase the yield, and reduce the final sale price of seed.

Processing and Packing Costs

Processing costs include the costs involved from threshing to the final packing. When seeds are threshed, they contain moisture ranging between

14 and 24 per cent. This must be reduced to 8 to 12 per cent depending on the packing material used. In vegetable and oil seed, the moisture content must be reduced further to 6 per cent. The point for consideration here is that additional expenditure is involved in drying seed to safe levels. Drying costs vary depending on the season of the year. In summer, drying costs tend to be less due to sun drying, in winter, artificial drying is necessary to lower the moisture to a safe level. Different screen sizes are required for different seeds. Seeds that pass over the screens are considered for procurement; seeds passing through the screens are discarded as under-sized and are generally returned to the grower. Processing losses, including under-sized seeds, represent 10 to 12 per cent of the total weight of the seed.

Cleaning and grading is the next important operation. The cost of this operation varies to a large extent depending upon the nature of threshing, pre-cleaning of seeds and also on the physical characteristics of the seed. Generally, cleaning field crop seeds such as maize, jowar, wheat, paddy and bajra present fewer problems and require less time than vegetable seed. With vegetable and flower seeds human labour is required in addition to machine cleaning, so the cost of cleaning and grading vegetable seed is higher. The cleaning costs vary from Rs. 10 to Rs. 12 per quintal.

Treating seeds to protect them from storage pests and diseases and from soil-borne pests is another cost involved in processing. The cost of treatment material such as Captan, Thiram or Agromycin must be added to processing costs. Other items of cost involved are bags, labels, leaflets, thread and seals. Table II illustrates the average costs for processing and packing of cereal, vegetable, fodder and fibre crop seeds.

TABLE II—PROCESSING AND PACKING COSTS OF DIFFERENT CROP SEEDS

Crop	Packing size in kg.	Processing cost per quintal (Rs.)	Packing cost per quintal (Rs.)	Total costs (col. 3+5) (Rs.)	Sale price per quintal (Rs.)	Percentage of sale price
1	2	3	4	5	6	7
Cereals						
Hybrid maize	6½	20	13.23	33.23	250	13.2
Hybrid jowar	4	20	19.25	39.25	700	5.6
Hybrid bajra	1 and 3	20	26.67	46.67	800	5.8
Paddy	12	15	9.17	24.17	140	17.2
Wheat	40	15	13.50	28.50	200	14.2
Vegetables						
Bhindi	5	15	17.20	32.20	800	4.3
Peas	30	15	17.20	32.20	300	10.8
Fibre and fodder						
Jute	3	15	32.50	47.50	600	7.9
Cotton	8	15	13.75	28.75	200	14.2
Berseem	10	20	12.22	32.22	1,000	3.2

Source : National Seeds Corporation Production Division.

The percentage of sale price due to processing and packing costs tend to increase as the sale price of seed decreases, and vice versa. Packing size depends on the quantity of seed needed to cover an acre. In some cases, smaller packings are also made to enable more small farmers to go in for lesser packings. As in any other industrial product, the cost of processing and packing is a very important component of the final price structure. The possibility of giving most attractive and durable packing should receive constant attention of the seed company, without inflating the final sale price of seed.

Storage Losses

Seed is a perishable commodity. The measure of seed quality depends upon the vigour and ability of the seed to grow and produce a good crop. Therefore, seed lots which fall in vigour or germination should be scrupulously and conscientiously removed from the seed store.

Three types of storage losses are common in the seed business: first, the loss due to fall of germination and/or vigour due to age of seed, defective processing, or lack of proper storage conditions; second, loss due to non-saleability of a variety due to shift in demand and consequent prolonged storage; third, loss due to deterioration of seed quality during storage by infestation of pests and diseases. All possible efforts should be taken to minimize if not eliminate these losses. Despite the best efforts, these losses may accrue to a substantial percentage, as high as 4.5 as reported in advanced countries.³ Pricing of seed must include sufficient cushion for such storage losses.

III

Fixing Sale Price

The final market price of certified seed, in a free market, is the result of many interacting factors such as total demand created for the seed, price of other seed, availability of credit, price of other farm inputs and the knowledge and ability of average farmers to buy enough seed to cover the maximum area in their holding. These are the external factors that influence the seed company to fix the sale price. Other factors that directly affect the sale price are:

1. Cost of production of seed or contract price paid to the grower.
2. Processing and packing charges.
3. Storage.
4. Transportation.
5. Administrative overhead.
6. Interest on the capital.
7. Dealer commissions or sales expenditure.
8. Storage losses and/or losses due to obsolescence.
9. Publicity.
10. Returns to capital.

3. Lela V. Barton : Seed Preservation and Longivity, Inter Science Publishers, Inc., New York, 1961, p. 160.

Additional factors that should be considered for fixing prices are:

1. Cost of and emphasis on intensive coverage of an area under HYV programme.
2. Left-over stocks and their likely use.
3. General shift of importance from one category of seed to others (as from cereals to fibres or pulses or vice versa.)

Methods of Fixing Sale Price

Different methods are used to arrive at an acceptable sale price of seed. The basic consideration is that the price should attract the maximum number of farmers to buy seed, and at the same time allow enough margin to the seed company, with a reasonable profit which can be used for further expansion to improve service to the farmers. The following main methods appear to meet the needs of seed industry for the present : (i) Total quantity method; (ii) Loading factor method; and (iii) Unit cost method.

(i) *Total quantity method:* This method is useful when bulk seeds are purchased under grower contract production, especially when the seed price is compared with the existing grain price at the time of procurement. The procurement of unprocessed paddy and groundnut seed is an example. The seed is later cleaned, bagged and tagged at the expense of the seed company. This method is also useful to fix sale price in the initial stages of a seed company when actual overheads and fixed costs are difficult to assess. Direct and indirect costs are added to procurement costs of the cleaned and graded seed. A fixed percentage of cost, say from 20 to 30 per cent is added for overhead and return to capital.

An example of 100 quintals of IR8 paddy seed procured at Vijayawada (A.P.) on cleaned seed basis illustrates the method.

FIXATION OF SALE PRICE OF IR8 PADDY SEED ON TOTAL QUANTITY BASIS						Rs.	p.
1.	Cost of procurement of seed.	Cleaned seed at 12 per cent moisture content					
	@ Rs. 65 per quintal	.. .. .	.. .. .	.. .. .	.. .. .	6,500	00
2.	Cost of processing @ Rs. 15 per quintal	.. .. .	.. .. .	.. .. .	.. .. .	1,500	00
3.	Cost of packing materials @ Rs. 1.95 for 12 kg. for 100 quintals or 100 quintals bags of 12 kg.	.. .. .	.. .. .	.. .. .	.. .. .	1,624	35
4.	Transport cost 100 km. distance for 100 quintals	.. .. .	.. .. .	.. .. .	.. .. .	100	00
5.	Storage @ Re. 0.50 per quintal for 4 months	.. .. .	.. .. .	.. .. .	.. .. .	200	00
						<hr/>	
						9,924	35
6.	Administration @	.. .. .	.. .. .	.. .. .	5%		
	Sales commission/sales cost	.. .. .	.. .. .	.. .. .	15%		
	Return to capital	.. .. .	.. .. .	.. .. .	10%		
					30%		
						<hr/>	
						2,977	50
						<hr/>	
				Total	..	12,901	85

Per quintal Rs. 130. National Seeds Corporation sale price Rs. 140.

Source : National Seeds Corporation Production Division.

(ii) *Loading factor method* : Based on the actual quantities handled, overhead and direct and indirect costs are determined for a number of years. These costs, plus the margin expected on different categories of seed are computed to arrive at a factor which is termed the loading factor.

The following loading factors are considered to arrive at the sale price of seed.

<i>Seed category</i>	<i>Loading factor</i>
1. All hybrids, cereals, fodders and fibres.	80 per cent on procurement price.
2. All vegetables.	110 per cent on procurement price.

Table III illustrates the sale price of seed arrived at by using the loading factor method for different seed.

TABLE III—SALE PRICE OF SEED DETERMINED BY THE LOADING FACTOR

Crop	Procurement price per quintal Rs.	Loading factor (per cent)	Sale price per quintal (Rs.)	Range of sale price in seed market per quintal Rs.
Hybrid maize	165	80	297	300 to 250
Paddy	65	80	117	140 to 115
Wheat	125	80	225	195 to 200
Jute olitorius	300	80	540	500 to 600
Soybean	150	80	270	250 to 300
Peas	175	110	367.5	250 to 300
Bhindi	350	110	735	800 to 600

Source : National Seeds Corporation Marketing Division.

The main advantage of this method is its rapidity of computing notional sale price, which can be finally fixed by taking into account the market trends. The disadvantage of this method is the lack of precision in arriving at costs involved in handling small quantities of seed such as vegetables.

(iii) *Unit cost method* : Under this method, the cost of one quintal of processed seed is considered for computing the sale price. All direct and indirect costs are based on average costs computed over a period of time from company records.

The following example of Kalyan Sona wheat illustrates the costs involved in arriving at the sale price :

SALE PRICE OF KALYAN SONA WHEAT (ONE QUINTAL)

	Rs.	p.
1. Cost of procurement of one quintal of Kalyan Sona wheat	125	00
2. Storage costs @ Rs. 50 per quintal per month for 5 months	2	50
3. Transportation from procurement centre to dealer	16	00
4. Interest for 6 months @ 10 per cent	6	25
5. Loss in storage (2 per cent on an average)	2	50
6. Administrative overheads @ 5 per cent	6	25
7. Advertisement @ 1/2 per cent	0	67
8. Dealer commission/sales expenditure (Range 10 per cent to 15 per cent —Average 12½ per cent over sale price)	25	00
9. Return to capital @ 10 per cent	12	50
Total ..	196	67

Prevailing sale price Rs. 200 per quintal.

Source : National Seeds Corporation Marketing Division.

Conclusions

1. Much effort should be devoted to cut down costs at various stages of seed production, processing, storage and distribution.
2. There is considerable scope for research on the methods of pricing, by compiling accurate data over a period of time with reference to storage losses, administrative overhead and selling costs to fix a norm for a fair return for further development of the seed industry.
3. A realistic price policy will accelerate the growth of the seed industry and make available sufficient quantities of high quality seed to the maximum number of farmers at competitive prices at the right time and right place.