

AGRO-PROCESSING INDUSTRIES: POTENTIAL,
CONSTRAINTS AND TASK AHEAD

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**AGRO-PROCESSING INDUSTRIES:
POTENTIAL, CONSTRAINTS AND TASK AHEAD ***

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An agro-industry is an enterprise that processes bio-mass, i.e. agricultural raw materials, which include ground and tree crops as well as livestock and fisheries, to create edible or usable forms, improve storage and shelf life, create easily transportable forms, enhance nutritive value, and extract chemicals for other uses.

As the products of agro industries are both edible and non edible, the agro-industries can be classified as agro-food industries (or merely food processing industries) and agro-non-food industries.

The agro-industry provides the crucial farm-industry linkage which helps accelerate agricultural development by creating backward linkages (supply of credit, inputs and other production enhancement services) and forward linkages (processing and marketing), adding value to the farmer's produce, generating employment opportunities, and increasing the farmer's net income. This in turn motivates the farmer for better productivity and further opens up possibilities of industrial development. The

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agro-industry generates new demand on the farm sector for more and different agricultural outputs which are more suitable for processing. An agro-processing plant can open up new crop and livestock opportunities to the farmer and thus increase the farm income and employment (Austin, 1981).

Derived from the raw material processed by them, Agro Industries display unique characteristics seasonality, perishability, and variability (Srivastava, 1981). The ground and tree crops, fisheries, and livestock undergo a reproductive cycle. Therefore, agro-industries have to procure raw materials only in the season (or there are wide fluctuations in the availability between the seasons), while the processing operations continue for a longer period and the demand for the products is round the year. The raw materials processed by the agro-industries are often perishable (at least in the food processing industries), and therefore greater speed in handling, storage, and processing is required. Unlike as in the case of non-agro-industries, the raw materials obtained and processed by the agro-industries are often of varying quality.

These characteristics make the procurement sub system for raw materials the crucial determinant of the performance of these enterprises. Agro-industries are amenable and more viable to be located nearer to the source of raw material allowing a spatial distribution of industries (reducing the regional disparities in industrialization). Agro industries also have a large export potential.

This paper analyses the present situation of the agro-industry and identifies issues for discussion. The paper is divided into four parts. Part I presents the ways of assessing the available agro processing potential. Part II presents a profile of the agro processing industry and the recent trends in India. Part III analyses the constraints in acceleration of production and exports of agro-based products. Finally, Part IV sums up the analysis and presents issues for discussion.

I

POTENTIAL FOR AGRO-PROCESSING

The potential for agro-processing can be viewed in two ways: 1. The degree of processing of primary raw material, and 2. Degree of processing of all the by-products under the commodity system.

Degree of Processing

The degree of processing of various raw materials varies from cleaning and grading of apples to milling of paddy and cooking, mixing and chemical alteration that create instant and ready to eat foods (Table 1). It may be noted that as the transformation of raw materials moves from Category I to IV, the value added as well as the price of finished products also rises. For example, the shrimp exports from India have been normally in the block frozen form (after being deheaded, deviened and shelled). More recently the effort has been to export the shrimp after processing it through instant quick frozen (IQF)

Table 1

Categories of Agro-Industry by Levels of Transformation Process

I	II	III	IV
Manual-Mechanical*	Mechanical*	Mechanical-Chemical*	Chemical*
Types of Processing Activity			
Cleaning Grading	Ginning Milling Cutting Mixing	Cooking Pasteurization Canning Dehydration Freezing Weaving Extraction Assembly	Texturization Chemical alteration
Illustrative Products			
Fresh fruits Fresh vegetables Eggs	Cereal Grains Meat Spices Animal feeds Jute Cotton Lumber Rubber	Dairy products Fruits and vegetables Meats Sauces Textiles & garments Oil Furniture Sugar Beverages	Instant foods Textured vegetable Products Tyres

* This classification has been added by the author

Source : Austin, p.4

method. These exports are expected to fetch 50% to 70% higher value than in block frozen form (Srivastava, et. al. 1989). Similarly, tea exported in branded tea packets fetches additional value. By the higher degree of processing in leather is illustrated in Table 2. Subsequent secondary and tertiary processing of semi-finished leather raises the value of index to 500.

As we move from the preliminary degree of processing to the

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transformation is to be encouraged in the light of the present

Table 2:

**Theoretical Value Accrued to Hides and Skins
When Processed into Different Stages**

(Value in Rs. Crores)

	Available (1986) (Million Pieces)	Value (at Natl- onal Prices)	Value of semitan- ned leat- hers	Value of finished leathers	Value if all finished leather is converted into products	Value if 75% of the finished leather is conv- erted into products
Value addition index			(100)	(150)	(225)	(500)
Cattle hides	22	193	290	434	965	723
Buffalo hides	16	134	201	302	670	503
Goat skins	75	375	563	843	1875	1405
Sheep skins	31	1555	233	349	775	582
Total		2257	1287	1928	4285	3213

Source: K. Seshagiri Rao, "India's Leather Industry - Its Potentialities and Problems", in Srivastava and Vathsala p.243

transformation is to be encouraged in the light of the present higher degree of processing, capital investment, technological complexity and managerial requirements also go up. Therefore, it has to be examined for each commodity as to what level of transformation is to be encouraged in the light of the present status and profile of the industry, technology options available, investment required, purchasing power of the target group in the domestic market, and specification of the international markets (Srivastava, 1989).

Degree of Processing of All the By-products

The agro-industrial potential becomes manifold when the processing possibilities of the entire commodity system are taken into account (Sah and Srivastava 1985). For example, a farmer cultivates a paddy plant, and these plants produce the following : straw (about 50% by weight), husk (about 10.5% by weight), bran (about 3.5% by weight), rice kernel (about 36% by weight). A recent study (Gaikwad 1986 and Gaikwad & Gupta 1987) has indicated that with an initial investment of Rs. 2 to 3 crores, each block of 10,000 hectare under paddy crop with two paddy seasons in a year and 4 MT/ha of production has a potential of supporting a complex of processing industries (rice mills, solvent extraction plant for rice bran oil, processing of husk for a variety of products, and straw paper/board mills). This yields 107% net value added on the raw material price. Such exercises can be done for all commodity by-product systems.

Similarly in animal based products we get the following raw materials : meat, blood, bones, hides, skins, glue stock, horns

and hoofs, wool, hair, feathers, glands and casings (Mann, 1978; Bhat, Menon and Srivastava, 1989). Processing of all these raw materials opens up large value addition possibilities. In remote rural areas, the farmer have been been able to recover only hides and skins, and the opportunity for processing of other by-products is lost.

By-products influence the price of meat (main product) and the price paid to the producer for the livestock depending upon the extent of utilization of all the potential. For example, 150 deep sea trawlers at Vishakapatnam throw 1,30,000 tonnes of fish back into sea (Srivastava, et.al., 1989). for economic reasons. The fish hold of trawler is 40 tonnes. The ratio of fish prices to prawn prices is 4 : 50 to 60. Therefore, every trawler prefers to keep the hold empty for prawn catches, except for the fish caught in the last fish haul on the return trip. Prawns catch is not more than 10 tonnes. Had this fish caught been brought to shore and processed into edible products like fish keema, sausages, fish cutlets, and fish balls high value products could have been produced and the overall value added from the activity would have gone up substantially. Technology exists at least on pilot scale to achieve the high value product. (Govindan, 1985, Srivastava et al. 1989).

II

AGRO-PROCESSING INDUSTRIES PROFILE AND RECENT TREND IN INDIA:

Profile:

In India substantial portion of net value added from THE

agro-industry is derived from unregistered and cottage scale units. Only 42.6% of value added, as shown in Table 3, was derived by the registered units in 1986-87. Between 1970-71 and 1986-87, the percentage share of unregistered units in value added has gone up from 47.8 to 57.4. This is contrary to the usual observations on the process of industrialization.

Table 3

**Net Value Addition from
Registered and Unregistered Units**

Years	Percentage Share of Net Value from	
	Registered Units	Unregistered Units
1970-71	52.2	47.8
1980-81	49.9	50.1
1984-85	51.3	48.7
1985-86	42.7	55.3
1986-87	42.6	57.4

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Note: These units includes commodities like food products, beverages, tobacco and tobacco products, textiles, wood and wood products - furniture and fixtures, paper and paper products and leather and leather and fur products.

Source: Central Statistical Organisation National Accounts Statistics - 1980-81 to 1986-87, New Delhi, 1989.

For example, agro food processing industries in the cottage and unorganized sector include 79,000 rice hullers, 2,66,000 flour chakkis, 10,000 dal mills, 2,20,000 oil mills, 50,000 bakeries, 5,000 pasta goods units, 15,000 traditional food units, and 2,000 poha making units. In all these cases, 88% to 90% of the total value added comes from only primary processing. Secondary and tertiary processing account for only a very small portion of the net value added (GOI, Ministry of Food Processing Industries Documents).

As shown by the Annual Survey of Industries 1985-86, agro processing units accounts for 39% of all factories, 12% of all fixed capital, 23% of working capital, and 15% of the total capital employed in the industry in the organized sector. This 15% of capital investment generates 36% of total employment, 26% of output, and 21% of net value added (Table 4).

The fixed capital investment per factory is only Rs.18 lakhs in the total agro-based industries as compared to the average fixed capital investment of Rs.86 lakhs per factory in the non-agro-based industries (Table 5). This indicates that bulk of the units in the agro-processing sector are very small and that they were set up mainly for primary product processing.

Other observations on the profile of agro industries visa-vis non agro industries are as follows :

1. The working capital as a percentage of the total capital employed is about 48 in agro industries as compared to about 28 non-agro-industries.
2. The ratio of fixed capital to net value added is 1.4 for the total agro based industries as compared to 2.9 for non agro industries.
3. Capital-labour ratio is only 0.25 in the total agro-based industries as compared to 1.1 in the non agro industries indicating the labour intensive character of the agro-based industries.
4. Capital productivity of agro based industries is almost double (0.7) that of non-agro-based industries (0.35).
5. Labour productivity in agro based industries is less than half of the labour productivity in non agro based industries.
6. However, the share of total emoluments in the value added is 57% in agro-based industries as compared to only 45% in case of non-agro-based industries.
7. The ratio of net value added to total output is only marginally lower than that of the non-agro-based industries.

Table 4. Key Variable of Agro Industry in Relation to Total Industry

Description	No. of Factories (Number)	Fixed Capital (Rs. lakh)	Working Capital (Rs. lakh)	Invested Capital (Rs. lakh)	Total Persons Employed (Number)	Total Emolu ment (Rs. lakh)	Total Inputs (Rs. lakh)	Value of Output (Rs. lakh)	Net Value Added (Rs. lakh)
	N	FC	WC	K	L	EML	I	O	NVA
1. Agro Food Industries	18179	236568	2855462	521930	1025424	79223	1172811	1581136	194301
2. Agro Non-Food Industries	21258	462414	351661	814075	1739516	199683	1185339	1567770	297964
3. Total Agro-Industries	39437	698882	637123	1336005	2764940	278906	2358150	3148906	492265
4. Non Agro-Industries	61579	530642	2165534	7475176	4819067	829207	6890689	8866634	1834382
5 Total Industries	101016	6008524	2802657	8811181	7584007	1108113	9248839	12015540	2326647
6. % Agro Food Industries to total Industry	18.00	3.94	10.19	5.92	13.52	7.15	12.68	13.16	8.35
7. % Agro Non-Food Industries to Total Industry	21.04	7.7	12.55	9.24	22.94	18.02	12.82	13.05	12.81
8. % Total Agro-Industries to Total Industry	39.04	11.63	22.73	15.16	36.46	25.17	25.50	26.21	21.16

Note: 1. It includes manufacture of food products (200 to 219) and manufacture of beverages (220 to 224)

2. It includes manufacture of cotton textiles (230 - 231), wool, silk and synthetic fibre textiles (240, 241 & 249), jute, hemp and mesh. textiles (250-253 & 259), wood and wood products (furniture and fixtures, paper and paper products (280-283), leather and leather products, and rubber and rubber products (300 - 302)

Source : GOI, Central Statistical Organisation Annual Survey of Industries - 1985-86.

Table 5

Key Structural and Technical Ratios of Agro Industries

Code No	Description of Industry	Fixed Capital per Factory Rs.Lakh	% of Working Capital to invested Capital	Fixed Capital /Net Value Added	Capital Labour Ratio	Capital Productivity	Labour Productivity	Share of Emoluments in Value Added	Net Value Added to Total Output
		FC/N		FC/NVA	FC/L	NVA/Y	NVA/L	EML/NVA	NVA/O
A									
20-21	Total Agro-Based Food Industries	13.006	54.69	1.217	0.230	0.821	0.1894	0.4077	0.122868
B									
23 to 30	Total Agro-Based Non-Food Industries	21.752	43.19	1.551	0.265	0.644	0.1712	0.6701	0.190055
A + B	Total Agro-Based Industries	17.721	47.68	1.419	0.252	0.704	0.1780	0.5665	0.156328
C	Non Agro Industries	86.224	28.96	2.894	1.101	0.345	0.3806	0.4520	0.206885
A + B + C	Total Industries	59.480	31.80	2.582	0.792	0.387	0.3067	0.4762	0.193636

* As per the details explained in the footnote of table 4.

Source : GOI, Central Statistical Organisation, "Annual Survey of Industries - 1985-86".

The agro-industries at present have been contributing between 35% and 40% of total exports (Table 6). Bulk of the exports are still accounted for by primary commodities. For example, 50% of leather exports are in the form of semi-finished leather, instead of value added products. Similar is the case of various products from agro based food commodities as well as agro-based-non-food commodities. As in almost all commodities, there is a supply constraint after meeting the needs of domestic market, the emphasis has to be placed on larger unit value realization by exporting value added, branded, and packaged products.

Recent Trends

The process of agro-based industrialization is already on in this country in response to increasing demand for various agro based products for direct consumption, industrial use, and export. There is already a shift from the early mechanical engineering based agro-industries to chemical based industries. For example, in addition to traditional agro-industries (rice mills, sugar mills, cotton ginning, spinning and weaving factories, jute factories, oil mills, etc.) in recent years many new agro industries have been established plants for solvent extraction for oilseeds, modern dairies for producing bottled milk, butter, cheese, chocolate, milk powder, etc., factories for producing a variety of paper and boards from paddy straw, baggasse, banana stems for producing alcohol, acetone, acetic acid and other chemicals from molasses and cassava, for producing medicines from medicinal plants, roots and tubers, for

producing starch, glucose and variety of products from maize and cassava, for fruit and vegetable products, fish and meat products, wines for export and man-made fibres from forest plantations. Fresh water, coastal, and deep sea fishery industries are getting increased attention (Gaikwad, 1986, pp 65-66).

Table 6

Export of Agro-based Commodities from India

(Value Rs. Crore)			
Exports of Agro-Based Industries			
Commodities	1985-86	1986-87	1987-88
Total Agro-based Exports	4308.8	4943.87	5511.80
Total Exports	10894.6	12452.40	15741.20
% of Agro based Exports to Total Export	39.5%	39.7%	35.0%

Source:- Government of India, Economic Survey 1988-89.
Monthly statistics of Foreign Trade of India Vol. I
March 1984, 1985, 1986 & 1987.

Note : Total Agro-based commodities include agro-based-food commodities (Coffee, Tea, Cashew, Kernals, Spices, Sugar and Molasses, Rice, Fish and Fish Preparations, Meat and Meat Products, Fruits and Vegetables and Others) and Agro-non-food commodities (Oil Cakes, Tobacco, Raw Cotton, Cotton Yarn and Fabrics, Coir Yarn and Jute manufacturers, Leather and Leather Products, Natural Silk and Wool and Woolen textiles).

During last six years, there has been a significant increase in investment in plant and machinery for mechanized and highly automated production of pasta products: instant noodles, vermicelli, and ready to fry snacks. These products have been backed by intensive advertising and promotion. Similarly some major investments are in process in fruit and vegetable industries, biscuits and confectionary industries, and other

snack foods. Some major investments have been made even in setting up of integrated paddy-rice processing complexes.

The trends in the growth of agro-processing can be summed up as follows:

1. By-product processing of major agricultural commodities has opened up the vast potential of agro-industrial growth in rural areas in recent years.
2. The degree of processing has been considerably intensified and modernized by the growth of processed food industry which is based on cooking, mixing, and chemical alteration producing a textured vegetable food.
3. The development of agro processing industries has attracted higher capital investments, enhanced technological complexities, and managerial requirements. Many companies have also found the agro-processing and processed food, as lucrative avenues for diversification.

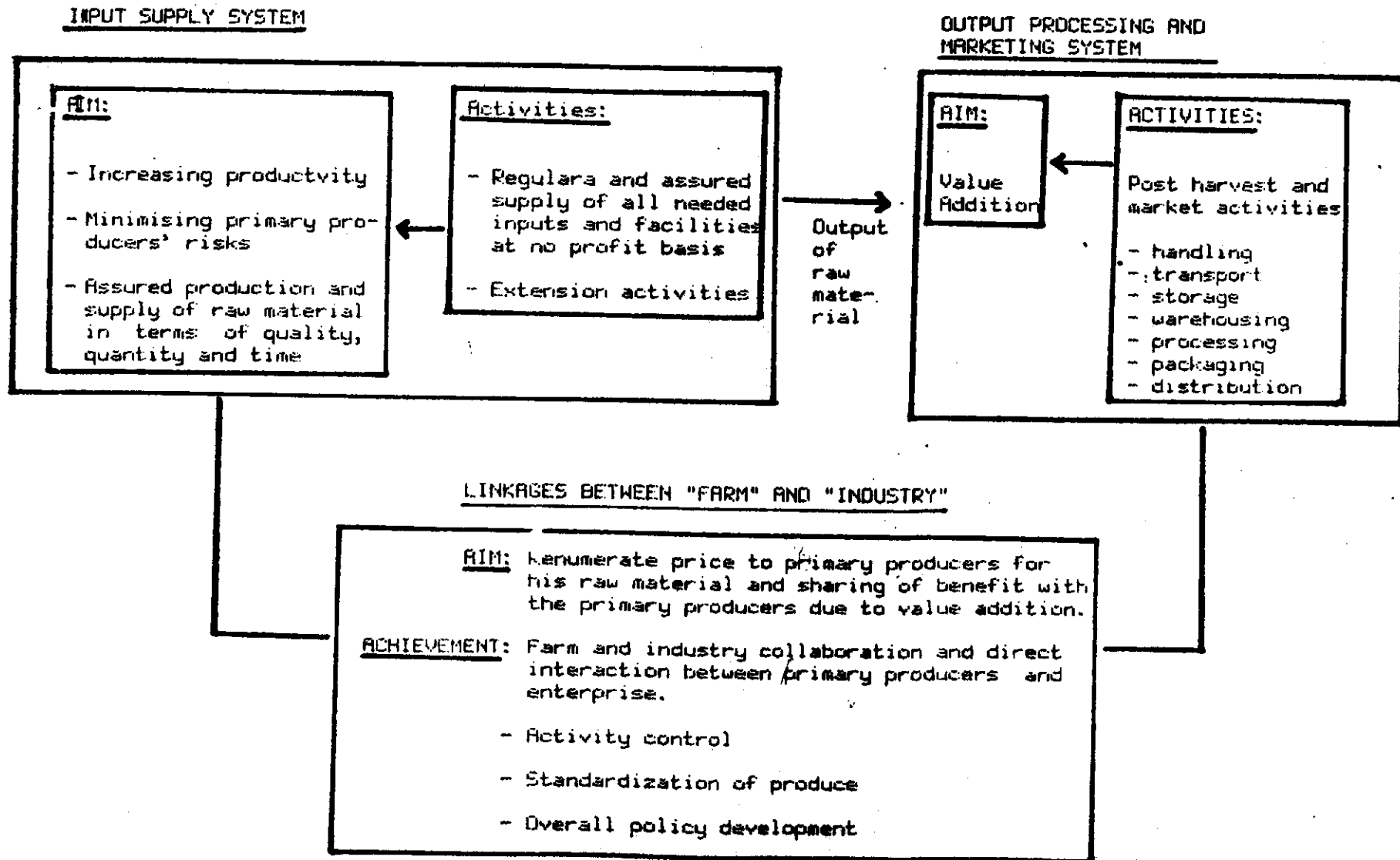
In agro based non-food sector more investments have been made to improve the product designs and product diversification into more value added products. It is this trend of converting the potential of processing of main products as well as by products which has to be accelerated in future years (Srivastava and S. Vathsala, 1989).

III

CONSTRAINTS IN ACCELERATION OF PRODUCTION AND EXPORTS OF AGRO BASED PRODUCTS

The constraints on acceleration of production for domestic market or exports can be identified from the systems framework right from the input supply to farmers and production of raw materials to output processing and marketing (Figure 1).

FIGURE 18. CONCEPT OF A SYSTEM



The input supply and production system exercises the major constraint on processing and marketing of products (Kulkarni and Srivastava, 1985). Similarly the functioning of the processing system and the policy environment also exercises a restrictive influence on the development of markets (both domestic and international) for the value added and processed agro-based products.

Constraints of Raw Material Supply

In India one of the major problems in agro processing is the inadequacy and suitability of raw materials. The yields per hectare are much lower than the world average. Thirty per cent of our fruits and vegetables are getting lost in the process of handling and marketing. At the same time there is under-utilization of the existing capacity.

Recently Chadha (1989) has observed the following constraints on the fruit and vegetable processing industries: 1. non availability or paucity of processing varieties of fruits and vegetables, 2. short periods of raw material availability, and 3. excessive costs of raw material.

Another estimate recently illustrated the situation as follows: If we consider an increase in yield of only 50% (as against the order of magnitude of increases possible), it would lead to 1) a minimum gross value of output of Rs. 12,000/ha (four times the average gross value of output in agriculture), 2) a minimum net income of Rs.3,000/ha (four times the average in agriculture), and 3) a minimum employment of 500 mandays/ha

(three times that in agriculture) (Prahlad in Srivastava and Vathsala, 1989).

The above situation obtains despite the fact that only 1.5% of the fruits and vegetables are being processed in India. Similar situation obtains even in agro-based-non-food commodities. For example, CLRI survey made the following two observations on the availability of raw materials:

1. Annually India is losing 9 million hides and 9 million skins together valued at Rs.35 crores due to non-recovery for a host of reasons.
- 2) If all the carcasses available in the country are recovered and converted into economic products, the additional value would be Rs.584 crores. (Seshagiri Rao in Srivastava and Vathsala (Eds.), 1989).

These observations indicate the need for the industry to develop appropriate linkages with primary producers for productivity enhancement and increased availability of raw materials. Johl (1989) observed:

1. To produce quality processed products at low cost, processing plants should produce/acquire seeds of appropriate varieties, distribute these seeds to the producers themselves and enter into definitive contracts with the farmers for buying the produce at remunerative/competitive/incentive prices.
2. Producers should be helped by the processing plants in respect of input supplies, extension of modern production technology and quality control.

Constraints on Processing and Marketing

The constraints in processing and marketing relate to technology, market development, and financial aspects.

Technology : As substantial portion of production takes place in cottage and small sector, the technology is often obsolete

(Srivastava, Paper presented at NABARD Seminar, 1989) and gives sub-optimal yields, energy over utilization, lack of scale economies in production, and increased marketing costs (GOI, Ministry of Food Processing Industries Documents). For example, there is a difference of at least 4% yields of rice between hullers and modern rice mills. In livestock products, slaughter houses are extremely obsolete, unhygienic, and unequipped for recovering the by-products. As the units are very small, they have very little surplus in modern equipment to make high quality products and processing of by-products for exports. The new technologies available have been designed to increase the recoveries through such processes as a reverse osmosis, counter current extraction, etc. Investment is required in balancing equipment and improved technology at several key stages in agro food processing industries -sterilising, concentration, and packaging. In exports, international standards are very exacting, particularly where mixing, homogenizing, deacidifying, and pasteurisation are involved. Perhaps, ways have to be found to integrate (by various processes of mergers, amalgamation, etc.) smaller units with larger and more modern units where smaller units can supply intermediate products for final conversion into end-products. Also, more and more integrated agro-processing complexes need to be encouraged which can serve as an anchor for forging forward and backward linkages. This question assumes special significance in the context of our exports to unified Europe after 1992. The kind of technology and product sophistication required may come from larger companies (Magee, 1989).

Marketing: Value added products from intensive processing require larger expenditure on market development. This problem is further compounded because processed and packaged products in India become extremely expensive. Normally it is expected that the cost of processed products must be such that these can be sold at the lower prices than those of the fresh corresponding products at least in the off /lean seasons. Therefore, a large number of units have to be enabled to join together to promote the products. Packaging material manufacturers, for example, do not cater to small orders from such units or charge higher prices than for larger units because of scale. If the SSI and cottage scale units have to keep large inventory of packaging materials, the cost of packaging, which is already high, will further go upon (Srivastava, et al., India Fisheries Sector Study, 1989; APEDA, 1989)

Financial and Fiscal Constraints: The fixed capital per factory is relatively very small but the working capital is substantially larger for agro-industries than for non-agro-industries. Therefore, agro-industrial units not only require term capital for modernization and rehabilitation but also face a higher rate of interest on working capital from commercial banks.

Therefore, the working capital needs, both in terms of cost as well as margin money (for core working capital), will have to be looked at differently than for non-agro industries. An analysis of sick units in agro-processing sector indicates that in a large number of cases, cost and management of working

capital has really brought the sickness.

In India, the processed/packaged food products have been considered luxury items, and therefore, they have been subjected to high tax incidence at various stages of processing. Various studies (GOI, Ministry of Food Processing Industries Documents, 1989) have shown that the incidence of taxes amounts to 30% to 60% of ex-factory cost. The taxes and the packaging cost together constitute the bulk of the price of processed products. For illustration, the element of taxes in green peas and tomatoes are indicated in Table 7.

Table 7

Cost Components in Whole sale Prices

Sr. No.	Cost Items	Green Peas		Tomato	
		Post Mod- vat-Situ	Complete Exemption of all taxes	Post Mod- vat-Situ	Complete Exemption of all taxes
1	Raw Material	43.25	43.25	23.27	22.89
2	Processing Charges Breakage Loss	20.16	20.16	11.12	11.10
3	Packaging	96.07	62.00	21.39	20.52
	Total	159.48	125.41	55.78	54.51
1	Interest 15%	11.96	9.41	2.51	2.45
2	Selling Expenditure	25.72	20.23	8.75	8.52
3	Excise on Finished Product	19.72	-	6.71	-
4	CST 4 %	8.67	-	2.95	-
	Total	225.55	155.05	76.70	65.48
1	Average Freight	12.00	12.00	4.00	4.00
2	Token Duty	19.00	-	6.46	-
3	GST 6%	20.52	-	6.96	-
	Wholesale Price of Manufacture	277.07	167.05*	94.12	69.48*

Source: GOI, "Working Group on Food Processing and Post Harvest Technology for VIII Five Year Plan" Draft Report, p 48.
* Element of tax is 40% + Element of tax is 27%

The processed products, therefore, have to be made cheaper so that they acquire a large consumption base in the domestic market. Taxation policies on processed products and custom duties on plant and machinery need to be thoroughly examined (GOI, Ministry of Food Processing Industries Documents, 1989).

IV

ISSUES FOR DISCUSSION

In the initial stages of growth Agro-processing is confined only to primary processing of main product and value addition from secondary and tertiary processing of all the by-products has only a small contribution in value addition. With the development, availability of technology and opening up of markets, by-products processing becomes much larger component to the value addition, generation of employment, and net incomes of the producers as well as processors.

There is an immense potential for accelerating the agro-processing for domestic as well as export markets (B. R. Shah in Srivastava and S. Vathsala (Eds.), 1989). But this potential will be realised only by strengthening the backward linkage for increasing the yields of crops and livestock, supporting investments in more recent technologies and balancing equipment, streamlining the tax structure on finished products, and developing the market for processed and value added products.

The following major issues, therefore, need to be discussed

1. In view of this, World Bank has recently initiated comprehensive Sector Studies on the following to identify project ideas for India: i) Fisheries; ii) Edible Oils; iii) Fruits and Vegetables; iv) Sericulture; v) Meat and Meat Products; vi) Leather; vii) Packaging.

and researched.

1. **Organizational Patterns for Agro-Processing:** At the primary processing stage where raw material accounts for the bulk of cost, the farmer's interests have to be safeguarded. Thus in all such agro-processing enterprises (whether in private, public, or cooperative sector), this appropriate backward linkage has to be encouraged and nurtured (even at times of falling prices). In view of this, cooperative agro-processing complexes acquire special significance. The farmer's processing enterprises have been observed to provide adequate incentives for increasing production. In higher levels of processing and processing of some of the by-products, where the weightage of the raw material is smaller, perhaps this question is not very important.
2. **R & D Inputs and Technology Upgradation:** Large number of units require technology upgradation. But adequate level of technology and balancing equipment is not always available, it is necessary to further liberalise the import of technology in selected areas, particularly packaging and machinery for food processing. Policy issues on import of technology, its adaption, and indigenization need to be discussed. Preferential treatment to the developments of packaging industry also needs to be given attention.
3. **Market Development:** As the trend for producing and exporting more value added products accelerates it will be necessary to promote and establish Indian brands in national as well as international markets. Several successful efforts have already been made by agro-based units. The recent effort of the Tea Board to promote Darjeeling tea and tea bags is one such example. The Marine Export Development Authority has also taken up the promotion of products for direct consumer sale in the importing countries. Therefore, the role of various export promotion agencies in developing international markets need to be examined (Jasol, 1989).
4. **Need for Concessional Finance and Larger Margin Money for Working Capital:** As the units are small, cost of term capital is higher and also working capital has to be raised from commercial banks at 18% rate of interest. More liberal financial assistance needs to be devised for accelerating production of agro-based products.
5. **Tax Incidence:** With the creation of a separate Ministry of Food Processing Industries, the need for acceleration for agro food industries has been recognized. It is in this context that the high tax incidence on processing food products and their adverse effect on market development has to be discussed.
6. **Linkage of Agro-industry with Planning for Agro-climatic Regions:** The Planning Commission has demarketed 15 Agro-climatic regions: Western Himalayan region, Eastern Himalayan region, Lower Gangetic region, Middle Gangetic Plain region,

region, Lower Gangetic region, Middle Gangetic Plain region, Upper Gangetic Plain region, Trans-Gangetic Plain region, Eastern Plateau and Hill region, Central Plateau Hill region, Western Plateau and Hill region, Southern Plateau and Hills, East Coast Plain and Hill region, West Coast Plain and Ghat region, Gujarat Plain and Hill region, Western Dry region and Island region. The question to be discussed is as to how a linkage of agro-processing activities is to be brought about with the crop and livestock specializations. Location and capacities will have to be linked with economic zones and emerging urban demand centres.

7. **Strengthening of the Data Base:** As the bulk of the units are in cottage and small scale sector, the data base on their working is not very strong. There is large time lag in the availability of even limited data. For the organized sector, the Annual Survey of Industries is a very important and comprehensive source; but here again is the time lag in the publication of data and sometimes the data is not made available by the units surveyed. Therefore, the ways of upgrading the data base and putting all the available information for policy and planning purposes without any timelag need to be examined.

8. **Need for Further Research:** As the bulk of the units in agro processing sector are small and data base very weak, it is necessary to prepare comprehensive case studies of selected units in each major subsector so that the problems at what is called the cutting edge level are understood and recommendations for policy formulation can be made. In this context, there is also a need for comprehensive industry studies for various agro-based subsectors. These studies also should make inter-firm comparison within the industry. We should also examine the possible of networking of various institutions involved in the study of agro processing sector.

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