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Value Chain Analysis and Financial Viability of Agro-Processing Industries in Himachal Pradesh

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Abstract

The paper has studied the structure and extent of value addition in different agro-processing units in Himachal Pradesh. It has also examined the financial viability of agro-processing industries in the state. The break-even analysis has shown enough leverage for processing units to stay in the business even at low capacity utilization. The extent of value addition has been about 53 per cent in the processing sector. The maximum value addition has been observed in fruits/vegetable processing (133%), followed by bakery and confectionery units. The financial viability ratios computed from financial accounts have revealed high current ratio but lower quick ratio (acid test) in most of the processing industries, showing that many industries have substantial unsold inventories. However, financial ratios have been found more favourable in case of small units as compared to large units. A direct relationship has been found between size of the firm and number of its backward and forward linkages. An average processing industry has 85 backward linkages and 123 forward linkages. It is found that geographical concentration of the processing industries in the state is influenced more by demand rather than supply factors. The suggestions and recommendations emerging from the investigation include policy thrust and emphasis on developing industrial areas in raw material producing regions, thrust on small-scale industries for self-employment in micro enterprises in rural areas, promotion of supporting and subsidiary (intermediate) industries to diversify value addition activities, cost effective and adequate supply of raw material by strengthening direct linkages through suitable contract farming models, liberal credit policy to modernize processing units and encouraging formation of small industries consortia or associations for collective marketing and sales promotion.

Introduction

In India, agro-processing is regarded as the 'sunrise sector' of the economy in view of its large potential for growth and socio-economic impacts on employment, income generation and exports (Grover *et al.*, 1996). There are various multiplier effects of agro-processing industry such as spread of industrialization in rural areas leading to more livelihood options to teeming millions, nutritional supplements, stable prices of agricultural commodities and many other effects due to backward and forward linkages. The economic prosperity of rural farmers in particular was achievable only with an

effective integration and synergy between agriculture and agro-based industries (Tripathi, 2006). But, it is disheartening to note that despite large and diversified agricultural base, commercial processing in India is quite low (Sidhu, 2005). As such, agricultural development may not go very far unless there is development of agro-based industries not only to take up surplus labour force from agriculture but also to provide a solid technical base to modernize agriculture. Agricultural transformation through creation of backward and forward linkages with industry is a recently emerging phenomenon (Chengappa, 2004). Therefore, development of agriculture and agro-based industries should go hand in hand. This is perhaps the most critical factor that our planners and policy makers have ignored

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in the past and the major reason why over the last six consecutive decennial censuses, the burden of workforce down the ladder in primary sector has not diminished despite continuously declining share of this sector, which presently stands as low as 16 per cent in the gross domestic products (GDP) of the country. This clearly shows lopsided development wherein changes in sectoral output composition have not led to the proportionate changes in structure and occupation of workforce. Consequently, the disparity between per worker income in agricultural vis-à-vis non-agricultural sector has widened over the years. This can be clearly verified from the output growth in industrial sector to the tune of 8-10 per cent in juxtaposition to 2-3 per cent annual growth in agriculture. Therefore, rapid growth of agro-processing industry close to agricultural production centres can bring about the desirable shift in employment structure without moving people from rural to urban areas (Jairath, 1996).

The small-scale industries need to be promoted besides medium and large industries and they need to improve efficiency and quality by upgrading skills, better product design, more efficient use of materials and improve marketing organizations. These are areas where state assistance can make a significant positive contribution towards development of agro-processing (Vaidyanathan, 2003). In this backdrop, it was considered pertinent to examine the performance of agro-processing industries in Himachal Pradesh, where the Govt. of India provided fiscal incentives for 5 years commencing from March 2003 to promote industrial development in the state. In the hindsight of promotional packages and incentives given by the central and state governments, the agro-processing sector has started making discernible progress. This study is the outcome of a project funded by ICAR in 2006 (completed in 2008-09) to evaluate the structure and performance of agro-processing sector in Himachal Pradesh. The specific objectives of the study were:

- (i) To study the structure, capital investment and extent of value addition in various types/sizes of agro-processing units in Himachal Pradesh, and
- (ii) To examine the financial efficiency/viability of different categories of commodity specific agro-processing units in the state as well as the extent of backward and forward linkages and the factors determining the establishment of agro-processing industries.

Data and Methodology

The present investigation has been carried out in Himachal Pradesh where there are about 9,000 tiny/small and medium sizes of agro-processing units for processing of fruits, vegetables, cereals, pulses, oilseeds, animal products, herbal/medicinal oils/products and a variety of ancillary agricultural commodities. As per the State Industrial Policy Guidelines, 1999, the state has been divided into two regions, viz. industrially developing area and industrially backward area. Two-stage stratified sampling design was followed to select the districts and processing units. In the first stage of sampling, three districts each from the backward and developing regions were selected. In region I (backward area) Kangra, Mandi and Kullu districts were included, while in region-II (developing area) Sirmaur, Solan and Una districts were included. The complete list of agro-processing units in the industrially developing and industrially backward districts was obtained from the State Directorate of Industries and District Industrial Centres (DICs). These units were grouped into different categories on the basis of commodity specific agro-processing as: cereals-based (flour mills, rice mills, bakery), pulses/confectionary units, fruits and vegetables-based, oilseeds-based, spices and condiments, and miscellaneous units processing variety of herbal/medicinal products. In the second stage of sampling, a sample of 200 (one unit closed down during survey and was rejected) agro-processing units of different types was selected randomly from each selected district through proportional allocation method (Table 1).

The primary data on different aspects of agro processing were collected from the selected processing units through survey method for the year 2006-07. The primary data comprised information on size, type, location, installed capacity and utilization, capital investments, labour employment, sources of raw material and supply mechanism, cost of processing, value addition, marketing of processed products, quality aspects, sales turnover, financial accounts, profits, equity position and general constraints. Different sets of data were classified and tabulated for carrying out detailed analysis. Tabular analysis was extensively used in the study to workout ratios, averages, and indices to derive different parameters of performance of agro-processing sector.

Table 1. Location and type of sample agro-processing units in Himachal Pradesh

Processing units	Location		Type of unit		Total
	Rural	Urban	Single	Composite	
	(Number)				
<i>Atta chakki</i>	45	18	27	36	63
Flour mill	11	13	21	3	24
Ricemill	7	1	5	3	8
Bakery	13	22	35	-	35
Pulses-based	5	3	8	-	8
Vegetable/Fruit-based	11	3	14	-	14
Oilseed-based	4	7	6	5	11
Spices/condiments	18	11	26	3	29
Miscellaneous	6	1	7	-	7
All units	120	79	149	50	199

Note: Single or specialized having processing of only one product or its derivatives

Composite units having two or more types of plants under single management and processing different commodities/products using different raw materials.

Results and Discussion

Status of Processing Sector in Himachal Pradesh

The industrial development in Himachal Pradesh has been quite slow and the state has been clubbed among the industrially backward states of the country. In view of this, the central government had extended some fiscal reliefs to Himachal Pradesh from March 2003 to March 2007 to promote industrial development in general and agro-processing in particular. To reap the benefits of fiscal incentives and to promote industrial development, the state government has identified certain industrial areas and industrial estates in different districts to attract the entrepreneurs to invest in the state. During 2008-09, there were 38 such industrial areas/estates across different districts where adequate infrastructure is being developed and special emphasis is being given to develop agro-processing sector in the state.

The classification of agro-processing units has been depicted in Table 2. It is observed from Table 2 that most of the processing units were cereal-based, followed by livestock-based and oilseed-based. There were only 163 fruits and vegetable based processing units. This clearly shows the slow expansion of fruit and vegetable processing industry, despite the fact that Himachal Pradesh is the leading producer of fruits (apples) and off-season vegetables in the country. This also disproves our assertion and hypothesis that

Table 2. Commodity-wise classification of agro-processing units in Himachal Pradesh: 2004-05

Processing units	Number	Per cent
Cereals-based	7019	55.92
Pulses-based	76	0.61
Oilseed-based	1107	8.82
Vegetables & Fruit-based	163	1.3
Livestock-based	1740	13.86
Spices/condiments	186	1.48
Miscellaneous	2261	17.65
Total	12552	100

processing industries expanded nearer to the potential source/ supply of raw material.

Investment Pattern

The total capital investment under different types of agro-processing units has been depicted in Table 3. The total capital investment was highest in case of flour mills (Rs 85.15 lakh) followed by rice mills (Rs 66.19 lakh) and fruit/ vegetable processing units (Rs 66.11 lakh). The share of land and building structures was substantial in all the units that accounted for about 65 per cent in case of flour mill and rice mill, and 50 per cent in fruit/ vegetable units. In the case of small *atta chakki* and bakery units, the share of investment on building structures was to the extent of 70-80 per cent. A similar pattern was visible in the case of oilseeds and spices/ condiments processing units.

Table 3. Capital investment under different types of agro-processing units in Himachal Pradesh

Particulars	(Rs/unit)		
	Land and buildings	Plant/machinery	Total
<i>Atta chakki</i>	434443	100057	534500
Flour mill	5508059	3007000	8515059
Rice mill	4290458	2328748	6619206
Bakery	712225	269604	981829
Pulses-based	691626	603563	1295189
Vegetable/Fruit-based	3322950	3287932	6610882
Oilseed-based	1802473	599845	2402318
Spices/condiments	975400	428602	1404002
Overall average	1455467	857396	2312863

Capacity Utilization and Break-even Analysis

The extent of capacity utilization under different types of processing units is depicted in Table 4.

A perusal of Table 4 revealed wide variations across installed capacity, extent of capacity utilization and break-even level of outputs (Tripathy, 2006). The lowest capacity utilization was found in case of oilseed-based processing units, meeting merely about 30 per cent of the plant capacity. Similarly, in the case of *atta chakki*, the capacity utilization was quite low (39%). It was found that inadequate supply of raw material was the major factor for low capacity utilization. The oilseed processing units were also finding it difficult to run the units from local supplies and were forced to purchase raw material from other states at higher prices. The bakery units in the state were also running

at low capacity (41%) for which lack of demand was found to be the major reason. The overall capacity utilization in agro-processing industry in the state came out to be about 53 per cent. Thus, it can be inferred that there was under capacity utilization in almost all types of processing industries in the state. It was mainly due to lack of adequate supplies of raw material as well as bottlenecks in market penetration and marketing strategies to woo the consumers.

The break-even analysis revealed that *atta chakki* (processing) should process a minimum quantity of 919 quintals per year, only at this level of plant capacity the unit would be able to cover both variable and fixed costs of processing. Most of the *atta chakkies* in the state were running into loss due to low capacity utilization. However, service units were found viable even at very low level of capacity utilization because of very low fixed cost as well as recurring cost. The flour mills in the state were found quite viable as the break-even output was estimated at 11,878 q/ unit, which was merely 10 per cent of the installed capacity. Therefore, even if some quota of wheat grains was withdrawn and allocated to small flour mills, there would be no major impact on economic performance of flour mills, while many small flour mills might become economically viable in the state. However, for rice mill the break-even output was estimated at 9,104 q/ unit (42% capacity utilization) and given the low production of paddy in the state, the rice mills might face the problem of viability if purchase of paddy from other states was not made to meet the installed capacity. Fortunately, the rice mills were able to procure

Table 4. Installed capacity, utilization and break-even production under different agro-processing units in Himachal Pradesh

Processing units	Installed capacity	Capacity utilization	Per cent utilization	(q/unit)	
				Break-even point	Per cent to installed capacity
<i>Atta chakki</i>	1912.99	751.87	39.30	919	48.05
Flour mill	117686.74	63231.75	53.73	11878	10.09
Rice mill	21703.25	12598.23	58.05	9104	41.95
Bakery	1323.70	538.66	40.69	101	7.63
Pulses-based	1000.50	770.15	76.98	203	20.31
Vegetable/Fruits-based	4394.29	2941.45	66.94	899	20.47
Oilseed-based	5743.64	1697.04	29.55	719	12.51
Spices/condiments	2031.89	1277.50	62.87	42	2.08
Average	16494.32	8723.69	52.89	-	-

substantial quantity of paddy from the neighbouring states (Punjab and Haryana) and selling rice in states like J&K and Uttrakhand.

In spite of stiff competition, the bakery units had a convincing leverage as the break-even output was just 101 q/ unit (7-8% of the installed capacity). The pulses-based units should acquire the minimum capacity utilization of about 20 per cent (203 q/ unit). Similarly, the fruits and vegetable processing units should also operate at or above 20 per cent of the total installed capacity. The break-even output of average oilseed processing unit came out to be just 12.5 per cent, while that of spices/ condiments processing units, it was just 2 per cent mainly due to high prices in the market.

Processing and Value Addition

The extent of value addition was found to vary from industry to industry and product to product, depending upon the nature/ brand of raw material, technology, packaging requirement and extent & magnitude of selling and distribution expenses involved. The extent of value addition under different types of processing industries was estimated and is shown in Table 5. It can be observed that *atta chakki* (processing) used the total inputs worth Rs 7,97,182 and produced processed output value totalling to Rs 10,84,921, resulting in the net value addition of 36 per cent over input cost. The large flour mill, on the other hand, enhanced value by about 31 per cent. In the case of rice mill, 13 per cent value addition was made with

rice milling. The value addition was quite high in bakeries (99%), pulses (89%), vegetables and fruit-based processing industries (133%).

Financial Performance

As shown in Table 6, the total business turnover in the case of average *atta chakki* (processing and service) was estimated at Rs 2,66,935, yielding a gross profit and net worth of Rs 83,467 and Rs 44,948 per unit. As mentioned earlier, the *atta chakki* (processing) incurred losses but service unit was earning profit. The proportion of non-profit making units was higher in rice mills (38%) and *atta chakkies* (29%). The flour mill on the contrary had a substantial annual turnover of Rs 5,12,91,677 and a gross profit margin of Rs 80,13,733 per unit. In the case of rice mill, the total business turnover was estimated at Rs 1,17,01,075 and the gross profit margin per unit was estimated at Rs 6,54,172.

The bakery units were relatively small with annual business turnover of Rs 12,92,082, resulting into a gross profit of Rs 3,86,133. The pulses-based units showed a total business turnover of Rs 26,80,073. The gross and net profit per factory was estimated at Rs 10,15,133. and Rs 3,04,433, respectively. The vegetable and fruit based units showed a total turnover of Rs 59,55,676. The per unit gross profit was estimated at Rs 19,19,519 which came out to be around 32 per cent of the total turnover. The oilseed-based unit revealed sizable turnover of Rs 1,28,34,864 with gross profit margin per factory of Rs 12,16,709. Overall average turnover per

Table 5. Extent of value addition in different agro-processing industries in Himachal Pradesh

Processing units	Value of material inputs	Value of final output	Value addition (%)
<i>Atta chakki</i>	797182	1084921	36.09
Flour mill	34317711	45094793	31.40
Rice mill	8996438	10137325	12.68
Bakery	603585	1199196	98.68
Pulses based	1325100	2505823	89.10
Vegetable & fruits	1913295	4461115	133.16
Oil seed based	8821385	12460205	41.25
Spices/condiments	4943456	6622166	33.96
Overall Average	5944416	8057060	35.54

Note: Inputs included value of additives/preservatives, etc.

Table 6. Turnover and profitability in different agro-processing units in Himachal Pradesh, 2006-07

Processing units	Turnover	Gross profit	Net profit
<i>Atta chakki</i> *	266935	83467	44948
Flour mill	51291677	8013733	6859972
Rice mill	11701075	654172	135160
Bakery	1292082	386313	230128
Pulses-based	2680073	1015133	304433
Vegetable & fruits-based	5955676	1919519	1152402
Oilseed-based	12834864	1216709	887934
Spices/condiments	6900966	1014377	364612
Overall Average	9007888	1428404	1028273

Note: *Average of both processing and service

Table 7. Financial viability ratios of different agro-processing units in Himachal Pradesh

Financial ratios	<i>Atta chakki</i>	Flour mill	Rice mill	Bakery	Pulses- based	Vegetable/ fruits based	Oilseed- based	Spices/ condiments	Overall
Liquidity ratios									
Current ratio	1.57	3.88	1.20	2.86	10.31	4.50	1.60	5.38	3.30
Quick ratio	1.30	0.56	0.48	1.26	5.76	0.86	0.37	3.64	0.80
Inventory turnover ratio	52.83	9.61	5.38	15.11	8.82	2.06	32.18	18.10	9.73
Debt-equity ratio	0.11	0.20	0.92	0.18	0.22	0.12	0.36	0.14	0.22
Debt to capital ratio	0.10	0.17	0.48	0.15	0.18	0.11	0.26	0.12	0.18
Profitability ratios									
Gross profit margin	31.79	17.77	6.45	32.21	40.51	43.03	9.76	15.32	17.73
Net profit margin	17.12	15.21	1.33	19.19	12.15	25.83	7.13	5.51	12.76
Operating ratio	0.72	0.84	0.97	0.76	0.83	0.67	0.92	0.93	0.86
Cost of goods sold ratio	0.68	0.82	0.94	0.68	0.59	0.57	0.90	0.85	0.82
Investment ratios									
Return on assets	0.08	0.45	0.02	0.20	0.18	0.14	0.31	0.16	0.29
Return on capital employed	0.08	0.52	0.03	0.21	0.18	0.14	0.34	0.17	0.32
Return on equity	0.09	0.54	0.04	0.23	0.21	0.15	0.40	0.19	0.35
Investment turnover ratio	0.47	2.99	1.41	1.04	1.48	0.53	4.31	2.92	2.24

agro processing factory in the state was estimated at Rs 90,07,888 and the gross and net profit margin for an average unit was estimated at Rs 14,67,744 and Rs 10,28,273

Financial Viability Ratios

Without going into the sophisticated details of accounting, we have prepared the broad indicators based on the data revealed by the sampled firms. Different financial ratios of various agro-processing units have been presented in Table 7. The liquidity position of the agro-processing industries was examined by computing current ratio and quick (acid test) ratio.

The financial viability ratios computed from financial accounts revealed high current ratio but lower quick ratio (acid test) in most of the processing industries, showing that many industries had substantial unsold inventories rather than receivable cash holdings. The inventory turnover ratio was very low in fruits/vegetable processing units as these units had to pile up stocks of raw material due to seasonal availability of fruits and vegetable commodities. The debt to equity, sales turnover and profitability ratios were quite favourable in the case of small units as compared to large units. The solvency, operating and cost of goods sold ratios with respect to sales were also favourable to small-

scale processing units. The return on total assets and total capital for average unit came out to be 20 per cent and 33 per cent, respectively.

To sum up, the financial viability indicators revealed differential pattern of performance of processing units. Overall, the agro-processing units showed satisfactory performance on account of liquidity, profitability, investment as well as leverage. There appears to be more prospects for small scale processing units rather than medium and large units. Different financial ratios though differed, did testify this finding quite convincingly.

Industrial Linkages

The linkages of agro processing industries with suppliers of inputs (raw material) and prospective output selling markets hold the key for development of this sector. Backward (supply of material) and forward (product sale) linkages are of paramount importance for the expansion and growth of agro-processing units. The availability of bulk quantity and good quality of raw materials from agriculture and reasonable demand of processed products from prospective buyers/markets determine the progress of processing sector.

As shown in Table 8, there was a direct relationship between the size of a firm and number of backward and forward linkages. An average processing industry

Table 8. Extent of backward and forward linkages of agro-processing units within and outside Himachal Pradesh

Particulars	(Number)			
	Backward linkages		Forward linkages	
	Within state	Out side the state	Within state	Out side the state
<i>Atta chakki</i>	65.18	14.90	59.82	-
Flour mill	77.68	41.96	150.91	6.86
Rice mill	310.51	110.51	36.88	15.74
Bakery & confectionery	11.38	3.46	110.46	6.54
Pulses-based	12.26	6.25	287.50	0.38
Vegetable/Fruit-based	101.57	29.00	315.36	12.86
Oilseed-based	31.91	10.27	46.09	4.00
Spices/condiments	40.79	8.64	185.38	32.72
Overall average	69.02	15.57	112.70	9.91

had 85 backward linkages (raw material supply, machinery, transport and institutional) and 123 forward linkages (sale centres, transporter/forwarding agents, traders, markets, etc.). The tiny and small processing units had fewer linkages and most of these were in the locality of their operation. On the other hand, large units (flour/rice mills and fruits/vegetable processing) had wider procurement and sale network within and outside the state though linkage with exporters was not found in any of the sampled agro-processing industry.

Suggestions and Future Policy Implications

The pertinent suggestions and recommendations emerging from the investigation are:

- More policy thrust and emphasis on developing industrial areas in raw material producing regions to strengthen backward linkages with the producers, particularly with fruits and vegetable growers. Registration of new units should be made keeping in view the potential and their financial viability, ensuring optimum size/ number of processing units.
- Thrust on small-scale industries rather than on medium and large industrial estates, as big industries may displace a large number of tiny and small units proving detrimental to encourage and implement self-employment schemes and micro enterprises in rural areas, Revision of policy of wheat quota allotment (for distribution under PDS or open sale through civil supplies agencies) to favour small flour mills instead of few large roller flour mills to make large number of small *atta chakkies* economically and financially more viable.
- Cost-effective and adequate supply of raw material by strengthening direct linkages through suitable contract farming models safeguarding the interests of farmers and bringing agricultural market reforms with effective implementation of New APMC Act.
- Liberal credit policy to modernize small-scale processing units to enable them to compete with organized industries and effective R&D support to the agro-processing sector in enterprise development/management and marketing/exports.
- Encouraging formation of small industries consortia or associations to formulate collective marketing and sales promotion strategies. The institutions like HPMC, HIMFED, HIMCU, Milkfed and Food/Civil Supplies should be given more functional autonomy and should provide anchoring role to small-scale processing industries by helping in procurement, marketing, sales promotion and even in exploring the avenues for exports.
- Proper policy support to promote women entrepreneurs in processing sector by emulating promising models already functioning in the state, viz. Samridhi Mahila Cooperative Society (Palampur, Kangra), M/s Mushran's Bhaira Jams (Rajgarh, Sirmaur) and M/s Bector's Cremica (Taliwal, Una).
- Continuation of fiscal incentives to thrust industries for processing horticultural crops, vegetables, maize, medicinal herbs and livestock products by identifying more industrial areas in the potential sites.

- Improvement in basic infrastructure like developing railway links, metalled roads, cool chains, adequate/uninterrupted power supply, disposal of sewage/industrial effluents, housing, control of traffic congestion, etc.
- Strengthening of database on agro-processing industries through regular surveys and creation of separate State Department of Agro Processing Industries to plan and monitor agro-processing industries and to provide policy input to the government on a continuous basis.

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