

Agro Processing Industries in Haryana: Status, Problems and Prospects

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Abstract

Agro processing assumed vital importance particularly in a state like Haryana where agriculture production has reached on plateau. Its importance became more elevated when employment opportunities in rural areas are squeezed. This paper analysed the growth of village level agro industries for different periods and also prioritized the factors hindering agro industrialization in Haryana. It is evident from the results traditional processing of village oil ghani, and jaggery and khandsari not keeping pace with time whereas cereal and pulses processing industries and fruits preservation and processing gaining movement in recent period. Nonetheless, the period of twenties indicating that village level processing is coming back on track. The situation is owing to development and adoption of suitable post-harvest machinery particularly for pulse milling, oil extraction and jaggery recovery. The growth of village level processing is constrained by factors such as procedural complexity in land acquisition and higher prices, insufficient finance for small entrepreneurs, lack of skill and awareness, higher cost of machinery and poor support on marketing and policy front. Hence, a comprehensive strategy which include development of physical, functional and market infrastructure along with provision of single window system, tax rebate and export subsidy need to develop to boost agro processing in the state.

Keywords: Agro Processing, Constraints analysis, Employment, Linear trends

Agriculture in Haryana state contributes around 21.19% of the gross state domestic product which is higher than national average of about 18%. There is quantum jump in production of food grains from 19.85 lakh tonnes in 1965-66 to 171.18 lakh tonnes in 2013-14 (Anonymous, 2015). Increase in agricultural production need to be properly coupled with agro-based industries in production catchments and marketing facilities so as to realize the due benefits in terms of income and employment to farming community and society at large. Further, available evidences suggest that agro-processing help in addresses the problem of seasonal unemployment, food and nutritional security, migration from rural to urban area, post-harvest losses/wastage while enhancing consumer acceptability, extending shelf

life and improvement in quality, enhanced income and employment through value addition to farm produce and even low grade materials (Bharti *et al.*, 2003; Dixit *et al.* 2010; Pandey and Shukla, 1966). Further, agro processing centres establish forward and backward linkages (Srinivas *et al.*, 2009) and have credible effect at both personal and community level (Oladipo, 2008). Dixit *et al.*, 2011 further summarized that sometimes the impact of agro processing technologies on society is stronger than entrepreneur who has established agro processing unit. This has happened when processing operations are done on custom hiring basis and saving of produce/commodity owing to reduction in processing losses, directly goes to the intended beneficiary/society. Hence, agro processing

has been recognized as the sunrise sector in view of its large potential for growth and likely socio-economic impact specifically on employment and income generation.

The development of the food-processing sector remained largely untapped despite country has production advantage in many agricultural crops and commodities including horticultural crops livestock sector. India process only 0.97 to 27.87% of cereals, 5.67 to 31.49% of pulses, 0.62 to 2.24% fruits, 0.24 to 8.59% of vegetables, 10.27 to 27.04% of spices and condiments (Ghos, 2013), which is far less than developed nations (Sujatha and Prasad, 2008). Nonetheless that fact underlines the tremendous opportunities in this sector. The food processing sector ranks fifth in the contribution to value addition and employ 19% of the industrial labour force.

However, this sector accounts for only 5.2% of the total investment. Some estimates suggest that in developed countries, up to 14.00% of the total work force engaged in agro-processing sector directly or indirectly. However, in India, only about 3.00% of the work force finds employment in this sector. The increasing human population, rising real income, changing life-styles conditions, media, advertisements, increasing quality consciousness and rapid urbanization reinforce us towards processing and value addition to agricultural produce in production catchments so as to foster of farm-non-farm linkages which in turn, generates higher income and employment for the farm families, besides making agriculture a more effective contributor to industrial growth (Badatya, 2003). The economies to scale in processing and distribution widen and deepen the backward and forward linkages which include a steadily diversifying base of agro-industrialization.

In this paper, an attempt has been made to examine the growth of selected agro-processing village industry in Haryana in terms of output (quantity)/turnover (amount), employment generation, and factors affecting the growth of agro processing and finally suggest some measures on infrastructure and policy front to further boost agro processing industries in the state.

Data Base and Methodology

The paper is largely based on secondary data,

however, primary data were also ascertained from 50 firms (i.e., 10 units for each type of industry such as flour mills, oil mills, dal mills, cotton mills and rice mills) randomly selected from Karnal and Fatehabad districts, as these districts have dominance in agro-processing industries. The data on constraints faced by agro industrialist/entrepreneurs were collected through personal interview with the help of structured schedules. Whereas, secondary data related to various agro processing industries in Haryana were collected for the period 1980-81 to 2010-11 from various statistical abstracts of Haryana and Agro Processing Department of Haryana and triennium ending average was calculated. The compound growth rate of agro-processing and employment generated were computed by fitting exponential function.

Analytical Techniques

Growth in processing levels and employment of agro-processing industries was estimated with the help of exponential function:

$$Y = ab^t$$

In log linear form:

$$\text{Log } Y = \log a + t \log b$$

The linear trend equations were also fitted for processing and employment of different agro-processing industries for the period 2001-02 to 2010-11 by fitting the linear equation:

$$y = a + b^t$$

Where,

Y = Dependent Variable for which growth rate is calculated output/turnover and employment of agro-processing industries.

a = Constant

b = Regression coefficient,

t = Time period in years

$$\text{CGR (Compound growth rate)} = (\text{Antilog } b-1) \times 100$$

For prioritization of constraints (based on responses), Garrett's ranking technique was used:

$$\text{Percent position} = 100 \times (R_{ij} - 0.5)/N_j$$

Where, R_j = rank given for i^{th} factor by j^{th} individual

N_j = Number of factors ranked by j^{th} individual

Results and Discussion

Status and growth of agro processing industry in Haryana

The level and extent of processing is the function of available technology and infrastructure. Although demand of processed products and supply of raw material contributing towards the growth of agro processing. Here, the growth of crop specific processing industries is discussed and presented in Table 1. The annual compound growth rate of production of various village industries in Haryana over different decades since 1980s presents a mix picture. The processing of cereals and pulses at village level industries increased at an annual compound growth rate of 2.54% during 1980-81 to 1989-90, whereas, the growth decelerated during 1990-91 to 2000-01.

Table 1: Growth of agro processing industries in Haryana

Particulars	Compound growth rate (per cent)		
	Period-I	Period-II	Period -III
	1980-81 to 89-90	1990-91 to 2000-01	2001-02 to 2010-11
Processing of cereals and pulses industry	2.54	-3.36	5.80
Village oil ghani industry	-12.71	-8.71	24.71
Jaggery-khandsari industry	-10.22	-2.49	4.38
Fruit preservation and d processing industry	6.28	11.34	2.32

The probable reason for negative growth during nineties may be (i) short supply of pulses during which was substituted by the import, (ii) investment in medium and large scale industry in food grain and oilseeds sector by private players under liberalization and globalization which inhibited the growth of small scale/cottage industry in rural catchments. It is worth mentioning that there is quantum jump in production of food grains over a period with the introduction of high yielding varieties of pulses and more particularly low water requirement of paddy varieties.

This supply side situation does not fully explain an annual growth of 5.80% during 2001-02 to 2010-11. Here, the credit also goes to post-harvest technologies suitable for small and medium entrepreneurs. For instance, lot of improvement in the recovery of dal (up to 25%) over conventional burr mill has been noticed when processed through improved dal mill such as PKV Mini Dal Mill (developed under All India Coordinated Research Project on Post-Harvest Engineering and Technology (AICRP on PHET), PDKV Akola centre), CIAE dal Mill (developed by ICAR-CIAE Bhopal), IIPR Mini Dal Mill (developed by ICAR-IIPR Kanpur). The negative growth of village level oil ghani industries for consecutive two decades is really a matter to retrospect and attract our attention towards technologies of production and processing as well. The failure of oil ghani industries (mean oil extraction through traditional kohlu system) was on account of lower recovery of oil. Nonetheless, the consumers preferred ghani oil over oil extracted with expeller as it retains original flavor but uneconomical. The turning of negative to impressive positive growth of 24.71% is certainly because of technological advancement in oil expellers. Similarly, jaggery and khandsari industry in Haryana was on the edge of closer at the end of 2001 mainly because of two reasons that are, (i) shifting sugarcane area under rice-wheat cropping system, (ii) marketable surplus of sugarcane diverted to Cooperative Sugar Mills. However, subsequently problem of delayed payment to the growers and stalling losses due to delay in issue of slip (supply order) by sugar mills and cane price issues created a situation for sugarcane growers to find out the solution by adopting traditional ways of processing the sugarcane.

Moreover, introduction of proven sugarcane processing technologies developed by AICRP on PHET centres and other SAUs and private sector (such as four roller crusher- improves recovery; three pan system, made of stainless steel- save energy and maintain quality; churner- reduces drudgery; filtration units- improves quality, Jaggery in small cubes shape- reduces losses and facilitates retail marketing) coupled with health consciousness among consumers, as jaggery has certain health benefits such as rich in minerals, micro-nutrients, antitoxic, anti-carcinogenic (Sahu, 1998), which lead to better market prices during recent period

contributed towards reviving the jaggery and khandsari industry in Haryana. The same is evident from a positive growth of 4.38% (Table 1).

Although Haryana is not a leading state in fruit production but fruit preservation in the form of *achar* and *chitin* has been practiced since ages. The growth of this sector is positive throughout during the period studied. It is worth mentioning that the processing of horticulture produce is now taking movement because of Government initiative and incentive. For instance, interest free loan up to 75% of the tax paid on the sale of goods produced in such industrial units is provided under the Haryana Value Added Tax Act, 2003 for a period of 5 years from the date of start of commercial production. New industrial units established within the State of Haryana are exempt from payment of electricity duty for a period of 5 years from the date of commercial production, no market fee is charged on the vegetables and fruits grown in the state and even used as raw material by food processing industries. The situation invites the potential investors and hopefully it will further improve processing level of horticultural crops by organized group.

Further, the trends of village level processing of cereals and pulses clearly indicating improvement in average quantity processed during triennium

ending 2011 over preceding years. The situation was alarming during triennium ending 1983 and 2002 where quantity processed decreased (Table 2). Similarly, the turnover of fruits processing took a start up during period of nineties and consistently maintained growth, although figure seems abrupt as inflation was not ruled out. The decreasing trends of village oil ghani industry and jaggery and khandsari processing indicating level of processing of these crops is far less than satisfactory. Hence, intervention in the form of technology and favourable policy is utmost important.

Linear trend in processing at village level in Haryana

The results obtained from linear regression on processing of different crops/commodities by village industries in Haryana are presented in Table 3. It is evident from the results that processing of cereals and pulses has increased by 3363 quintals per year registering growth rate of 5.34% per year and the regression coefficient is statistically significant.

In case of village Ghani industry, Jaggery & Khandsari industry the processing level during 2001-02 to 2010-11 has increased at the rate of 525 quintal, 3615 quintal per year, respectively. Similarly, the growth of fruit preservation and processing

Table 2: Trends of village level processing industries in Haryana

Particulars	Triennium ending 1983	Triennium ending 1993	Triennium ending 2002	Triennium ending 2011
Processing of cereals and pulses ('000 quintals)	50.04	41.14	36.58	74.00
Village oil ghani industry ('000 quintals)	8.63	1.11	0.81	4.75
Jaggery and khandsari industry ('000 quintals)	156.18	74.36	65.15	98.96
Fruit preservation/ processing industry (₹ in lakhs)	4.91	31.40	115.67	780.00

Table 3: Linear trend in processing of different village industries in Haryana (2001-02 to 2010-11)

Particulars	Trend equation	R ²
Processing of cereals and pulses industry	Y=44.486 + 3.363X* (385)	0.91
Village oil ghani industry	Y=0.477 + 0.525X* (0.076)	0.857
Jaggery & Khandsari industry	Y=70.343 + 3.615X (0.684)	0.778
Fruit preservation industry	Y = 52.439 + 81.617X (7.387)	0.938

Note: *Significant at $p \leq 0.05$; Figure in parenthesis indicate standard error of respective regression coefficients.

industries in terms of turnover was to the tune of ₹ 81.67 lakh per year in absolute term.

Employment pattern village level agro industries in Haryana

The employment pattern in various village level industries is presented in Table 4. It is clear from the data presented in Table 4 that in triennium ending 1983 highest share of employment was contributed by Jaggery & Khandsari industries (68.82%) followed by Cereals and Pluses processing industry (6.86%). While the trends was reverse at triennium ending 2011, first place was occupied by cereals and pulses processing industry (25.51%), followed by Jaggery & Khandsari industries 11.56% (Chadha and Sahu, 2003).

Further, Table 5 presents the growth rate in employment in village industries. The growth rate in employment in cereals and pulses industries witnessed annual compound rate of 8.73% in during eighties (1980-81 to 1989-90), which slowed down

to only 0.21% in during nineties. This was because growth of cereal and pulses processing industries slowed down, as also discussed earlier. But during the next decade, its growth sharply increased to 10.28% as also noticed by Keswan and Verma (1990). The growth of employment in village Oil Ghani industry and Jaggery & Khandsari industry was negative during 1980-81 to 1990-91 and that is because of overall sluggishness in processing of the said village level industry. But turning to positive employment growth in village oil ghani, Jaggery and khandsari and fruit processing industry during twenties is a bright sine for their revival and future growth prospects. Similar results were obtained in case of fruit preservation industry (Datta and Chatterjee, 1989).

Linear trend of employment in agro processing industries

The trend analysis of employment pattern in village industries in Haryana revealed that the employment

Table 4: Employment pattern of various village level agro industries in Haryana (Percent of total employment)

Particulars	Triennium Ending 1983	Triennium Ending 1993	Triennium Ending 2002	Triennium Ending 2011
Cereals and pulses processing industry	6.86	11.70	15.44	25.51
Village level oil ghanni/ processing unit	1.45	0.10	0.26	1.86
Jaggery and khandsari unit	68.82	12.37	9.18	11.56
Fruit preservation industry	0.44	1.03	0.82	4.97

Table 5: Growth of employment in village level agro processing industries in Haryana

Particulars	Compound growth rate (per cent)		
	1980-81 to 1989-90	1990-91 to 2000-01	2001-02 to 2010-11
Processing of cereals and pulses	8.7	0.21	10.28
Village oil ghanni industry	-13.70	-6.0	32.71
Jaggery and khandsari industry	-19.72	-9.09	4.55
Fruit preservation and processing industry	-16.06	-5.57	24.86

Table 6: Linear trend of employment in village level agro industries in Haryana (2001-02 to 2010-11)

Particulars	Trend equation	R ²
Processing of cereals and pulses industry	$Y=1534.93 + 268.339X^*$ (32.748)	0.894
Village oil ghani industry	$Y=-4.733 + 38.733X^*$ (6.034)	0.837
Jaggery and khandsari industry	$Y=1053.00 + 102.005X^*$ (.626)	0.391
Fruit preservation and processing industry	$Y=52.53 + 80.867X$ (5.788)	0.961

Note: *Significant at $p \leq 0.05$; Figure in parenthesis indicate standard error of respective regression coefficients

in cereals and pulses processing industry, village oil-ghani industry and Jaggery & khandsari industry registered annual increase at the rate of 268.34, 38.73 and 102 persons respectively (Table 6).

The trend values for these industries were found to be statically significant ($p \leq 0.05$). Similarly the employment in fruit preservation and processing industries registered increase to the tune of 80 persons per annum but the trend value was found to be statistically non-significant. The trend is considered as good fit as R^2 values are above 0.8 in all cases except jaggery and khandsari.

Factors affecting the pace of development of agro-processing industries in Haryana

To assess the problems encountered in establishment, operation and development and marketing which adversely affecting agro industries in the state, the response of selected respondents/entrepreneurs was ascertained on 25 selected variables. The problems hindering overall growth of agro processing sector were further categorized into (a) installation, (b) financial management, (c) in procurement of raw material, (d) in processing and, (e) in marketing and which are depicted in Table 7.

Table 7: Prioritization of constraints/problems faced by agro processing industries N=50

Sl. No.	Nature of constraints	Rank	Garrett mean score
A	Problem faced at the time of plant installation		
1	Difficulty in land acquisition and high price of land	I	70.00
2	Lack of technical know-how	IV	58.00
3	High cost of machinery	II	66.00
4	Difficulty in getting power connection	X	34.00
5	Difficulty in getting license		18.00
B	Problems related to financial arrangement		
6	Higher rate of interest	V	54.00
7	Insufficient finance from lending institutions	III	62.00
8	Lower financial limits fixed by financial institution		14.00
9	Lack of grants and subsidies advanced by government/	VIII	42.00
10	Higher taxation on raw material purchased from market		26.00
C	Problems faced in procurement of raw material		
11	Lack of assured supply of raw material		30.00
12	Higher rates of raw material and irregular supply	III	62.00
13	Higher marketing charges		22.00
14	Lack of quality control	V	54.00
D	Problems faced in processing		
15	Shortage of power/electricity	VIII	42.00
16	Under utilization of installed capacity of unit	IX	38.00
17	Higher rate /charges of electricity and fuel	V	54.00
18	Higher working capital		30.00
19	Lack of technical manpower		22.00
F	Problems faced in marketing of final products		
20	Lack of efficient market for final produce	II	66.00
21	Competition from big players and organized sector	III	62.00
22	Higher government intervention		30.00
23	Multiplicity of taxes/ high rate of sale tax		26.00
24	Lack of marketing cooperatives	VI	50.00
25	Non availability of efficient transport by road and higher cost	X	34.00

Further, with the help of Garrett ranking technique the top 10 constraints were prioritized. For instance, land acquisition and high price of land (Garrett rank= 70) was rated as top most constraints followed by lack of efficient market for final produce (Garrett rank= 66) and higher cost of machinery (Table 7). It is obviously clear that real estate value is higher in Haryana, as state is in vicinity of Delhi, capital of the Country. Insufficient finance, higher rates of raw material and irregular supply, market competition were rated as third most important constraints. Nonetheless, lack of technical know-how, higher rate of interest, shortage of power and higher charge

per unit were considered among top constraints hindering the pace of agro industrialization in the state. The other problems encountered in processing were shortage of power and under utilization of installed capacity, higher rate of power charges and fuels, and lack of technical man power. Similarly, some problems faced in marketing of end products is enlisted as lack of marketing cooperatives, non-availability of efficient and cheaper transport, multiplicity of taxes further restrict the growth of agro industries. The problems of marketing and infrastructure were also highlighted by Grover *et al.* (1996) and Jairath (1996). The results reveal that

Matrix of suggested measures for development of agro processing industries

Sl. No.	Broad area of intervention	Critical intervention points	Anticipating Action at
1	Physical infrastructure development	i. Establishment of processing infrastructure in production catchment and maintaining cool chain ii. Quality control laboratory	Public and private sector
2	Strengthening power sector	Easy accessibility of electricity connection	Haryana State Electricity board
3	Public Transport	Refrigerated van, specially designed rail wagons for perishables	State Transport Department, Haryana Marketing Board, Ministry of Railway, GOI
4	Research and development	i. Processing equipment and machinery at least cost ii. Location model for agro processing centres (APC) iii. Entrepreneurship/skill development programme iv. Training on Smart marketing	at least ICAR, SAU and private sector Khadi and village industry board and State Departments of Agriculture and Horticulture in association with Krishi Vigyan Kerndra (KVK)
5	Marketing	i. Market infrastructure and provision for marketing of processed food ii. Cooperative marketing iii. Market information & intelligence iv. Functional food (Protein rich food products from cereal and pulses, soybean, oil meal product) should come under Public Distribution System (PDS) v. Inclusion of fortified products under mid day meal programme	Haryana State Marketing board Cooperative sector Marketing board, National informatics centre (NIC) Food and Supplies Department, Government of Haryana Ministry of Human Resource Development, GOI
6	Policy front	i. Single window system/ Swidha centre for electricity and water connection, licensing and loan, etc. ii. Tax holidays and other incentives including export subsidy for agro-processing units	Government of Haryana / Union Government of India Government of Haryana/ Union Government of India

supply side constraints are more pronounced and associated government departments need to work in a transplant and comprehensive manner, as some of these constraints/problems could not be addressed at entrepreneur level. As suggestive measures, Government of Haryana may ease the procedure for land acquisition for post-harvest activities, as these are complementary to agriculture. Further, regulatory mechanism should be in place to check land mafia.

Here, R&D organizations such as Indian Council of Agricultural Research (ICAR) sponsored AICRP on PHET centre and Haryana Agricultural University can take a lead role in development of location specific tool, gadget and machinery and process protocols and their commercialization through entrepreneurship development programme.

Suggested measures for proper development of agro-processing industries in the state

In the light of problems recorded and respondents' suggestions, a matrix has been developed and presented as above.

It is further suggested that Agro Processing Centre (APC) should be promoted in the production catchments and location specific model and type of machinery required to be analyzed and developed by Research and Development organization. APC was found economically viable enterprise and helped in avoiding distress sale at the same time established forward and backward linkages (Dixit *et al.*, 2011).

Conclusion

The growth of agro processing in Haryana during last 30 years is evident from the results but with downward movement during eighties and nineties particularly in village oil ghani, jaggery & khandsari and fruits preservation and processing sector. The period of twenties indicating that village level processing is coming back on track. The employment in cereals and pulses processing has increased from 6.86% during triennium ending to 25.51% during triennium ending 2011 whereas, it has decreased in jaggery and khandsari sector from 68.82 to 11.52%, indicating a need for modernization of jaggery and khandsari processing sector. The growth of village level processing is constrained by various factors such as procedural

complexity in land acquisition and higher prices, insufficient finance for small entrepreneurs, lack of skill and awareness, higher cost of machinery and poor support on marketing and policy front. Needless to mention Agro Processing Centre in production catchments has numerous economic and social benefits. Hence, a comprehensive strategy which include development of physical, function infrastructure and market infrastructure along with provision of single window system, tax rebate and export subsidy need to develop to boost agro processing in the state.

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