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Prospects of Agri Value Chain for Wheat in Haryana: Its Economics, Market Surplus and Linkage with Processors

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ABSTRACT

The paper is based on a survey done in Haryana to study the agri value chain of wheat which has surplus production is the state. The analysis brings out that wheat gives higher net income than other competing crops of the season which justifies the farmers' allocation of 90 per cent of their *rabi* area under this crop. The survey also revealed that farmers are growing wheat and selling it as usual in APMC markets since the 1970s. Most of the flour mills are owned by business families who have no linkage with farmers due to APMC Act and even otherwise to avoid politically pliable farmers. The state APMC Act is the biggest barrier in linkage as it does allow any purchase outside APMC market. Despite that 77 per cent millers were willing to purchase directly from the farmers because it will reduce their purchase price by 5 per cent in terms of arhatia fee, loading, unloading and transport expenses and losses. In turn, the processors may help in arranging good seeds and chemicals for the farmers to get quality wheat. But many farmers were apprehending price discrimination by millers after APMC becomes defunct in the long run while some big millers were also afraid to deal with politically pliable farmers.

Keywords: Agri value chain, Wheat processing units, Global markets, Exports, Haryana

JEL.: C83, Q13, Q17

I

INTRODUCTION

After the establishment of WTO in 1995 and the Trade Facilitation Agreement (TFA) entered into force on 22 February 2017, the world agricultural market has been heading towards a unit trading bloc (WTO, 2020). It offers enormous opportunities but also heightens competition with increasing freedom amongst market players. In the process, weaker market players will be 'pushed' out of mainstream and it may be a threat for small Indian farmers. Hence, India needs to promote Agri-Value Chain (AVC) to leverage its potentials in agriculture and enhance its export competitiveness. The global market is demanding high quality products, including ready availability, flavour, quality, freshness, convenience, environmental safety, and traceability. On the other hand, small farmers have little awareness about the quality parameters and even access to quality inputs. In order to bridge this gap, farmers are to be linked with AVC in which processors/ marketing intermediaries can provide the

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right information, capacity building and quality inputs. This integration may enable the Indian farmers to participate in the growing global agricultural market. To strengthen AVC, Agricultural Value Chain Finance (AVCF), can play an instrumental role in linking farmers and processors as well as enhancing productivity by application of modern inputs and technology (AFDB, 2012). Moreover, it offers an opportunity to the banks for expanding scope for agricultural credit by improving efficiency and ensuring repayments by consolidating linkages among participants in the value chain.

Convincing of Indian Farmers to Join AVCs

Firstly, the average size of holding is very small, i.e., 1.08 ha in 2015-16 (Government of India, 2018) which has decreased over time due to equal division among all heirs as per succession Act 1925. Of the total holding, about 69 per cent have average holding size of 0.38 ha. This smaller size is the constraint for investment in new technology and even accessing other than local markets. Secondly, in the increasing exports of agricultural commodities, the maximum benefits are cornered by the processors. If farmers are linked with the AVC, they will also get share in higher export prices and also support from processors in getting quality seeds, other inputs and capacity building.

Thirdly, now-a-days, even domestic consumers prefer buying of processed/semi-processed grains and vegetables. To illustrate, consumption of wheat in the form of daliya, loaf, cookies, rusks, muffins, noodles, pasta, custard, etc. is rapidly increasing even in rural areas. It is estimated that wheat and its processed products may be accounting for about one-third share of the consumer expenditure on food (Government of India, 2014). Value addition at farmers' level can give them additional income but it can happen if farmers are involved in some activity of processing by branded big food units. To dovetail the inflated theoretical benefits of AVC with ground situation, it was decided to study the status of AVC of wheat which affects the maximum farmers and consumers. In quest for identifying the existing AVCs and explore of the scope for AVC in future for the surplus wheat in Haryana, this study was sponsored by National Bank for Agriculture and Rural Development (NABARD).

Study Area

Among major wheat producing States of India are Uttar Pradesh (UP), Punjab, Madhya Pradesh (MP), Haryana, Rajasthan and Bihar which accounted for about 92 per cent of all India wheat production during the last 5 years (Government of India, 2020a). In terms of the contribution to Central pool, the situation is changing fast. In 2020-21, MP is at the top for the first time with 129 lakh tonnes followed of Punjab (127 lakh tonnes), Haryana (75 lakh tonnes), UP (36 lakh tonnes) and Rajasthan with

22 lakh tonnes (*op cit.*). Keeping in view the sizeable surplus and location near the mega consumption markets of Delhi and Gurugram, the state of Haryana was selected for the study.

Objectives of the Study

The main objective of the study was to find extant linkages if any and to ascertain the willingness of the wheat growers and its processors to link through with AVC and to evolve suggestions for their effective linkage. Specifically, it aims (i) To study the comparative economics of the wheat production and marketing channels used by surveying the farmers in a few district of Haryana. (ii) To ascertain extant status of linkage by approaching a few existing flour mills and bakeries to know their procedure for procurement of wheat and constraints, if any. (iii) To find out the willingness of the farmers and processors to link and bring out the risk and uncertainties perceived by them in joining the agri value chain of wheat and (iv) to assess the scope for wheat processing by wheat producers in the State with financial support from the banks.

Data Source

The paper is mainly based on primary data collected for the study (Sangwan and Gagandeep, 2015). However, secondary data from State Government (Government of Haryana, 2015; Agmarknet.nic.in, 2020) and other stakeholders has also been used to link with the macro environment. The primary data has been collected from the stakeholders in the AVC, viz., farmers, wheat flour mills and high value bakery units using products of wheat flour as the base (Figure 1).

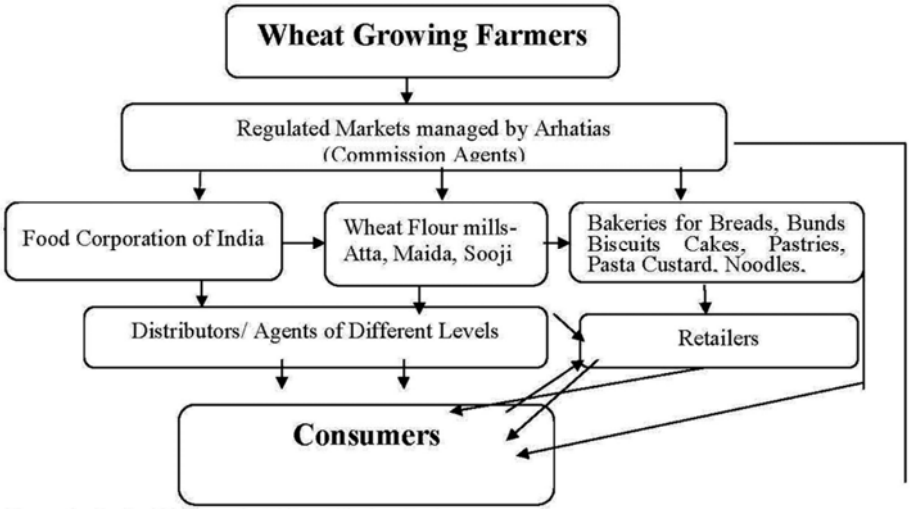

Figure1. Stake Holders in Value Chain of Wheat.

To select the sample farmers for interview in Haryana, its wheat surplus districts, blocks and villages were selected as under.

Selection of Sample Districts

The sample districts for survey were selected in view of availability of surplus wheat and per capita availability in the triennium ending 2013-14(Annexure-1). On this criterion and to represent different regions of the state; three districts of Hisar, Kaithal and Sonipat were selected. In each identified district, two or three sub-divisions (tehsils) were selected on the basis of more area under wheat. Five villages, from each of the identified tehsil were randomly taken from the alphabetical list of total villages. From each selected village, 5 to 11 farmers were interviewed. Thus, a total of 252 wheat growing farmers from 30 villages were interviewed in six selected blocks of three identified districts of Haryana. The details of sample are given in Table 1.

TABLE 1. DISTRICT/TEHSIL-WISE VILLAGES IDENTIFIED AND FARMERS INTERVIEWED

District (1)	Tehsil (2)	Villages Covered and farmers Interviewed in brackets (3)	Total (4)
Kaithal	Kaithal	Deewal (8), Jakholi (7), Kole Khan (8), Paharpur (9) and Siwan (7).	39
	Gulha- Chika	Bhunna (11), Harigarh Kingan (10), Khushal Majra (10), Paharpur Peedal (8) and Seon Majra (10).	49
Hisar	Hisar	Bichpari (8), Gaibipur (11), Kirori (5), Panihari (10) and Surewala (8).	42
	Hansi	Bass Akbarpur (7), Dhamian (8), Kajal (10), Madan Heri (7), Hansi Rural (9).	41
Sonipat	Sonipat	Bagru (7), Fatehpur (9), Karewari (9), Murthal Khas (8)and Salarpur Majra (8).	41
	Kharkhoda	Chhanauli (9), Jharauthi (8), Kundal (8), Nizampur Majra (8) and Saidpur (7).	40
Total	6	30	252

Source: Survey by CRRID Team for the study.

Agri Value Chain Experiences in India/Haryana

Sugar and milk are the two traditional value chains that have stabilised in different parts of India. Cotton, rubber and plantation crops such as coffee and tea have organised value chains in many locations where the relationships between the producer, aggregator, processor and marketer continue over a long time. Corporate-led AVC has originated after the policy of globalisation since the 1990s and it covers many crops such as cereals, pulses, spices, fresh vegetables and fruits and flowers. A few private companies like ITC, Hindustan Lever, Cargill India, Rallis, etc. have experimented with contract faming in food grains, though successful examples are limited (agmarketnet.nic.in).

Some value chains in India are oriented towards exports as their outputs find global markets. Basmati rice, guar gum, grapes, pomegranate, mango, vegetables, coffee, tea, spices, cashew are examples of value chains that have an export orientation. As compared to domestic markets, the export value chains have additional requirements relating to quality, certification of different types, specialised storage and transport which in turn need additional investment in sorting, grading,

warehousing, processing, packing, specialised transport, etc. In Haryana, sales outside its APMCs are strictly prohibited as per the State Act except the apni mandi for fruits and vegetables till the recent ordinances in July 2020. Contract farming is allowed in the State as per section 43 of APMC Act 2018 and earlier 2006 but the Haryana Marketing Board has put strict conditions (www.hsamb.gov.in). After that Haryana State Cooperative Marketing Federation (Hafted) had started contract farming in few crops like wheat, basmati rice and barley at a limited scale. The United Breweries Group and SAB Miller had contacted for farming of malting barley in Rewari (Financial Express, 2008), though its success is not documented.

For encouraging the participation of private investors in food processing, Haryana Government has established food parks for food processing at Rai in Sonipat and Saha in Ambala. An International Horticulture market at Ganaur in Sonipat is coming up on about 493 acres with investment of 1200 crore (http://hortharyana.gov.in/). As per Model APMC Act, there is a provision to establish private markets by the companies dealing in contract farming but so far, none has come up due to strict conditions of APMC. The earlier studies of contract farming suggest bindings may be honoured by both contractors and farmers (Kumar and Kumar, 2008). The HSAMB has prepared a model agreement format for the registration of the contractor but the success stories of AVC in food grains are not reported in the state.

II

ECONOMICS OF WHEAT VERSUS OTHER CROPS

The economics of wheat and other crops was worked out on the basis of data of 252 sample farmers from the districts of Kaithal, Hisar and Sonipat in Haryana during the year 2015-16.

Social Status of Sample Farmers

Of the total 252 sample surveyed farmers, 73 per cent belonged to general category (GC), 20 per cent backward classes (BC) and 7 per cents cheduled castes (SC). Average members per family in all the three sample districts were 4.92 with 4.85 persons in GCs, 5.06 in BCs and 5.22 for SC families. This indicates the availability of labour within the families. Education-wise, 43 per cent were illiterate/primary, graduates and above were just 9 per cent while the remaining 48 per cent were 8th to 12th pass. It indicates that illiterate and the drop-outs from education have been sheltered in agriculture. That may be the reason that about 11 per cent adult farmers were unmarried too.

Economic Conditions of Sample Farmers

Of the surveyed 252 farmers, 31 per cent of sample farmers were marginal, 32 per cent small, 23 per cent medium (5 to 10 acres) and 15 per cent were big farmers

(> 10 acres) with average owned land of 6.14 acres. The farmers were augmenting their holdings by leasing in land which increased their average operated holding to 9.52 acres. Out of this, 38 per cent was leased in land. The land was leased in by all the categories of farmers, but it was the maximum by SFs which is contrary to the neighbouring Punjab. But owing to exorbitant increase in lease rent upto Rs. 44000 per acre, it was reported that MFs and SFs were decreasing their leased in land in recent years due to decreases in price of basmati paddy. Just 10 per cent of the family members of the sample respondents were having other occupations such as service including private, trade, transport, etc. as their main occupation. Allied activities especially dairy was the subsidiary occupation of about 92 per cent of sample farmers.

Cropping Pattern

Out of total operated area of 2399 acres by 252 surveyed farmers, 93 per cent was sown under *kharif* crops and 99 per cent in *rabi* crops as given in column 8 of Table 2. Area was less in *kharif* because a few farmers leave some parcels of their land fallow to sow early *rabi* crops. In *kharif* season, paddy was sown on 80 per cent area, cotton 11 per cent, fodder 5 per cent and 2 per cent each under vegetables and maize. In *rabi* season, 90 per cent area was under wheat, 4 per cent under fodder and oilseeds each and 2 per cent under vegetables (column 9).

Across the districts; in Kaithal, paddy in *kharif* and wheat in *rabi* were occupying as much as 97 and 95 per cent of the area (column 3). In Hisar, cotton in *kharif* and oilseeds in *rabi* were other important crops (column 5). In Sonipat, fodder and vegetables occupy more area in both seasons (column 7) which may be due to nearness to Delhi market. Overall paddy and wheat occupied 85 per cent of gross cropped area (GCA). Cropping intensity of three districts was 192 per cent with the highest 197 in Kaithal and 188 in Hisar and Sonipat.

Gross Value of Crops Per Acre

Gross value per acre (GV/A) is presented for all crops of sample farmers in Table 2 at 2015-16 prices. The GV/A of paddy and wheat was Rs. 34070 and Rs. 29136, respectively (column 14). In Hisar and Sonipat, cotton and maize are also grown in Kharif and their GV/A was Rs. 22118 and Rs. 5737 respectively (columns 11 to 13). GV/A from vegetables in *rabi* season was about Rs.42000 but marred with risk due to wide variations in their prices. Sugarcane is competing with paddy and wheat in GV/A in Hisar but the constraints of irrigation and delayed payments to cane growers from sugar mills resulted in shifting its acreage to paddy-wheat rotation. Moreover, both these crops are 100 per cent procured by the Government at their MSPs. In total GV of a farmer, wheat and paddy accounted for 93 per cent of with 85 per cent acreage. It substantiates that the farmers are rational in adopting the cropping pattern dominated by paddy and wheat.

TABLE 2. CROPPING PATTERN AND CROP WISE GROSS VALUE OF PRODUCE IN SAMPLE DISTRICTS

	Cropping pattern in sample districts						Total	Crop area as per cent of		Gross value of produce per acre (in Rs.)			
	Kaithal		Hisar		Sonipat								
Season/ Crop	Area	Per cent	Area	Per cent	Area	Per cent	Area	Season	GCA	Kaithal	Hisar	Sonipat	Average
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Paddy	1118.50	97.43	278.20	47.28	377.55	76.69	1774.25	79.61	38.44	36521	27462	31678	34070
Cotton	0.00	0.00	229.00	38.92	12.50	2.54	241.50	10.84	5.23	0	22118	5920	21280
Maize	0.00	0.00	29.00	4.93	19.00	3.86	48.00	2.15	1.04	0	5207	5737	5417
Vegetables	0.00	0.00	11.50	1.95	38.50	7.82	50.00	2.24	1.08	0	16435	26909	24500
Fodder	29.50	2.57	40.75	6.92	44.75	9.09	115.00	5.16	2.49	11458	11755	11128	11435
Kharif Total	1148.00	100.00	588.45	100.00	492.30	100.00	2228.75	100.00	48.29	35877	22982	27782	30684
Wheat*	1118.75	94.46	553.25	85.20	471.50	86.98	2143.50	90.22	46.44	30034	28266	27633	29136
Mustard	0.00	0.00	40.50	6.24	6.00	1.11	46.50	1.96	1.01	0	16494	15000	16301
Barley	0.00	0.00	7.00	1.08	0.00	0.00	7.00	0.29	0.15	0	8143	0	8143
Oilseeds	0.00	0.00	16.00	2.46	16.00	2.95	32.00	1.35	0.69	0	16063	16375	16219
Vegetables	12.00	1.01	9.10	1.40	25.30	4.67	46.40	1.95	1.01	45833	22857	46443	41659
Fodder	53.60	4.53	23.50	3.62	23.30	4.30	100.40	4.23	2.18	30747	28809	22403	28448
Rabi Total	1184.35	100.00	649.35	100.00	542.10	100.00	2375.80	100.00	51.47	25613	22462	23712	24316
Sugarcane-perennial	0.00	0.00	3.00	100.00	8.00	100.00	11.00	100.00	0.24	0	90667	52625	63000
GCA	2332.35	100.00	1240.80	100.00	1042.40	100.00	4615.55	100.00	100.00				
NSA	1186.50		659.75		553.00		2399.25	100.00	-				
Cropping intensity (per cent)	197		188		188		192	-	-				

Source: Field Survey by CRRID Team during June 2015;
Notes: GCA= Gross cropped Area, NSA Net sown Area, * Wheat value includes its residue too.

Some Features of Wheat Production

As per survey, the main varieties of wheat sown in Haryana were HD-2967 in 66 per cent area, WH-1142 in 13 per cent, HD-2851 in 9 per cent, WH-711 in 8 per cent and RAJ-1114 in 2 per cent and other varieties in the remaining 2 per cent area. The wheat seed sown per acre varied from 30 to 50 kg with average of 46.40 kg. Per acre yield of main varieties ranged from 15q to 18q, depending upon quality of land and irrigation. It is totally irrigation crop. Sources of irrigation were reported as pump sets both electric and diesel by 95 per cent and canal by 47 per cent. Thus, 42 per cent were using both as supplementary. Canal irrigation was the highest 76 per cent in Hisar.

Item-wise Cost of Cultivation

District-wise cost of cultivation (COC) per acre for wheat is given in Table 3.

TABLE 3. DISTRICT-WISE PER ACRE COST OF CULTIVATION IN SAMPLE DISTRICTS

	Kaithal		Hisar		Sonipat		Average	
Item	Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ploughing (Times)	4.20	1440	4.50	1474	4.88	1981	4.53	1632
		(14.14)		(14.64)		(18.36)		(15.77)
Seed (kg)	46.61	1080	44.52	997	48.12	1000	46.42	1026
		(10.60)		(9.91)		(9.27)		(9.91)
Compost (Trolleys)	1.36	750	0.74	368	1.23	651	1.11	590
		(7.36)		(3.66)		(6.04)		(5.70)
DAP (kg)	52.73	1202	50.00	1140	49.38	1126	50.70	1156
		(11.80)		(11.33)		(10.44)		(11.17)
Urea (kg)	157.04	879	128.23	718	120.63	670	135.30	756
		(8.63)		(7.13)		(6.21)		(7.30)
Weedicides (ltrs.)	0.98	592	0.95	412	0.99	535	0.97	513
		(5.81)		(4.09)		(4.96)		(4.96)
Pesticides (ltrs.)	1.00	373	0.96	116	1.00	285	0.99	258
		(3.66)		(1.15)		(2.64)		(2.49)
Irrigation charges	3.8	547	4.2	1246	4.00	884	4.00	892
(Times)		(5.37)		(12.38)		(8.20)		(8.63)
Maintenance cost	1.24	333	0.63	183	0.94	279	0.94	265
of P'Set (Times)		(3.27)		(1.82)		(2.59)		(2.56)
Harvesting process	Per acre	1014	1.00	1688	1.00	1464	1.00	1389
		(9.95)		(16.77)		(13.57)		(13.42)
Transporting to	Per acre	305	1.00	275	1.00	268	1.00	283
market/ home		(2.99)		(2.73)		(2.48)		(2.73)
Family labour	3	650	3	525	3	640	3	605
		(6.38)		(5.22)		(5.93)		(5.85)
Hired labour	3	820	3	740	3	810	3	790
		(8.05)		(7.35)		(7.51)		(7.64)
Others/ Misc.	-	201	-	183	-	192	-	192
		(1.97)		(1.82)		(1.78)		(1.86)
Total	-	10186	-	10065	-	10785	-	10345
		(100.00)		(100.00)		(100.00)		(100.00)
Average yield (q)	18.17	16.16	16.16	17.21				
Residue Net (Rs.)	3692	4830	4224	4189				

Source: Field Survey by CRRID team during June 2015.

The cost covers all material inputs, use of machinery and labour, etc. In the case of use of own machinery, i.e., tractor and pump-set etc., the operational cost was taken. Interest on capital investment was not taken into consideration. Actual charges paid were taken for hiring, for ploughing, irrigation and transportation. Thus, charges for machinery consisted of a mix of owned and hired equipment. The average per acre cost of wheat cultivation was Rs.10345 in 2015-16.

Item-wise ploughing cost was 16 per cent, seed costs 10 per cent, cost of manure and fertilisers 24 per cent and that of weedicides and pesticides 7 per cent. Expenditure for Irrigation including maintenance of equipment and harvesting and transporting accounted for 11 per cent 16 respectively. The component and labour, both family and hired was about 14 per cent. Other/ miscellaneous expenses were 2 per cent.

Across the districts, labour and seed cost showed least variations while the ploughing, harvesting and transportation costs to market cost varied depending upon own or hired machinery. Inputs were used more in Kaithal district due to better land and canal irrigation; hence its yield was also higher. Irrigation cost was higher, if use of diesel pump is more.

Across farm size, transportation cost per quintal worked out higher for SFs and MFs. But no difference was reported in other marketing charges which were levied per quintal, e.g., cleaning cost @ Rs.12.20 per qtl is charged from the farmers while other costs like commission @ Rs.2.5 per cent, market fee and rural development cess @4 per cent, VAT @5 per cent, auctioning @0.08 per cent are realised from the buyers whether government agencies or private persons, flour mills, etc.

Net Income Per Acre

District-wise per acre gross sale value, cost of cultivation (COC) and net income (NI) is presented in Table 4 by taking the same from earlier Tables. Average per acre NI is Rs. 18791 after deducting COC of Rs. 10345 from gross sale value of Rs. 29136.

TABLE 4. AVERAGE NET INCOME PER ACRE OF WHEAT IN SAMPLE DISTRICTS

District	Yield in qtl.	Value of wheat @	Net value of residue (Rs)	Gross sale Value (Rs.)	Cost of production	Net income
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Kaithal	18.167	26342	3692	30034	10186	19848
Hisar	16.163	23436	4830	28266	10065	18201
Sonipat	16.144	23409	4224	27633	10785	16848
Average	17.205	24947	4189	29136	10345	18791

Source: Taking yield and residue from Table 3.11 and actual price realised by farmers @ 1450 per qtl in 2015.
Note: Gross sale value of wheat includes wheat residue too.

Across the districts, net income (NI) per acre in Kaithal was the highest at Rs.19848 after deducting COC of Rs. 10186 from gross sale value of Rs. 30034. Similarly in Hisar district, the NI is Rs.18201 with lower gross sale and COC than

that of Kaithal. The NI per acre is the lowest Rs. 16848 in Sonipat due to lower gross sale value and higher COC than Kaithal and Hisar. It may be due to smaller holdings, lack of irrigation and more use of hired machinery by most of the farmers in Sonipat.

Extent of Marketed Surplus

The quantity of wheat sold through different channels, retained for seed and domestic consumption for human and animals was directly asked from the farmers. It is to be noted that all the sample farmers were selling in the market. The quantity of wheat surplus and marketing through different channels are worked in each district (Table5). Of the total production of 36879qtl by sample farmers; 83 per cent was sold in APMC through *arhatias*, 7 per cent retained for human and animal consumption each and 3 per cent was retained for seeds. Direct sale to consumers was negligible. About one-third seed was replaced by new seeds every year.

TABLE 5. DISTRICT-WISE MARKETING AND CONSUMPTION OF WHEAT IN QUINTALS AND PER CENT SHARE

	Kaithal		Hisar		Sonipat		Total	
Sale through/and retention for	Quantity	Per cent share	Quantity	Per cent share	Quantity	Per cent share	Quantity	Per cent share
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Sale in APMC	17968	88.40	6767	75.67	5878	77.22	30613	83.01
Direct to consumers	0	0.00	0	0.00	25	0.33	25	0.07
Retained for seed	593	2.92	132	1.48	273	3.59	998	2.71
Retained for human consumption	794	3.91	937	10.48	750	9.85	2481	6.73
Retained for animals	970	4.77	1106	12.37	686	9.01	2762	7.49
Total	20325	100.00	8942	100.00	7612	100.00	36879	100.00

Source: Field Survey by CRRID team during June 2015, APMC- Agricultural Produce Marketing Committee.

Across the districts, the maximum 88 per cent of wheat produced was sold in Kaithal, 76 per cent in Hisar and 77 per cent in Sonipat. Sale outside APMC was reported by one farmer in Sonipat district to an atta chakki. Quantity retained for consumption by both human and animals was 9 per cent in Kaithal, 23 per cent in Hisar and 19 per cent in Sonipat. Variations may be due to smaller holding size and more allied activities in Hisar and Sonipat.

Farm-Size Wise Marketed Surplus

It may be interesting to see the farm size wise marketed surplus as worked out in Table 6. As expected, the wheat production marketed was the minimum 69 per cent by marginal farmers, 81 per cent by small farmers and 87 per cent by other farmers. Retention for human and animal consumption in percentage terms was almost double

by marginal farmers as compared to small and other farmers. Wheat saved for seeds was 2.71 per cent which was less than normal requirement of 3 per cent. It was because of seed-saving by just 20 per cent MFs, by 50 per cent SFs and by 40 per cent other farmers. Overall, 37 farmers saved for seeds. The remaining seed required was purchased from the market for replacing the old seed.

TABLE 6. FARM SIZE WISE MARKETING AND CONSUMPTION OF WHEAT

	Marginal farmers		Small farmers		Other farmers		Total	
Sale through/and retention for	No. of farmers	Wheat qty. (in q)	No. of farmers	Wheat qty. (in q)	No. of farmers	Wheat qty. (in q)	No. of farmers	Wheat qty. (in q)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
APMC	77	3021	80	8117	95	19474	252	30612
	(100.00)	(68.33)	(100.00)	(81.46)	(100.00)	(86.58)	(100.00)	(83.01)
Direct Sale	1	25	0	0	0	0	1	25
	(1.30)	(0.57)	(0.00)	(0.00)	(0.000	(0.00)	(0.40)	(0.07)
Seed	15	116	40	392	37	490	92	998
	(19.48)	(2.62)	(50.00)	(3.93)	(38.95)	(2.18)	(36.51)	(2.71)
Human	77	651	80	705	95	1125	252	2481
	(100.00)	(14.73)	(100.00)	(7.08)	(100.00)	(5.00)	(100.00)	(6.73)
Animals	68	608	76	750	93	1404	237	2762
	(88.31)	(13.75)	(95.00)	(7.53)	(97.89)	(6.24)	(94.05)	(7.49)
Total	77	4421	8	9964	95	22493	252	36878
		(100.00)	(100.00)	(100.00)	(100.00)		(100.00)	(100.00)

Source: Field survey by CRRID team during June 2015; Figures in brackets are percentage to the respective totals under each farm size.

Role of Commissions Agents (Arahtias)

Arhatias do not find specific mention in the circular of State Government but in practice, they are fulcrum of all transactions in the APMCs. The wheat arrived in APMC is unloaded in front of their shops by the dealing farmers. The number of dealing farmers with an arhatia varied depending upon the loans advanced and dealings. The number was from 40 to 100 farmers in APMC of Kaithal City. The arhatia is responsible for the quality of wheat and he arranges equipment like, separators (Jharana), fanning machine and labour, etc. for cleaning. The bags are supplied by the purchasing agencies but filling, stitching and loading are arranged by arhatias. The labour cost was reported Rs.10 per bag of 50 kg. Out of that the arhatia was charging Rs 6.10 from farmer and Rs.3.90 from the purchasing agency.

The staffs of purchasing agencies would come sometimes after a gap of three days or more for certifying the quality. The wheat lifting by the contracted transporters of the purchasing agencies is frequently delayed and the arhatias are responsible during the period. He is paid commission @2.5 per cent for providing space and facilitates in the APMC. He also helps APMC in realising market fee and rural development cess @ 2 per cent each from the purchasing agencies and others. He acts as billing and payments agent too and paid Rs 0.15 per bag for this service by government procurement agencies (GPAs). It was revealed that GPAs are more

dependent on arhatias to enforce quality norms and to ensure quantity till the wheat reaches the godown. He makes payments on behalf of the agencies to the farmers.

Summing up Economics of Wheat Production

The discussion in the above sections reveals that farmers are growing wheat and selling it as usual in APMC markets since 1970s. Almost no direct sale was reported to consumers and the millers. Wheat is grown in 90 per cent of *rabi* area as there is no competing crop (s) to fetch higher net value to the farmers. One notable observation was almost the total replacement of manual labour in operations like weeding, spraying of pesticides, harvesting, preparation of dry fodder, etc. In this way, all the COC of wheat has become paid out cost for the farmers. It has serious repercussion on the farmers in case of decrease in yield as has happened in March 2015 when wheat was damaged due to unseasonal rains.

III

FARMERS LINKAGE WITH PROCESSORS

Extant Linkage with Flour Mills

To ascertain the linkage of farmers with first stage processers, 9 wheat flour mills consisting of 6 roller flour mills and 3 atta-chakkies were surveyed in May and June, 2015. The chakki-units were located in Sonipat district and owned by individuals. Of the rollers mills, 3 units were from Rai food Park in Sonipat, one each from Panchkula, Ambala and Hisar. Out of total 6 sample roller mills, five were registered under Private Companies Act and one under Partnership Act. Though, survey included many aspects of their working, capacity utilisation and economics but in this paper, only the information regarding procurement of raw material is used to ascertain their linkage with farmers.

Procurement of Raw Material

All mill owners reported that bulk of their wheat requirement is purchased from APMC grain market during harvesting months of May and June. After marketing season; millers reported purchase from Food Corporation of India (FCI) which releases from its warehouses. FCI fixes the price including all cesses, taxes, and transportation and storage charges. Direct purchase from the farmers is not allowed as per APMC Act of Haryana. The purchaser in Haryana whether Government of private has to pay commission @2.5 per cent to the arhatia, market fee and development cess @4 per cent, VAT and other expenses about 7 per cent. These total charges vary from state to state. In Haryana, millers were paying about 13.5 per cent over the MSP in 2015. Some mills bordering UP were purchasing through agents

who supply below Rs.150 per quintal than the price of Haryana with all proper receipts. It was due to less market price than MSP and lower other taxes in UP.

In terms of ownership, no farmers' families were found to have the flour mills. Most of the flour mills are owned by business families who have other linkages too. They were concerned about the procurement price whether the wheat is produced by farmers of Haryana or other states. Even some second stage processors i.e. 9 bakery units located in Sonipat (1), Ambala (1), Panchkula (3) and Chandigarh reported no links with famers. The bigger MNC units like Nik Bakers, Polka, and Capital were not ready to share any information. These MNCs have rendered many old oven based bakeries in Chandigarh non-competitive since April 1997 when biscuits, pastry were taken out of reserved category for MSMEs.

Farmers' Awareness about Wheat Processing

Wheat flour is universally known but the second stage bakery products were not known to all farmers. As per multiple responses of sample farmers, about 73, 48 and 46, 17 and 12 per cent farmers were having knowledge of bread making, bunds, and biscuits, noodles and other items like cakes, rusks, custard, etc. (Table 7).

TABLE 7. AWARENESS OF WHEAT PROCESSED PRODUCTS IN SAMPLE DISTRICTS (ITEM-WISE MULTIPLE RESPONSES)

	Kaithal		Hisar		Sonipat		Total	
Product	Nos.	Per cent	Nos.	Per cent	Nos.	Per cent	Nos.	Per cent
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Flour	87	100.00	84	100.00	81	100.00	252	100.00
Noodle	21	24.14	6	7.14	16	19.75	43	17.06
Bread	62	71.29	63	75.00	59	72.84	184	73.02
Bund	52	59.77	27	32.14	42	51.85	121	48.02
Biscuit	34	39.08	45	53.57	38	46.91	117	46.43
Others	4	4.60	10	11.90	16	19.75	30	11.90
Total	87	100.00	84	100.00	81	100.00	252	100.00

Source: Field survey by CRRID team during June 2015.

Across the districts, the situation was almost the same. Among the districts, awareness of these products was higher in Sonipat than Kaithal and Hisar. It may be due to proximity of Sonipat to mega consumption centre of Delhi and location of Rai Food Park in this district.

Farmers' Involvement in Wheat Processing Units

Most of the farmers were aware of wheat processing units like flour mills and bakeries, though all their products were not known to them. Out of total 252 sample farmers, most of them have installed small chakki for their home use but the common facilities were reportedly vanishing. A big farmer and MLA in Kaithal have set up a floor mill which has become defunct and it has become a bad example for farmers.

Farmers' Willingness to Link with Processing

Of the total sample farmers, 46 per cent expressed willingness to link with wheat processing units. Such farmers are 55 per cent in Hisar, 44 per cent in Kaithal and 41 per cent in Sonipat as shown in Table 8.

TABLE 8.WILLINGNESS OF FARMERS TO LINK WITH WHEAT PROCESSING UNITS

	Kaithal		Hisar		Sonipat		Total	
Willing or not	Nos.	Per cent	Nos.	Per cent	Nos.	Per cent	Nos.	Per cent
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Yes	38	43.68	46	54.76	33	40.74	117	46.43
No	49	56.32	38	45.24	48	59.26	135	53.57
Total	87	100.00	84	100.00	81	100.00	252	100.00

Source: Field survey by CRRID team during June 2015.

The concern of willing farmers are summarised in Table 9. Of the 117 willing farmers, 91 per cent would like to link with wheat processing units, if prices offered are higher, 19 per cent would consider if convenient to market and 11 per cent if time saving and 4 per cent if transport cost is reduced. Among districts, the higher price was the consideration by 95 per cent farmers in Kaithal. Convenience and time saving were the concern of 39 per cent farmers in Hisar and 27 per cent in Sonipat.

TABLE 9. REASONS FOR WILLINGNESS TO LINK WITH WHEAT PROCESSING UNITS (MULTIPLE RESPONSES)

Consideration for	Kaithal		Hisar		Sonipat		Total	
Linking	Nos.	Per cent	Nos.	Per cent	Nos.	Per cent	Nos.	Per cent
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Higher Prices	36	94.73	41	89.13	29	87.87	106	90.60
Convenient	3	7.89	10	21.73	9	27.27	22	18.80
Time Saving	5	13.16	8	17.39	0	0.00	13	11.11
Transport saving	3	7.89	0	0.00	1	3.03	4	3.41
Total	38		46		33		117	

Source: Field Survey by CRRID team during June 2015.

Farmers' Risk Perception about Linkage

Risk apprehensions of 54 per cent of sample farmers' who are unwilling to link with the wheat processing units are summarised in Table 10.

TABLE 10. APPREHENSION FOR NOT WILLING TO LINK WITH WHEAT PROCESSING UNITS

Reasons	Kaithal		Hisar		Sonipat		Total	
	Nos.	Per cent	Nos.	Per cent	Nos.	Per cent	Nos.	Per cent
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Not interested	23	45.10	11	29.73	25	53.19	59	43.71
Commission Agent the Best	9	17.65	9	24.32	9	19.15	27	20.00
Less rate in open market	2	3.92	0	0.00	0	0.00	2	1.48
Millers will discriminate	17	33.33	17	45.95	13	27.66	47	34.81
Total	51	100.00	37	100.00	47	100.00	135	100.00

Source: Field survey by CRRID team during June 2015.

Of the unwilling farmers, 44 per cent expressed apathy to link and 20 per cent preferred the *arhatia* due to old links. About 37 per cent apprehended less price and discrimination by the millers. Less price and discrimination in long run by millers was the apprehension of 46 per cent in Hisar, 33 per cent in Kaithal and 28 per cent in Sonipat. In fact, experience of linkage with processing units was not available with the farmers to think about its benefits. During 2014-15, the author conducted a study of rice mills in Haryana too and no paddy grower was found linked with the mills (Sangwan and Gagan Deep, 2014).

Other Reasons for not Linking

Other reasons for not selling direct to the processors are given in Table11. Of the total sample, 70 per cent reported that wheat processors have never contacted them, 22 per cent knew that direct sale is not allowed and 6 per cent apprehending lesser price from the processors. The remaining two per cent farmers never thought of direct selling to the processors. Across the districts, apprehension of lesser price is the maximum in Kaithal (16 per cent).

TABLE 11. DISTRICT-WISE PROBLEMS IN DIRECT SELLING OF WHEAT TO PROCESSORS

	Kaithal		Hisar		Sonipat		Total	
Reasons	Nos.	Per cent	Nos.	Per cent	Nos.	Per cent	Nos.	Per cent
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Not contacted by processor	53	60.92	57	67.86	66	81.48	176	69.84
Did not try for direct sale	1	1.15	1	1.19	3	3.70	5	1.98
Less rate than MSP	14	16.09	0	0.00	1	1.23	15	5.95
Not allowed	19	21.84	26	30.95	11	13.58	56	22.22
Total	87	100.00	84	100.00	81	100.00	252	100.00

Source: Field Survey by CRRID team during June 2015

Millers Response about Direct Purchase from Farmers

The responses of 9 sample millers are summarised in Table 12. About 78 per cent millers expressed their willingness for direct purchase. They argued that even after paying the market fee, cess and vat (now GST), the purchases at their mill compound @ MSP will cheaper by about 5per cent due to saving in arhatia's commission, transport, loading and unloading, loss in transit, etc.

TABLE 12. WILLINGNESS OF SAMPLE FLOUR MILLS TO PURCHASE WHEAT FROM FARMERS

Interest↓/ Unit→	Shagun flour mills	Aahar consumer products	Gee gee flour mill	Supreme flour mill	Vidya dal and flour mill	Rattan flour Mill	Jyoti flour mill	Malhotra atta chakki	Pawan atta chakki
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Interested in direct purchase	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes
Reasons for no direct purchase	not allowed			Not interested to deal with Political farmers		Not allowed			

The biggest barrier for no linkage between farmers and processors is the state government itself. Its APMC Act Section 8(1) bars direct purchase from farmers by millers and any other. To quote *"From the date of issue of notification under section 6 or from such later date as may be specified therein, no person, unless exempted by rules made under this Act, shall, either for himself or on behalf of another person or the State Government, within the notified market area, set up, establish or continue or allow to be continued any place for the purchase, sale, storage and processing of the agricultural produce or purchase, sell, store or process such agricultural produce except under a license granted in accordance with the provisions of this Act, the rules and bye-laws made there under and the conditions specified in the license."* It applies for flour mills even after amendment till 1 July 2020. Though, despite ban by APMC, a few atta-chakki were purchasing in small lots covertly on agreed prices with the farmers.

Further, millers were apprehending problems in dealing with politically pliable farmers who will be supported by politicians despite written agreements.

Willingness to Set up Wheat Processing Units

The responses of the farmers to set up wheat processing units are given in Table 13.

TABLE 13. WILLINGNESS TO SET UP WHEAT PROCESSING UNITS

	Kaithal		Hisar		Sonipat		Total	
	Nos.	Per cent	Nos.	Per cent	Nos.	Per cent	Nos.	Per cent
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Yes	31	35.63	6	7.14	11	13.58	48	19.05
No	56	64.37	76	93.86	70	86.42	204	80.95
Total	87	100.00	84	100.00	81	100.00	252	100.00
Who identified type of unit	31	100.00	6	100.00	12	100.00	49	100.00
Flour mill	25	80.65	4	60.00	7	58.33	36	73.47
Biscuit/bread/bund units	5	16.13	2	40.00	5	41.67	12	24.49
Noodle, etc	1	3.22	0	0.00	0		1	2.04

Source: Field survey by CRRID team during June 2015. Percentage in 5 to 7th line is from those identified the units. In 4th line percentage of all who identified type of unit.

Of the sample, only 19 per cent farmers were willing to set up some type of wheat processing units. District-wise, 36 per cent farmers in Kaithal, 14 per cent in Sonipat and only 7 per cent in Hisar were willing to set up any wheat processing unit. The types of processing units identified are shown in Table 13. About 73 per cent of willing farmers showed willingness for flour mills, 25 per cent for biscuit/bread/ bund units 2 per cent for noodle and other units. Across the districts, flour mills were expressed as choice by 81 per cent farmers in Kaithal, by 60 per cent in Hisar and 58 per cent in Sonipat. Willingness for setting biscuit/bund/bread units was 16 per cent in Kaithal, 40 per cent in Hisar and 42 per cent in Sonipat.

Farmers' Apprehensions to Set up Processing Units

The problems apprehended by some the sample farmers to set up wheat processing units are presented in Table 14.

TABLE 14. PROBLEMS IN SETTING UP WHEAT PROCESSING UNITS (MULTIPLE RESPONSES)

	Kaithal		Hisar		Sonipat		Total	
Type of unit	Nos.	Per cent	Nos.	Per cent	Nos.	Per cent	Nos.	Per cent
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Availability of loan	4	8.33	2	66.67	3	30.00	9	14.75
Availability of subsidy	19	39.58	1	33.33	2	20.00	22	36.07
Training required	17	35.42	0	0.00	3	30.00	20	32.79
Availability of land	6	12.50	0	0.00	1	10.00	7	11.48
Any other	2	4.17	0	0.00	1	10.00	3	4.92
Total	48	100.00	3	100.00	10	100.00	61	100.00

Source: Field Survey by CRRID team during June 2015.

Of the 61 respondent farmers, 15 per cent apprehended non-availability of big loan for setting up a flour mill and 36 per cent wanted that Government should give some subsidy for setting up the wheat processing units. Owing to lack of any family experience, training was suggested by 33 per cent farmers to create interest and impart know-how for establishment of processing units. About 11 per cent reported non-availability of suitable land in industrial estates and as a unit outside the estates will not get uninterrupted supply of electricity. Rest of the farmers could not even think of starting their own processing units owning to no experience of their family. Across the districts, farmers of Hisar were more specific in loan requirement and subsidy.

IV

CONCLUSIONS AND SUGGESTIONS

1) Wheat is grown in 90 per cent *rabi* area in most of districts of Haryana as it gives higher net income than other competing crops of the season. The other notable finding was replacement of manual labour in all wheat operations by machinery, thus making its entire COC as paid out cost. It has increased the risk concern of farmers in terms of decrease in yield or prices or both.
2) The survey analysis revealed that farmers are growing wheat and selling it as usual in APMC markets since 1970s. No farmers' families were found to have the flour mills. Most of the flour mills are owned by business families who have no linkage with farmers due to APMC Act and even otherwise to avoid politically pliable farmers.
3) In Haryana, millers were purchasing wheat by paying about 13.50 per cent taxes over MSP as compared to 8.5 per cent in the neighbouring States of UP over its market price which is usually less than MSP by Rs. 200 per qtl. After accounting for all costs, the millers of Haryana were paying Rs.150 less per quintal on the

wheat purchased from UP. So millers have no special attraction for farmers of the state.

4) Despite that 77 per cent millers were willing to purchase direct from farmers because it will reduce their purchases price by 5 per cent in terms of arhatia fee, loading, unloading and transport expenses and losses. In turn, the processors may help in arranging good seeds and chemicals for the farmers to get quality wheat. This can be a win-win situation for the farmers, processors and the State government.
5) Farmers were apprehending price discrimination by millers during purchases at their mills while some big millers were also afraid to deal with politically pliable farmers.
6) To set up flour mills and other processing units; the individual farmers reported lack of capabilities and unsure about big loans at scale of mills. Hence, farmers' producers organisations (FPOs) for wheat as well as paddy may be promoted on the lines of the FPOs being promoted for vegetables and fruit growers. The Agriculture department of States may be entrusted FPOs like horticulture department.
7) The willing farmers and FPOs of wheat may be imparted technical knowledge of flour mills and bakeries. Industry department, Hafed, NABARD and bankers can associate in training for project preparation, providing guidance for bank credit and other incentives from State and Central governments.
8) State government may consider equity participation for the wheat processing units by FPOs at par with those given by government of Maharashtra to sugar mills and later on for cotton ginning units. Even interest subsidy may be considered for the units of the FPOs on the loans provided by banks.
9) The flour mills and bakery units were also found profitable by the study and there is a scope for new units in the surplus wheat state of Haryana. Government of Haryana may consider setting more food parks in southern Haryana along the railway lines to Bhiwani and Hisar where land will be cheaper.
10) The AVC in wheat can be possible if propelled by the State Government to create employment and income for rural youth. Hafed may be persuaded by State Government to buy the product of flour mills of FPOs to market under its brand at the initial stage.
11) The FCI price policy should be favourable to the surplus wheat producing States through all India auction at the place of storage/release of the wheat. Minimum quantity of wheat release may reduce from 100 tonnes to truck load, i.e., 10 tonnes for purchase by smaller units.

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ANNEXURE 1. RANKING OF HARYANA DISTRICTS AS PER WHEAT SURPLUS DURING TRIENNIUM ENDING 2013-14

Districts name (1)	Average production (000 t) (2)	Population in 2011 (3)	Annual consumption requirement (000 t)* (4)	Surplus production (000 t) (2-4) (5)	Per capita availability in kg/ year (2/3) (6)	Rank in per capita availability (7)	Rank in Surplus (8)
Ambala	378.33	1136784	58.52	319.48	332.52	14	15
Panchkula	52.67	558890	28.77	23.93	94.29	20	21
Y.Nagar	397.33	1214162	62.51	334.49	326.97	15	14
Kurukshetra	555.00	964231	49.64	505.36	575.59	6	9
Kaithal	872.00	1072861	55.23	816.77	812.78	3	4
Karnal	860.00	1506323	77.55	782.45	570.93	7	5
Panipat	434.33	1202811	61.92	372.08	360.82	13	13
Sonipat	742.67	1480080	76.19	666.51	501.80	8	7
Rohtak	458.67	1058683	54.50	404.20	433.27	11	12
Jhajjar	459.33	956907	49.26	410.04	479.98	9	11
Faridabad	145.00	1798954	92.61	52.39	80.60	21	20
Palwal	465.67	1040493	53.56	412.14	447.58	10	10
Gurgaon	237.67	1514085	77.95	159.75	156.99	19	19
Mewat	312.00	1089406	56.08	255.92	286.39	16	16
Rewari	235.00	896129	46.13	188.87	262.24	17	17
M/Garh	211.00	921680	47.45	163.55	228.93	18	18
Bhiwani	688.67	1629109	83.87	604.83	422.75	12	8
Jind	801.67	1332042	68.57	733.13	601.86	5	6
Hisar	1082.00	1742815	89.72	992.28	620.83	4	2
Fatehabad	996.33	941522	48.47	947.83	1058.18	2	3
Sirsa	1538.00	1295114	66.67	1471.33	1187.54	1	1
Entire State	11923.33	25353081	1305.17	10617.33	470.26	-	-

Source: Government of Haryana (2014), *Statistical Abstract of Haryana 2013-14* and various issues.
Note: *Normal per capita consumption @ 51.48 kg per year.