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Pulses Market and Developing Value Chain on Retail, Wholesale and Daal Factory Level Analysis for the Farmers of Sukkur

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Abstract:
This research investigates Pulses Market and Developing Value chain on Retail, Wholesale and Daal factory level Analysis for the Farmers of Sukkur. Data were collected from various retail, wholesale, Processor, agent in different cities of Sindh Pakistan. A well-structured and pre-tested questionnaire was prepared with the help of the experts and project team and Before starting the survey, the enumerators were rigorously trained in various areas and ifor one day by the project team responsible for the baseline survey in Larkana District. In first few visits I checked them whether they are collecting information according to the questionnaire. Focus group discussion was carried out to get information from farm level. Value chain analysis of pulses is carried out to identifiy the current practices, opportunities for improving value chain at different levels of value chain of pulses. It was revealed that Pulses play an important role in farming systems worldwide. They have proved to be ideal crops for achieving improvements in nutrition and health conditions, reducing poverty through higher food security and enhancing ecosystem re- silience, particularly in developing countries like Pakistan ACIAR Australian Centre for innovative Agriculture Research is making efforts to improve value chain of pulses in Pakistan considering all value chain actors. The research project intends to understand the current practices and obstacles, different value chain actors are facing. After identifying the possible interventions to improve value chain of pulses in the country, interventions will be tested across the value chain. In order to see the effect of interventions on the performance of interventions. It was revealed that Value chain analysis of pulses is carried out to identifiy the current practices, opportunities for improving value chain at different levels of value chain of pulses. For this purpose, the high end-stores, superstores and grocery shops were visited in in Larkana, Sukkur Hyderabad and Karachi. . Wholeslaers, merchants, processors (Channa factory) and farmers were contacted for detailed study of value chain of mung beans. chick peas and Lentil. Results reveal that size of grain, color, packaging, Brand cleanliness and freshness are important attributes of pulses when the consumers make decision in purchasing pulses from the supermarkets and or super stores. Main issues recently he faced that in 50k.g of chickpea bag 2k.g dust, in lentil 50.kg bag 4 .kg dust and broken seed from lentil. In Mungbeans 50.kg bags 2.kg dust particals' and broken Mungbeans. In Hyderabad we have visited Ahmed Ali Wholesaler located in Main issues recently he faced that in 50k.g of chickpea bag 3k.g dust, in lentil 50.kg bag 3 .kg dust and broken seed from lentil. In Mungbeans 50.kg bags 2.kg dust particulars' and broken Mungbeans.
Keywords: *Pulses Market, Value Chain on Retail*

Introduction

Pulses are the common option for the majority of Pakistani households. Pulses are rich in proteins among all cultivated crops in Pakistan. Pulses can be grown in all type of soil. Pulses re play a vital role in crop

rotation, mixed and intercropping, as they maintaining the soil fertility. Pulses add organic matter into the soil in the form of leaf mold and require less manuring. Pulses in general are nutritionally enriched as they have high protein content, relative to staple cereals. In addition to their nutritional content, there are several reasons that strongly
support legume cultivation and adoption. Important reasons for their cultivation include: (i) suitability for human and animal consumption, (ii) adaptability for inter- or mixed cropping, (iii) agronomic management of legumes is relatively easy, (iv) legumes are relatively hardy crops and grown in some of poorer soils and harsh growing conditions and face lower incidence of pests and diseases, (v) input (especially nitrogen fertilizer) requirement is lower compared to other crops,and (vi) legumes are also considered as cash crops. Though legume cultivation has several advantages they also suffer from some limitations restricting their cultivation, especially limited availability of quality seeds of improved varieties, harvesting is tedious,in addition to labour requirement for value addition, and most importantly volatility of markets.

Pulses play an important role in farming systems worldwide. Pulses are smart crops both for humans and the cropping system as they provide protein, minerals, vitamins, and fiber for human diet and nitrogen to the soil and contribute to the maintenance of biodiversity. Pulses, also called grain legumes, contribute about 33% of the global dietary protein requirement of the human population. In Pakistan, the production of pulses is far less than the requirement and the balance is met through imports. They have proved to be ideal crops for achieving improvements in nutrition and health conditions, reducing poverty through higher food security and enhancing ecosystem re- silience, particularly in developing countries like Pakistan

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Research Methodology

Data were collected from various retail, wholesale, Processor, agent in different cities of Sindh Pakistan. A well-structured and pre-tested questionnaire was prepared with the help of the experts and project team and Before starting the survey, the enumerators were rigorously trained in various areas and ifor one day by the project team responsible for the baseline survey in Larkana and Sukkur District. In first few visits I checked them whether they are collecting information according to the questionnaire.

Value chain analysis of pulses is carried out to identifiy the current practices, opportunities for improving value chain at different levels of value chain of pulses. For this purpose, the high end-stores, superstores and grocery shops were visited in in Larkana, Sukkur Hyderabad and Karachi. . Wholeslaers, merchants, processors (*Daal Factory*) and farmers were contacted for detailed study of value chain of mung beans. chick peas and Lentil.
Results reveal that size of grain, color, packaging, Brand cleanliness and freshness are important attributes of pulses when the consumers make decision in purchasing pulses from the supermarkets and or super stores.

2. Current Market Structure

Farmer -Middleman/Agent-Commission agent- processor-wholesaler-Retailer

Farmers in Larkana and Sukkur in link with middleman or agent because 90 percent of the pulse farmers financed by Middleman so he purchased pulses and sell out to Commission agent or in few cases directly sell to the Processor, Wholesaler purchased directly from processor and then supply to retailer.

3 Consumer Insight: Size of the grain, Whole not broken, cleanliness, color, packing, Branding and price are considered important attributes by the super stores and supermarkets

4.The relative importance of meeting customer expectation at the retail level

Attributes	Relative importance		
	Chickpeas	Lentils	Mung Beans
Variety	Not important	Not important	Not important
Packaging	Very much	Not important	Very much
Size of grain	Very much	Not important	Very much
Origin of Pakistan	Very much	Very much	Very much
Freshness	Not important	Very much	Very much
Cleanness	Very much	Very much	Very much
Chemical free (safety)	Not important	Not important	Not important
Price	Very much	Very much	Very much

Pulses are mostly purchased in summer and second half of the day from grocery and supermarkets/super stores. Quantity bought by the consumers ranges ½ kg-2 kg depending on the type of grocery shop, stores, etc. cleanliness, packing and price are considered important attributes by the super stores and supermarkets. Grading, sorting and packing are done at the supermarkets and superstores whereas no or little value addition relating activities are done at grocery shops. However, one owner of grocery shop reported that he used to keep pulses in glass boxes in order to having shining and brightness to attract the customers. Size of grain, origin of pulses, cleanliness, packing and price are very much important for customers while buying mung bean and chick peas as reported by the retailers. Color, Packaging, Size, Freshness, quality cleanness.

Value addition at the retailers end

Cleaning , Grading, sorting and packaging are carried out at warehouse of the supermarkets, and superstore. Involve women in retail level.Write expiry date and use of packaging with different designs.Grocery Shop level Use of polyhedrane bags depends on the amount of pulses purchased.In Sindh no proper storage.
Main Operating Costs at retail levelTwo or three women should employee in pulse section and they will deal with pulse customers. Rs.20,000/per month.10 women and men employed for sorting grading and cleaning Branding, labelling and packaging cost vary from Rs.2 to rs.3kgof pulseTransportation cost including loading and unloading is on average Rs.39-41

Table 2: Production issues in pulses production in Sukkur and Larkana

Sukkur	Impact on production	Possible solution
Cost of farm inputs (2)	Less use leads to low production	Direct subsidy to inputs
Weather conditions (2)	Damage to the produce	timely provision of weather forecast
Weeds (2)	Reduction in productino	
Access to improved seed (2)	Low productivity	Access to quality seed
Blight (1)	Low production	Resistant varieties and fungicide use

Figures in parentheses show order of importance, 1 for higher importance and 5 for lower

5. Sale and purchase prices range of Pulses at the high-end market and critical issues at their level

High End Market Price Chickpea

	Purchased Price	Sale Price	Price Margin
Imtiaz Super Store	180	220	Rs.30

High End Market Price Mung bean

	Purchased Price	Sale Price	Price Margin
Imtiaz Super Store	195	240	Rs.45

High End Market Price Lentil

	Purchased Price	Sale Price	Price Margin
Imtiaz Super Store	150	180	Rs.30

Market Price Chickpea

	Purchased Price	Sale Price	Price Margin
Max-Bachat Hyderabad	175	1200	Rs.25
Seven Eleven Sukkur	180	200	Rs.20

High End

Market Price Mung bean

	Purchased Price	Sale Price	Price Margin
Max-Bachat Hyderabad	190	225	Rs.30
Seven Eleven Sukkur	190	220	Rs.30

Market Price Lentil

	Purchased Price	Sale Price	Price Margin
Max-Bachat Hyderabad	155	170	Rs.25
Seven Eleven Sukkur	165	185	Rs.20

6. Wholesaler insight about maintaining quality and meeting customer expectation and critical issues at their level.

Wholesaler point view Freshness, size of grain and cleanliness of the pulses are top priority of the wholesaler. If any dust are broken of pulses specially lentil, Mungbeans and chickpeas the price will be low. Chemical free is also important for wholesaler. Chickpeas size of the grain, cleanness, freshness and color on top priority Lentil and Mungbeans: cleanness, freshness and color on top priority**.** Although wholesalers demand the quality produce of the pulses (based on size of the grain, waste, moisture, etc.) from merchants and or farmers, they care very little during selling the produce to the daal factories or millers. This implies absence of price incentives for selling the quality produce to the processors. In spite of these facts, the processors deduct the amount paid to the wholesalers for waste, moisture and damaged or broken pulses. This implies that there is a need to sensitize and build confidence among the processors and wholesalers that value addition would be beneficial to all the value chain actors.

Merchant and farmers are other important value chain actors and we don't see value addition relating activities at farmers' and merchants' ends. Interventions at the farm level needs immediate attention to start value addition as doing this will reduce cost of value addition at later stages of value chain of pulses. However, this happens only if price incentives for value addition are ensured to farmers and merchants.

Quality parameters Considered by wholesaler

Issues: Main issues recently he faced by wholesaler that in 50k.g of chickpea bag 2k.g dust, in lentil 50.kg bag 4 .kg dust and broken seed from lentil. In Mungbeans 50.kg bags 2.kg dust partials' and broken Mungbeans. In Hyderabad we have visited Ahmed Ali Wholesaler located in Main issues recently he faced that in 50k.g of chickpea bag 3k.g dust, in lentil 50.kg bag 3 .kg dust and broken seed from lentil. In Mungbeans 50.kg bags 2.kg dust particulars' and broken Mungbeans.

Some of the major operating costs at the wholesalers levels, purchasing price, selling price and margins in mungbean, chickpea and lentil.

Wholesaler	Chickpea	Mung bean	Lentil
Purchasing Price A Grade	Rs. 120.K.g	Rs135/kg	100k.g
Processing Cost	Rs.10.kg	Rs.5.kg	Rs.10.kg
Selling Price	Rs.180	Rs.190	Rs.145
Margin	Rs.50	Rs.50k.g	Rs.35/k.g
Purchasing Price B Grade	Rs. 110.K.g	Rs.125/kg	90. kg
Processing Cost	Rs.10/k.g	Rs.10	Rs.8
Selling PRICE	160kg	Rs.180	Rs.140
Margin	Rs.40	Rs.45	Rs.38
Shop Rent	40,000 p.m	45,000	50,000

Labor Charges Loading	20/per bag	22/per bag	22/per bag
Labour Charges	20000-23000	30,000	30,000

8. Financial analysis of chickpea, lentil and mungbean including purchase price and selling price of each commodity at the factory level.

Operating Costs	Chickpea	Mung bean	Lentil
Purchasing Price A Grade	Rs.4000/ 40.kgbag	Rs.5500	Rs.4000
Processing Cost	Rs.200/	Rs.300	Rs.300
Selling Price	Rs.4800	Rs.6500	Rs.4600
Margin	Rs.600	Rs.700	Rs.300
Purchasing Price B Grade	Rs. 3500	Rs.5000	Rs.3500
Processing Cost	Rs.200	Rs.300	Rs.300
Selling PRICE	Rs4200	Rs.5800	Rs.4100
Margin	Rs.500	Rs.500	Rs.300
Other Costs			
labor charges of filling bags	10/bag	11/bag	11/bag
Labor charges of loading and unloading	16/bag	15/bag	15/bag
Worker wages	20,000-25,000 month(mx-20)	20,000/ month(mx-20)	20,000/ month(mx-20)
Packaging material	28/bag	30/bag	30/bag

9.Marketing Issues and production issues at farmers level

Table 5: Marketing issues in Sukkur District

1=high 5 carries low

Larkana	**Sukkur**	**Impact**	**Possible solution**
Low price (1)	Low price (2)	Low profitability	Quality consideration for higher prices
Selling in local market (1)	Selling in local market (2)	Small produce by the small farmers	Cooperation to be built among farmers for selling the produce at big market
Storage difficulty (2)	Storage difficulty (3)	Selling at low price	Public and private partnership for buiding storage facility
Distance to market (2)	Distance to market (2)	High transportation cost	Improved infrastructure be provided
Lack of knowledge to grading, sorting (3)	Lack of knowledge to grading, sorting (2)	Poor quality of the produce	Capacity building through agri extension

10. Financial analysis of chickpea, lentil and mungbean including selling price of each commodity at farmer level

Financial Model at farmer level

Activities	**Mung bean** (Rs/acre)	**Chickpeas** (Rs/acre)	**Lentil**
Seed	3300	3496	2031
Ploughing	3200	1850	2200
Weeding	3000	3042	3500
Pesticide	2000	1000	900
Irrigation	3400		
Fertilizers	4600	2800	3100
Harvesting	4000	4300	3600
Packaging		40	
Storage	2000	1000	2000
Transportation	80	150	90

Loading/Unloading	60	140	120
Total cost per acre	25,640	17818	13941

Reflection and Chain Characterization

In the chain characterization the poor management practices were carried out the pulses value chain. A poor management practices activities at factory level as well as retail and wholesale level. The value of the customers was not understand in the chain. A short perm price based relationship is built in the consumer level.Chain characterization Commodity Specific Chain characterization

Mungbeans

Mungbeans are cultivated in various Taulkas of Sukkur i.e Bagraji, Pano Akil and Abad . From last couple of years the trend of Mungbeans cultivation as a third main crop after chickpea and Wheat is increasing day by day. The total area for pulse crops is about 130 areas and 10 percent of the total cultivated area. In this area irrigated land is used for these crops. Mungbeans is cultivated by broadcasting of seed method in Larkana district. Mostly farmers purchased seed from local market, few f the farmers purchased seed from the Punjab. Yield per acre in Sindh is very low 10-12 monds/ acre. Availability water is the most constraints for Mungbeans growers in Sukkur District.

Mungbeans are also sources of feeding animals and used in household consumption mostly farmers are used with lentil and rice bread in winter season. In Sindh private seed companies are not involve in seed production or Government of Sindh seed cooperation are mainly focus on Rice and wheat seed production not in pulses.

Government of Pakistan focus on to improve the yield of Mungbeans by supply of quality of seed to the farmers and to improve the Mungbeans value chain with the support of private and foreign donors.

Lentil

Lentil is one of the healthy foods. In early 800 B.C in middle east. Lentil has many health benefits like fiber, lower cholesterol, and protect against diabetics. Lentil is culverted in Villages of Pano Akil Hussain Kalwar and Sangi area we have explore 16 lentil growers in Sukkur Districts. The area of land cultivation of lentil decreased in last ten years due to very low production 3 to 4 monds. Poor agronomic practices and unavailability of quality certified seed in Sukkur district is the main cause of decreasing land holding of Lentil.

By product of Lentil like husk and straw is used for animal feed. The recent surge in the prices DAP and other input cost and unavailability of good quality of seed in Sindh province and unstable market prices of lentil Government very little interest of Government interest in pulses crop.

Lentil by products are used for animal fodder, factories are using by products and commercially sell in the market and earn money. In Larkana twice a week most of the families are using lentil in their diet.

Chickpeas

Chickpeas are excellent source of dietary fiber, which is vital healthy digestion. In one cup of chickpeas you will get 12.5 grams of fiber. Chickpeas is growing in various areas of Sukkur District mainly in Abad, Bagarji and Pano Akil. Chickpea is growing in Indus river basin in a single crop. Most of the farmers are getting better yield of chickpeas in Indus river belt.

The chickpeas growers are in small in size of land holdings.In Sukkur District 95 percent of the while chickpeas are cultivated only five percent of the farmers are growing Black chickpeas.

Black chickpeas are used in salad and in dinner diet. Chickpeas growers identified some constraints like blight issue in local varieties. One of progressive chickpea grower Liaqat Abbasi he shared his experience that last year he purchased American white chickpeas seed from Karachi and it was 98% resistant to blight and other issues.

Post harvested losses range 20-25% because of poor labor and management in Sukkur district. Mostly chickpeas growers are using tradition farming practices and using manual harvesting. Lack of technological advance practices like machine use harvesting.

In recent survey many progressive farmers willing to pay for harvester machines but in the market machines are not available for chickpeas. Many farmers reported 25% loss of falling grains of chickpeas. In Sukkur famers produced and sell through middle man to Daal factory. Middle man enjoys 30% of the profit of the

farmers with out doing any thing. He invested money in providing inputs to the farmers. In the recent trend analysis chickpeas are widely used in different value added practices in Arabic and Lebanese dishes Hamas, Baba Gounch and Falafal. Chickpeas also used in basin.

Chickpeas also packed in different home brands labels like Imtiaz, Bin Hashim. Max Bachat and Carrefour retail stores.

In Sindh popular dish of Chickpeas called Pali which is very tasty. This is also available in tin Packed and very famous in western world.

Chickpeas consumption in different festivals, Eid and Maharam.

Constrains of producing chickpeas mainly, availability good quality of seed, lack of improved varieties, lack of irrigation, facilities, high transportation cost, poor marketing. No innovation and modern agriculture practices. The middle main share 20-30%, retailer, 10, wholesaler, 11% in pulses**.** In Sindh popular dish of Chickpeas called Pali which is very tasty. This is also available in tin Packed and very famous in western world. Pali is one of the favorite dish in Pakistan chickpeas leaves used for cooking and serve with rice bread. Chickpeas leaves are very costly in the month of August to January price range 200-240/K.g and mostly farmers in Larkana and Sukkur region gets better market of chickpeas leaves.

Possible Intervention

Farmers Direct sell to factory no middleman involvement

Quality of seed provided to farmers level to produce good quality of pulses

Sorting and grading at Farm level

Recommendations

One of the most significant challenges faced by the pulse production industry in Sindh-Pakistan is achieving adequate dissemination of improved seed varieties. The lack of such dissemination has severely limited gains in productivity in recent years. Particular attention should therefore be paid to strengthening the seed supply in the sector, notably through identification and development of varieties of pulses that are suitable for the identified regions and that are in line with international market requirements. Improved seeds will then be distributed through farmers' associations. A stronger in- volvement of the private sector will also be encouraged to ensure regular supply of the quality seeds necessary for the good development of the industry.

Also related to enhancing the use of quality inputs, and in addition to seed supply, an important element under this strategic objective will be to ensure that the sector has ac- cess to a strong base of inputs, in particular pesticides and fertilizers that are suitable for specific soil characteristics and pulse varieties. A plan to improve availability of these products for pulse farmers will be developed.

Pilot farm initiatives for production and harvesting of the identified pulses will also be established, providing a platform for the exchange of best practices with farmers' organizations. Following this initiative, a vast programme to scale up production (sowing and harvesting) of the identi- fied pulses will be undertaken in the previously identified regions.

Finally, strengthening the sector will be achieved by improving postharvest management and ensuring that the crop is handled and stored properly.

Structured investment promotion efforts for sector devel-opment (processing) will also be organized as part of this strategic objective. An important step will be to promote technology transfers to allow Sidh-Pakistann investors interested in pulse processing to develop their activities, namely through the setting up and supply of processing machinery should provide on subsidy basis.

Finally, investment will be promoted by inviting investors, explaining the investment opportunities, providing sector information and matchmaking with local producers

In Sindh province pulses sector is still little-known in- ternationally, a key step towards achieving this objective is to ensure structured export development and promotion efforts. Building the capacities of commercial attachés concerning pulses and their processed products will be conducted in this regard, and regular trade missions to selected target markets for business owners from the sec- tor will be organized. Specific market development plans for these priority target markets will also be designed and implemented.

In addition, and in order to enable local exporters to meet international buyers, participation in trade meets and international and bilateral trade fairs will be strengthened, notably through closer collaboration with international puls- es sector agencies..

The development of reliable market information systems will ensure the continuous growth and global reach of the sector. This objective will be achieved through providing timely and relevant trade information for value chain stake- holders, including detailed market reports.

- Access to quality inputs (including seeds), including pesticides and fertilizers (including training should be provided to the pulse farmers
- Building capacities and knowledge on pulse production, including soil analysis and water management, sowing, and protection from diseases and pest attacks;
- Developing the farmers' organizations' knowledge of the pulses market, including prices, market requirements and global outlook (including national, local, market);
- Training on farming and postharvest techniques (cleaning, sorting, grading, drying, polishing, bagging, storage, etc.);
- Mapping of manufacturers of processing equipment in Sindh-Pakistan (types, processing capacity, technical support and spares).
- Training requirements for local technicians to maintain the equipment.
- Cost of the equipment – actual and associated costs – including financing mechanisms.
- Capacity and diversity (multipurpose during low seasons where other crops can be processed) use of processing.
- Packaging range of equipment –smaller/bigger packets etc.

Refferences

i. Chand, R., Raju, S.S. and Reddy, A.A. 2015. Assessing performance of pulses and competing crops based on market prices and natural resource valuation. *Journal of Food Legumes* 28(4): 335-340,
ii. Chaudhary, J.N. Singh, K.M. and Singh, R.K.P. 1990. Pulses production in Bihar-an empirical analysis. *Agricultural Situation in India*. **45** (2): 113-119
iii. Choudhary, A.K. 2013. Technological and extension yield gaps in pulses in Mandi district of Himachal Pradesh. *Indian Journal of Soil Conservation* **41** (1): 88–97
iv. Choudhary A K and Suri V K. 2014. Scaling up of pulses production under frontline demonstrations technology programme in Himachal Himalayas, India. *Communication in Soil Science and Plant Analysis* **45** (14): 1 934–48.
v. Census (2011) Government of India.
vi. Commodity Profile : Pulses, August 2015, Ministry of Agriculture, GoI
vii. Dass, A, Suri, V.K., Choudhary, A.K. 2014. Site-specific nutrient management approaches for enhanced nutrient-use efficiency in agricultural crops. *Research and Reviews: Journal of Crop Science and Technology* **3** (3): 1–6.
viii. Department of Statistics and Evaluation, Government of Bihar, Patna.
ix. ESI. 2015. The Economic Survey 2014–15. The Economic Survey of India, New Delhi.
x. Government of Bihar (2003), Bihar through figure, Department of Statistics and Evaluation, Patna.
xi. Government of Bihar (2008) Bihar Economic survey – 2008-09, ministry of finance, Patna, March. P. 23.

xii. Government of Bihar, Economic survey 2012-13, 2013-14.
xiii. ICAR Annual Report 2014, Indian Council of Agricultural Research.
xiv. Joshi, P. K., Tripathi, G. and Gautam, M. 2012. Transforming Bihar agriculture: challenges and opportunities: Paper presented at Global Bihar Summit 2012: Forging Partnerships For Development, 17-19 February 2012, Patna, India. Available at http://www.globalbihar.net/wp-content/uploads/2012/02/papers/pk_joshi_agri.pdf
xv. Kumar, A., Suri, V.K. and Choudhary, A.K. 2014. Influence of inorganic phosphorus, VAM fungi and irrigation regimes on crop productivity and phosphorus transformations in okra (*Abelmoschus esculentus* L.)–pea (*Pisum sativum* L) cropping system in an acid Alfisol. *Communications in Soil Science and Plant Analysis* **45** (7): 953–67.