

## Original Research Article

# Value Addition & Market Analysis of Major Pulses in Bihar for Livelihood Security

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## ABSTRACT

The main objective of present study is to double the income level of rural producers and stakeholders concentrating on the improved economic channels or market chains. The market map framework was used to serve the policy maker and rural development planners to formulate policies and concentrate on product specific market respectively. The utilization of main product and by-product of the crop indicated that traditionally grown variety of both the pulses were mainly used for consumption purpose. Value chain analysis indicated that 90% of farmers sold their produced just after harvest to village trader in local market to meet out the operational expenditure and others obligations. Producer's share in consumer rupees was worked out and found that only 60% farmers were used main channel in study area. Value addition network indicated that about 50% of producers share reduced due to higher marketing margins taken by intermediaries present in channel of marketing (51/kg). Appropriate backward and forward linkages of pulse growers with marketing were also analysed to generate better returns from pulses. There is a need to enabling environment through the government policies to support services for enhancing marketing efficiency of selected market in Bihar. In constraints analysis indicated that non availability of dall mills /processing plants in specific location followed by suitable variety not available at the time of sowing, storage problem, Lack of market information for forward linkage with other markets were the major constraints faced by the famers in selected district. Further, it was also noted that 30 percent of produced get lost every year before to reached into the market.

## Keywords

Value chain Analysis, Backward linkage, Forward linkage, consumption, cost of cultivation, pulses, Bihar

## Introduction

In India, pulses are grown on 23 million hectares area with an annual production of 15 million tons in 2003-04; it has been increased to 25 million hectares in the year 2013-14 along with 15 to 19.7 million tonnes production. Productivity also increased during same period from 635 Kg/ha to 785 Kg/ha (Suhasini *et al.*, 2013; Kumari *et al.*, 2016). The net availability of pulses has come down from 60 gm/day/person in 1951 to 31 gm/day/person while Indian Council of

Medical Research recommends 65 gm/day/capita in 2008. The requirement of pulses will continue to increase in future mainly due to ever increasing population and preference for pulses as the cheapest source of dietary protein. Recently, The Prime Minister also call for second green revolution of the country with emphasis on enhancement of pulse production to ensure food and nutritional security of people also founds the Bihar is most suitable for it.

Particular reference to major pulses like *chickpea* and *pigeon pea* in Bihar, the area and production of both the pulses has been declined due to growing popularity and public policy. It indicates state has huge potential in pulse production but as for marketing is concerned there is lack of established dal mills in the area dealing with large scale (Kumari *et al.*, 2016). This study argued that effort to secure and double the income of poor rural producers and workers are best pursued through concentrating on the improved overall performance of particular economic channels or market chains. The maps also illustrate the costs, secondary services required to each stage, critical constraints faced during marketing as well as for value addition at each stage, and the relative clout of players along with value chain.

## **Materials and Methods**

The present study was undertaken in the Bhagalpur district of Bihar. The stratified random sampling was used for selection of farmers; and snowball sampling for other stakeholders. Primary data were collected from the farmers using semi structured questionnaire and in close interaction with various stakeholders as much as 20 wholesalers, 20 retailers, 20 village trader and 135 farmers were interviewed to understand the value chain during the year 2015-16. The data analysis was started from cost and production data compiled from various producers involved in the cultivation of pulses. The figures used in the analysis were the estimates of the representative sample of farmers adopting advanced technology of farming (improved seed, fertilizers and pesticides) compared it with those farmers who were cultivating pulses without adopting the advanced technology. The value added at each financial transaction in the chain has been constructed

from the difference in its value (in terms of Rs /kg).

## **Value chain Analysis**

A value chain is a sequence of related business activities (functions) from provision of specific inputs for a particular product to primary production, transformation and marketing, up to the final sale of a particular product to the consumer (GTZ ValueLinks, 2008). It also includes the number of intermediaries performing different functions, like producers, processors, traders and distributors of a particular product linked by a channel through which the product passes from primary producers to the end consumers. Thus, value chain actors, responsible for movement of materials, information and/or services, share an interest in the end-product was considered for analysis, because changes in the end-market affect them both collectively and simultaneously.

## **Mapping**

Mapping is a central element of value chain analysis. It has been used to show the flow of produce from producer to ultimate consumers. It is made up of following three inter-linked components: (1) Value chain actors (farmers, dealers, distributors, etc.), (2) Enabling environment (infrastructure and policies, institutions and processes that shape the market Environment), and (3) Service providers (business or extension services that support the value chains' operations).

The data on physical infrastructure in mandis, monthly prices, corresponding arrivals, and share of the markets (local as well as outside state), etc were collected directly from mandis. All major mandis trading in pulses i.e. Bhagalpur, siliguri and

Patna had been covered by the survey for studying the trade channels and value chain mapping for major pulses in Bihar.

## **Results and Discussion**

In Bihar, The area under pulses indicated a declined rate but productivity of major pulses like chick pea and pigeon pea over the year shown an increased or somewhat stable over the year (fig-1 and 2). Which is an indicative of potentiality of both major pulses production in the state, by and large predominated by cereal-based cropping systems.

However the area under chickpea in India shown an increasing trend due to the fact that some of state has gained area under the chick pea. But its productivity was lower than that of our state. Further it was also observed that drastic changes in area, and productivity of chick pea has been increased from 2008 to 2013. The main reason behind this was due to improved variety demonstration trial under TL-2 project did well in some state.

The other major pulses were pigeon pea, constituted about 12 to 13% in the rainy season cropped area. The area under arhar in Bihar was declined by -1.51 percent during the period and was statistically significant at 1 percent level of significance. The productivity of arhar had shown positive growth rate at state level. It may be noted that growth in yield of major pulses in Bihar were more stable than other states and therefore, the study assumes significant importance for the sector as whole. It clearly reveals that pulses were neglected crop in the study districts and farmers were excessive dependence on Rice. The main reasons expressed by the respondents for the cultivation of rice were that, it is stable crop fetches higher yield and is best suited to

their marginal lands. Despite of these facts that pigeon pea requires low-input and restore the soil fertility, farmers were reluctant to cultivate rice only in rainy season. That is why majority of area under pigeon pea were on bund despite of fetching higher income without using any fertilizer and other nutrient for their growth.

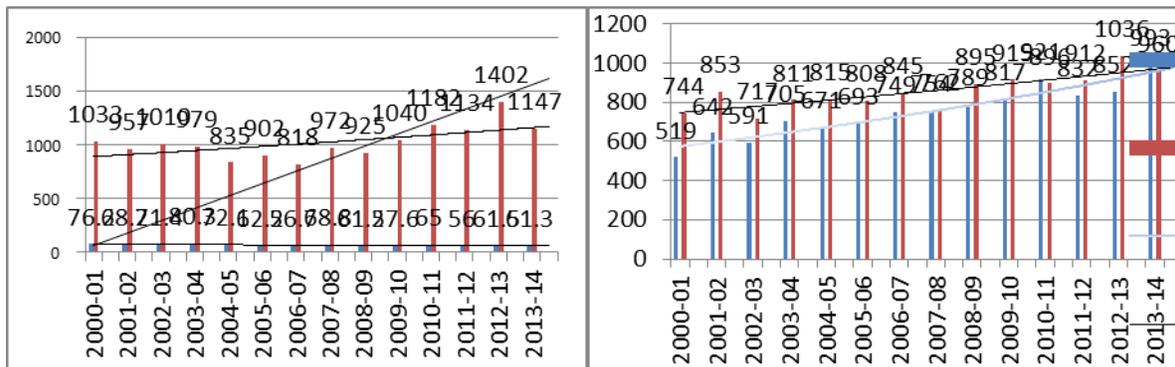
## **Economic analysis of pulses cultivation in Bihar**

Economic analysis of identified crops is very important to understand the comparative advantage of major crop grown by the farmers.

It could be observed from the graph that total cost of Rs.15392 /ha and Rs. 19280 were spent on cultivation of traditional and improved variety of chickpea respectively in selected district of Bihar. It may further reveal that cost of cultivation associated with improved variety was comparatively more than that of local variety, mainly due to fact that farmer were using own seed for local variety and purchased seed for improved variety.

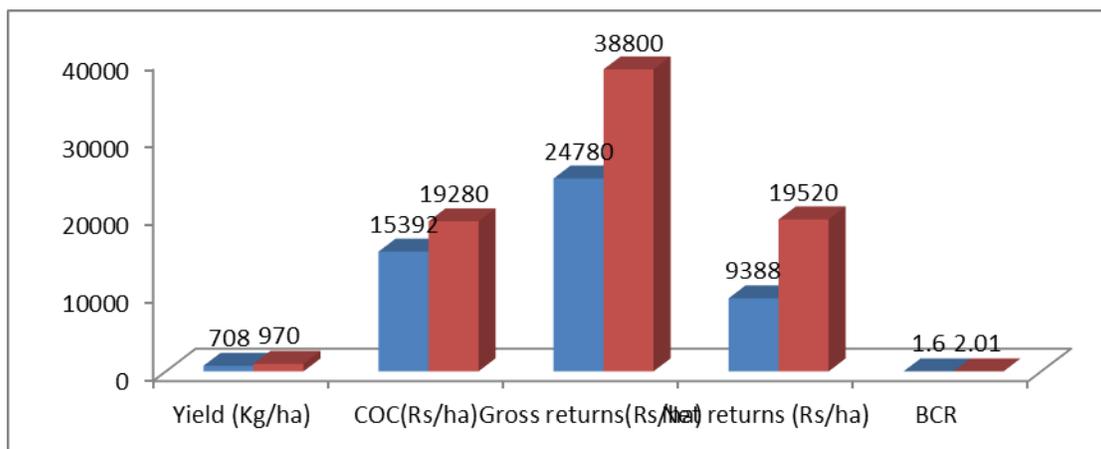
The estimated net return was Rs9388/ha in sample village for local varieties and Rs.19520 for improved varieties respectively. Comparative cost and benefit analysis indicated that pulses crop are more remunerative as benefit cost (1.6) ratio for local and for improved varieties it was estimated higher in Bhagalpur (2.01). It means improved varieties given to farmer were found more suitable in Bhagalpur districts. Results are supported by the findings of Kumari *et al.*, (2015). However for pigeon-pea the estimated cost and return shown in graph indicated that total cost incurred in cultivation of pigeon pea for local as well improved cultivars were almost same as Rs14500 and Rs 14700 respectively.

**Table.1** Area and yield of chickpea during 2001-2014 in Bihar. **Table.2** Area and yield of chickpea during 2001-2014 in India



Source: Compiled by the Author, 2017

**Table.3** Economic analysis of chickpea in selected district of Bihar



Source: Compiled by the Author, 2017

**Services involved in value chain analysis**



<b>Network 1(<i>daal</i>)</b>	<b>Network 2(<i>sattu</i>)</b>
Producers share in consumer rupees was estimated as 68.86 percent	Producers share in consumer rupees was estimated as 31.11 percent
Marketing cost was Rs 5.05/Kg	Marketing cost was estimated Rs 10.97 /Kg
Marketing margin was 12.95/Kg	Marketing margin was Rs 51/Kg
Total cost was Rs 18/Kg	Total cost was Rs 62 /Kg

Source: Calculated from the network-1 and 2

However due to difference in price of improved variety the estimated gross return was Rs 32512 and Rs 42240 respectively for local and improved variety.

### **Major value chain actors**

*Seed producing agencies* - New varieties are developed by the ICAR research Station and ICRISAT Patancheru, trial at farmer fields and research station in Bihar.

*Input suppliers* - these include fertilizer and agri-chemical companies, government distributors, small wholesalers (dealers)/retailers (distributors), and even smaller retail shops that sell small quantities of seed, fertilizer and pesticide to farmers.

#### *Government*

*distributors/wholesalers/distributors* - Some of the wholesalers also supply pesticides, fertilizers along with seeds directly to large farmers as well as to small retailers.

*Retailers/dealers* - Input retailers operate small shops in the villages/ local market. They buy seeds and other inputs from the wholesalers. They earn usually a margin of 20 – 30 per cent on sale of seed.

*Producers-farmers* - Most of the farmers have been practising the same crop rotation pattern of rice and wheat on the same fields for years rather than alternating with other crops. Smallholder farmers used the grain for family consumption, and the surplus is sold in the nearby market /primary market.

*Enabling Environment* - The “enabling environment “factors are created by organizations (national and local authorities, research agencies etc.), and institutions (policies, regulations and practices) that are beyond the direct control of economic actors in the value chain. Under this due to prevailing practice of unorganised /unregulated markets, not a single product specific market of specific commodities, like whole pulses, *dall mill*, *besan* and *sattu* markets were available so far in Bihar

*Service Providers (business and extension Services)* - In most effective value chains, the actors who actually form the chain (i.e. transact the main product) are supported by business and extension services from other enterprises and support the organizations catering different needs such as input supplies (seeds, fertilizers, irrigation, etc.), market information (prices, trends, buyers, and suppliers), financial services (such as credit, savings or insurance), transport and logistics, etc. There is a consistent need for all the chain actors to access these services timely and efficiently.

### **Services involved in value chain analysis**

Main services started from input supplier, Farmers of selected district they get input from the local input dealers. Under the enabling environment finance policy, business regulation, land policy, trade standards, quality assessment institution like B.AU etc are the main services provider needed to involve more for effective

functioning of value chain. However main services involved while transaction of pulses in Bihar were control and support, packaging, marketing, storage, processing and finally move the commodity through different identified channels of marketing. Traders import pulses from MP and Maharashtra also. The prevalent channels followed in selected districts of Bihar for transaction of, whole pulses, dall, and sattu are given below.

Producer – Village Trader – Dall Miller – Wholesaler – Retailer – Consumer,

Producer – Dall Miller - Retailer - Consumer,

Producer – Wholesaler – Dall Miller - Retailer –Consumer

### **Channel-I**

Producers share in consumer's rupees of pigeon pea in selected district of Bihar indicated that farmers received only Rs 40/kg for their whole grain followed by the primary polisher whose main work was only to polish the dall, taking Rs 15 /kg for transaction. However from miller to consumer the marketing margin varied from Rs 11-17 at subsequent stages of marketing. If primary producer assume the function of village trader one can reduce the margin of seven rupees per kilogram during the transaction of daal. It could be observed that in value addition the cost incurred was just double to the whole grain in processing the *daal* through the identified channels -1, and producers share was reduced to half i.e. 31 percent followed by margin taken by intermediaries' was 3-4 times more in network two. (Kumari *et al.*, 2016)

It could also be seen that due to unavailability of processing machine at large

in Bihar, commission agent were taking huge amount of margin of Rs of 51/kg involved in the processing of *sattu* and *besan*. The cost of marketing from these identified channel were estimated as Rs11 which is double of the network- one i.e. network identified for marketing/processing of dall. The total cost of marketing of *daal* was estimated as Rs 18 and for *sattu* it was Rs62. It may be concluded that due to value addition the total cost of marketing and share of profit taken by the individual's presents in the channels has been increasing as many as no of intermediaries increases. Marketing of Pulses in Bihar go through a large supply chain which drives up the prices of consumers. This is generally due to large number of intermediaries present in the channels of marketing. Guy *et al.*, (2001) also found similar results in their study on pigeon pea production systems, utilization and marketing in semi-arid lands of Kenya.

Bhagalpur and Banka has emerged as one of the most promising district in terms of pulses production in Bihar. However, performance of pulses in the Bihar state has been adversely affected by the non-price constraints. Despite of release of many improved cultivars by public institutions, the new pulse varieties have not been taken up by the farmers as enthusiastically as was expected. This may be due to inadequate facilitation of the promotional activities and weak horizontal linkages among research, extension and seed companies. It has been observed that public research institutions though have adequate R&D facilities, lack the marketing bent to popularize their products. There is need to harmonize existing laws and regulations besides ensuring good and stable producer prices; quality farm inputs and improved convergent extension services. Most importantly, is to develop the efficient and integrated pulse grain as well dall mill to

drive the sector hand-in-hand with the other competitive crops. Instead of depends upon only farming farmers can go for subsidiary agribusiness, “Mini dall mill” as well as processing of sattu/besan is one of the good agribusiness opportunity among farm families. This will certainly helpful for accelerating the income double of farmers.

## References

Barrett, C. 2008. Smallholder market participation: Concepts and evidence from Eastern and Southern Africa, *Food Policy*, 33 (4): 299–317.

Directorate of Economics and Statistics 2010. *Agricultural Statistics at a Glance 2010*, Department of Agriculture and Cooperation, Ministry of Agriculture, Government of India, New Delhi.

FAO STAT 2012. Statistical databases and data sets of the Food and Agriculture Organization of the United Nations. <http://faostat.fao.org/default.aspx>.

GTZ Value Links 2008. *Value Links Manual – The Methodology of Value Chain Promotion*. GTZ, Germany.

Kaplinsky, R. 2000. Spreading the gains from globalisation: What can be

learned from value chain analysis? *Journal of Development Studies*, 37 (2): 117-146.

Kumari, M. and Singh Ravigopal 2017. Status Problem and Prospects of Chickpea Production in Bihar: A Situation Analysis, *Int. J. Curr. Microbiol. App. Sci.* 6(8)

NFSM-Progress Report No: 5, 2011-12. Enhancing chickpea production in Rainfed Rice Fallow Lands (RRFL) of Chhattisgarh (CG) and Madhya Pradesh (MP) states of India following Improved Pulse Production and Protection Technologies (IPPPT).

Reddy, A. A, MCS Bantilan and Geetha Mohan 2013. “Pulses Production Scenario: Policy and Technological options”, Policy Brief 26, International crop Research Institute for the semi-Arid Tropics.

Task Force on Bihar 2008. *Bihar's Agriculture Development: Opportunities and challenges*. Government of India, New Delhi. Innovative approach to achieve self-sufficiency in production of pulses, *National Food Security Mission*, 2010-11.