# Assessment of community based wheat seed production module of BISA in North Bihar: A survey study

**Preeti Kumari[1]**

Borlaug Institute for South Asia, BISA (CIMMYT-INDIA)
preetipriya0911@gmail.com

**Abstract: Community based seed production gives more access to quality seeds, accurate information, and to produce community based improved varieties and seed practices to all farmers. Despite significant progress in developing improved wheat varieties, many of those improved varieties have not reached farmers, especially and poor and marginalized farmers. Taking the case of a district in north Bihar, this paper identifies several critical challenges of the existing seed delivery in India. The existing system has largely ignored the potential of farmers to play a significant role in developing an effective and equitable wheat seed delivery system. Due to inadequate feedback mechanisms, there is a knowledge and information gap between farmers' needs and preferences and the research stations. This results in an ineffective information feed for effective breeding programs. Using a small-scale, mixed, inductive, and broad-based research design, the paper sheds light on some simple but powerful measures to improve the overall wheat seed delivery system using a responsive approach.**

**Keywords: Community, seed distribution, wheat seed production pathways, India**

## Introduction

Wheat is one of the predominant staple foods and a main cereal crop of many diets around the world. Globally wheat is cultivated in an area about 220 million hectares with a record production of 763.06 million tons of grain. It is the second most important crop in India and a principal source of calorie intake. Systematic research in the crop has started in India way back in 1960s through the coordinated system of multi-location research to cater the needs of diverse population. At the national level, there is a shift in area, production and yield under wheat during 2008–2009 to2012–2013, 2013–2014 to 2017–2018. Comparing the past two periods, the change was more prominent in wheat production, followed by area and yield. The average change in production was around 9%. The country on an average produced 7.3 million tones more than the past period. The major wheat-growing states like Punjab, Madhya Pradesh and Rajasthan have witnessed positive change in area and yield and production. Surprisingly, Jharkhand registered positive change in area, yield and production, while Haryana and Uttar Pradesh, the major traditional wheat-growing states, witnessed a negative change in production due to negative change in yield. Regional disparities in area and yield had significant impact on the wheat production. Average production in Madhya Pradesh showed an increase by 6.87 million tones, followed by Rajasthan (1.2 million tons). However, the production has declined in Uttar Pradesh (1.41 million tons) and Haryana (0.11 million tons).State wise comparison of area and production for 2017–2018 shows that Uttar Pradesh, Punjab, Madhya Pradesh and Haryana were the major contributors to the national production. However, Punjab, Haryana and Uttar Pradesh retained the status of higher productivity for many years. The scope for additional production of these states has been limited due to stagnation of wheat acreage and yield. The state Bihar contributes 5.7% towards national production from 8% of wheat growing area of the country with a low productivity of 1.9 tons/ha. Bihar is witness of significant difference between actual and potential yields. Average wheat yields in Bihar is2.19 MT/ha, whereas experimental yields on research farms and frontline demonstrations have reached up to 4.5-5.5 MT/ha. A numbers of studies shed light on potential causes of these low yields. Delayed sowing, unavailability of quality seeds, non-judicious use of fertilizers, poor mechanization, frequent droughts and/or floods, diseases infestations, lack of market facilities, etc. are major causes of poor productivity. Limited availability of small duration rice and wheat varieties is a key factor of late sowing in the state. There is chance of 50% yield reduction when wheat is sown in the month of December in comparison to November sown wheat. In order to ensure the availability of quality seeds of preferred varieties to the poor resources farmers is need of the day which may be obtained through Community Based Seed Production (CBSP) approach. Borlaug Institute for South Asia (BISA), Pusa, Samastipur is pioneer Institute which follow a systematic pathway combining a set of activities starting from the identification of preferred genotypes to variety demand stimulation and seed accessibility from the beginning and has the seed system arrangement to ensure the seed availability to the farmers to fulfilment of yield gap and increasing of wheat production in Bihar and prepared a BISA model of community based seed production module in the North Bihar which is expected to assist community based participants to understand the saving of wheat seed at community level, and analyze the performance of wheat

production & marketing activities which could serve as a major input to formulate appropriate marketing policies and strategies in north Bihar by identifying interventions that improve efficiency of the marketing system and to become an additional source to conduct detailed studies by identifying research agenda. Keeping these facts in view a study entitled "Assessment of Community Based Wheat Seed Production Module of BISA in North Bihar" was undertaken with following specific objectives.

- ❖ To Create Awareness of Business Module for Quality Wheat Seed Production.
- ❖ To assess the Communicative Advantage of Community based Wheat Seed Production.
- ❖ To assess economics of the Community Based Wheat Seed Production Module of BISA in north Bihar.

**Literature review and conceptual framework** in this chapter, an attempt has been made to review the past literature pertaining to present research field wheat seed production and has been compiled to enable better understanding of the research carried out. in their research paper on "Strategies to build viable Community Seed System in dry land ecosystems for Sustainable Seed and Food Security in India "the Farmers have also cross-pollinated plants by hand, or by mixing varieties within the same field, to maintain and adapt their crops. As a result of this relationship between the farmer and plant, these locally adapted crops are able to withstand changing growing conditions. Some varieties may be resistant to certain pests, while others may be more tolerant of salinity or drought. Some varieties may be planted or harvested earlier or later in the season. In this way, farmers have been able to maintain a mix of crops suitably adapted to their own local needs. Traditional crops are crops that have a long history in a region and are adapted to local conditions, especially in times of stress or hardship where resources like water and nutrients are a limitation. They also provide a wide range of nutrients to the diet. Some people may think that they do not have a wide variety of traditional crops or they may think that crops from other countries are better than their own. The seeds of traditional crops and the knowledge about their growth and use are important resources and should be conserved and used. Farmer saved seed quality is always constrained by poor harvests, inadequate on farm storage facilities, insufficient means to multiply quality seed, and poor seed distribution systems. There is thus a need to strengthen local capacity to produce, store and distribute seed of many crop varieties, including some landraces/farmers' varieties, that are useful for diverse and evolving farming systems. (Meena Kumari 2006) In this research paper on "Seed production and supply spectrum across dry land ecosystems" with privatization or commercialization of public sector seed activities, the formal public-sector seed activities have tended to focus on a narrow range of crops grown by larger farmers, in this way, reducing supplies of seed of new varieties of subsistence crops to smallholder farmers even further (According to Bengtsson, (2007). In the conventional seed system, the agricultural research institutions work on improving seed quality, increasing yield, and developing disease resistance, but gendered preferences for varieties have not been considered to inform these decisions, especially in the cereal seed system. While intensive wheat breeding efforts have been undertaken in the country with the frequent release of new varieties, some gaps render it less effective for farmers, particularly the resource-poor smallholder's farmers...India's cereal seed system is dominated by the private sector, whose profit-making endeavors seem to have overlooked the interests of poor smallholder farmer. It might not have an incentive to ensure an equitable distribution among men and women farmers, as the business motive of the private sector is generally profit maximization rather than social justice. One of the biggest challenges remains in delivering quality seeds to the farmers owing to inefficient seed delivery systems caused by weak distribution channels and the lengthy process of making the good quality seeds available in the public domain. Lack of information and awareness among farmers further impacts variety selection and accentuates issues in the provisioning of improved wheat seeds in India. A survey points out that more and more farmers use privately available seeds in the local markets for quality considerations, but limited regulation of unscrupulous traders impedes the equitable distribution of seeds. Existing literature has explored why seed systems and farmer networks are important in the development of national and state-level seed policies, but documentation on seed delivery pathways in Bihar is limited. As supported by Amri et al.

According to Sendhil et al., (2012), in their research journal on "exploration into changing food consumption pattern in India" The country as per the national policy on agriculture has set a target of 4 per cent growth rate for which high growth in wheat production becomes a mandate owing to its importance in food basket. The growth rate can be achieved by increasing the production and bridging the existing yield gap. Wheat is a staple crop in many countries and hence its consumption is directly proportional to the population growth. Consumption of wheat in rural India has increased apparently due to the availability of nutritious cereal. The share of wheat in total cereals consumption has increased from 25.43 per cent (3.88 kg month-1) in 1972-73 to 37.36 per cent (4.24 kg month-1) in 2009-10 (rural India) while a marginal increase from 42.88 per cent (4.82 kg month-1) to 43.54 per cent (4.08 kg month-1) was observed in urban India.

According to Nasurudeen et al., 2006. In their Indian Journal of Agricultural Economics on "The dynamics and inequality of nutrient consumption in India". The Difference in consumption pattern could be the result of sustainable

production and consumption in rural areas, rural-urban price divergence, varied preferences due to higher incomes in the urban areas, and variety of foods available in urban markets at global level, consumption has been constantly increasing during the last 10 years with the increase in population. Alarmingly, the global consumption will shoot up further due to the demand put forth by rising population and is expected to reach 775 mt in 2020.At the national level, there is a shift in area, production and yield under wheat during 2008–2009 to 2012–2013, 2013–2014 to 2017–2018. Most of the community-based seed production modules are initiated because farmers are concerned about the non-availability of quality seed at planting time. Many farmers don't have access to improved varieties; and wouldn't be able to afford them even if they were. So introduction of alternative seed systems models must impact farmers' access to seeds of improved varieties at affordable cost. The quality of seed produced by community-based system or farmer seed systems is guaranteed only by its seller or village seed committee, Because they are not processed and are uncertified seed. The seed so produced is low priced, and available at farmers' doorsteps at the right time, and provides access to all farmer groups in the village.

According to Zerbe; (2001) in their paper on suggest, "Seed of hope, seeds of despair: towards a political economy of the seed industry in southern African". In order to ensure that quality seeds of preferred varieties are accessible to poor resources farmers, a systematic pathway combining a set of activities starting from the identification of preferred genotypes to variety demand stimulation and seed accessibility must be established from the beginning. It is very clear the crop breeding pattern and the seed system arrangement have influence on the availability and seed accessibility to farmers mostly the poor and marginalized. Therefore imposing a generic formal seed or private sector led seed systems may not be the best solution.

According to Ravinder Reddy et al. 2006 in their research paper on "Seed systems in the semi-arid tropics of Andhra Pradesh. In Enhanced livelihoods of poor livestock keepers through increasing use of fodder, after identifying areas of operation, the Non-Governmental Organization (NGO) or Project Implementing Agency (PIA) should carry out Reconnaissance survey on Seed Needs Assessment (SNA). This is done as a series of participatory dialogue to engage communities in the problem diagnosis on all matters relating to seed and to achieve the community's commitment to act and develop own solutions. The SNA will also identify knowledge gaps that can be corrected during training. Still more the SNA should assist communities in developing an action plan on what needs to be done, while remembering the role of the NGO is only to facilitate this process.

**Research Methodology**

The interest of obtaining reliable information from Small farmers & marginal farmer in North Bihar survey is an issue to be given top priority. Smallholder farmers and marginal farmer will show little cooperation unless their concerns are taken care of very seriously. In order to gain their trust, the respondents were carefully informed about the objectives of the survey and the direct and indirect benefits from the research. The farmers' survey schedule was at the farm level, telephonic of 3 district of North Bihar randomly selected farmer sampling. In the light of pre-registration, essential amendments were made on such things as ordering and wording of questions and coverage of the interview schedule. After registration of farmer and prior to the final administration of the interview schedule, enumerators were given training and briefings on the objective, contents of the interview schedule and were also acquainted with the basic techniques of data gathering and interviewing techniques and on how to approach farmers. Then using the amended structured interview schedule, primary data were collected by using personal interview technique, telephonic technique from sampled farmers.

**Methods of Data Analysis** In these study two types of data analysis, namely primary descriptive statistics and econometric analysis were used for analyzing the data collected from wheat producer.

**Descriptive statistics** this method of data analysis refers to the use of ratios, percentages, in the process of examining and describing community based production, purpose, facilities, services, agriculture characteristics, role of farmers: market and trader characteristics, the structure of production costs, profitability, and major constraints and opportunities of production and supply. The following indicators are used in this type of analysis.

**Percentage Analysis**

Data collected are edited and coded by using the tally bars. This helps in converting the gathered data into a tabulated grouped data.

Percentages were worked out to study the sample characteristics like age, income, education, family size, etc. This technique was used to make simple comparisons.

$$\text{Percentage Analysis} = \frac{\text{Number of respondents}}{\text{Total sample size}} \times 100$$

**4. Results and discussion**

**4.1.** Farmer survey outcome of assessment of community based wheat seed production module in North Bihar (Muzaffarpur, Darbhanga, and Vaishali).This chapter summarizes the major findings of the study. Both descriptive statistics and econometric analysis were used to analyze the primary data. Descriptive statistics were employed to describe the wheat production characteristics of sample farmers. Moreover, the cost structure and profitability of community based wheat, production and marketing support services, structure, conduct and performance were studied to measure efficiency. Econometric analysis was used to identify factors affecting supply of wheat in the study area.

**PART-1 INDEPENDENT -VARIABLE**

1. Age: Below 30(1)/ (2)/31 – 60(3)/ Above 60(4)
2. Educational Qualification : Illiterate (1)/ Primary (2)/Secondary(3)/ Higher Secondary (4) Graduation + Post Graduation(5)
3. Size of Land Holding

| | | |
|---|---|---|
| 1. | Marginal ( Up to 1 ha) | (1) |
| 2.. | Small (1 to 2 ha) | (2) |
| 3. | Semi-Medium (2 to 4 ha ) | (3) |
| 4. | Medium ( 4 to 10 ha) | (4) |
| 5. | Large (Above 10 ha) | (5) |

**4.1.2. Educational status of sample farmers**

The details on the educational status of sample farmers are furnished in Table 4.1.2

**Table 4.1.2 Educational Status of farmers**

| Educational Status | No of Farmers | Percentage |
|---|---|---|
| **Illiterate** | 5 | 11.11 |
| **Primary** | 10 | 22.22 |
| **Secondary** | 7 | 15.56 |
| **Higher Secondary** | 20 | 44.44 |
| **Graduation+ Post Graduation** | 3 | 6.67 |
| Total | **45** | **100.00** |

In the study area, that majority of the farmers had the Higher Secondary level of education (44.44 per cent), followed by farmers who were Graduation plus level (6.67 per cent), secondary level (15.56 per cent) and Illiterate level (11.11 per cent). Only 22.22 per cent of the respondents were found to be primary. So we can see that order of education status of farmers- higher secondary> primary >secondary> illiterate > graduation +post-graduation in the majority of farmers,' level of education was found to be higher secondary and graduation level.

**4.1.3. Occupational status of farmer:**

The details of occupational status of sample farmers are presented in Table 4.1.3

**Table no: 4.1.3 Occupational status of farmers**

| Occupational Status | No of farmers | Percentage |
|---|---|---|
| **Agriculture only** | 20 | 44.44 |
| **Agriculture + wage earners** | 10 | 22.22 |
| **Agriculture + business** | 10 | 22.22 |
| **Agriculture + Gov. job** | 5 | 11.12 |
| Total | **45** | **100.00** |

| Category | No of Farmers | Percentage |
|---|---|---|
| Marginal (<1 ha) | 5 | 11.11 |
| Small (1-2 ha) | 5 | 11.11 |
| Medium (2-5 ha) | 20 | 44.44 |
| Large (>5 ha) | 15 | 33.34 |
| Total | 45 | 100 |

It could be observed that for a majority of the sample farmer's agriculture was the primary occupation (44 per cent), agriculture +wage earners (22 per cent), Agriculture+ business was second major occupation group and only 22 per cent of sample farmers followed agriculture and also wage earners,11.12 percent farmers was dependent only agriculture+ Govt job. So we can see that order of occupational status of farmers- Agriculture only> Agriculture + wage earner> Agriculture +business > Agriculture +Govt job. Hence, agriculture, Agriculture +wage earners and business was the major occupational status of the sample farmers.

**4.1.4. General Characteristics of Sample Respondents**

**Characteristics of Sample Stakeholders**

**4.1.5. Age Distribution**

The sample farmers were classified into three categories, based on the age viz., less than 30 years, 30 to 60 years and more than 60 years. The details are furnished in table 4.1.1

**Table no: 4.1.5 Age distribution of farmers in Different district of North Bihar:**

It could be observed that in the study area, that majority of the sample farmers belonged to the age group of 30 to 60 years (62 per cent) followed by more than 60 years (33.34 per cent) and below 30 years (4.44 per cent). So we can see that order of age distribution of farmers- 30 to 60 > above 60>below 30. Hence, it is concluded that the sample farmers were middle and higher age groups engaged in providing of agriculture.

| **Age group (in years)** | **No of Farmers** | **Percentage** |
|---|---|---|
| **Below 30** | **2** | **4.44** |
| **30 to 60** | **28** | **62.22** |
| **Above 60** | **15** | **33.34** |
| **Total** | **45** | **100.00** |

**4.1.6. Category of farmers of North Bihar**

The details of a category of sample farmers are presented in Table 4.1.4

**Table 4.1.6 Category of Farmers**

It could be observed from Table 5.4 that majority of the farmers' belonged to marginal category (11.11 per cent), followed by small (11.11 per cent), medium farmers (44.44 per cent) and large farmers (33.33 per cent).

**4.1.7. Current practice about farmers for buying and selling of Agricultural product**

**4.1.8. Crops grown in Study area**

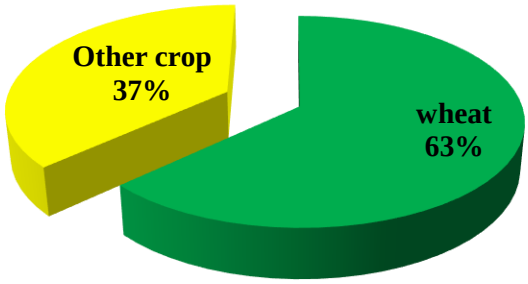
| Kharif Season | **Paddy, Vegetables ( Brinjal, Lady fingers)** |
|---|---|
| Rabi Season | Wheat, Potato, Green gram, Gram, Mustard, Vegetables (Potato, Tomato) |

It was revealed from the individual interview that there have major crops grown vegetables in kharif season and wheat, potato, mustered, gram and vegetables in Rabi season adopted in the study area. From the all crops grown most farmers are adopted rice and wheat cropping system.

### 4.1.9. Cultivated of wheat & Other Crop Land from Different district of North Bihar:

Land is perhaps the single most important factor of production and measure of wealth in the study area. Cultivated land used for the production of wheat crop three district of North Bihar covered 63% & most of famer producing wheat crop from district of Darbhanga & 37% of the remaining land represents land used for pasture, homestead farm, fallow land and land rent-in and rent-out.

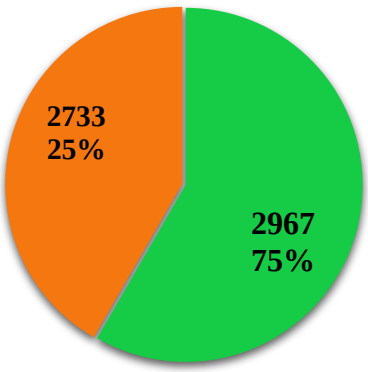
**Total producing of wheat in North Bihar**



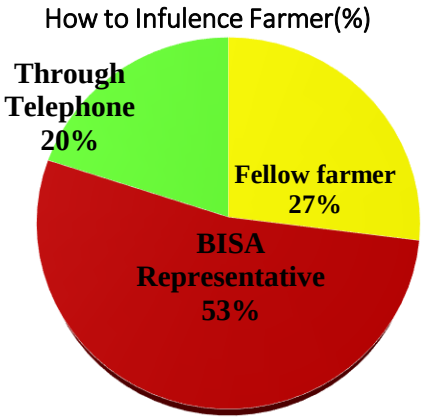

### 4.1.10. Variety of wheat seed increases of the production:

As per the observation of farmers in North Bihar mostly famers choosing a good variety of wheat seed for high production of wheat cultivation, we can say that 75 % of farmers are using 2967 variety, 25% of farmers are using 2733 variety of Wheat cultivation in north Bihar.
Variety is known for high yield, and has more vegetation and so attacked by more pests, so there will be more consumption of pesticide in the particular area.

**Variety of wheat Cultivated (%)**

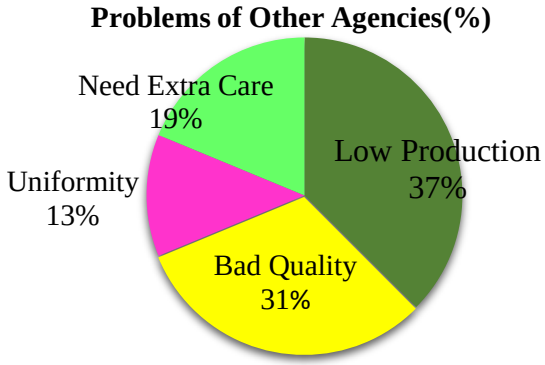



**4.1.11. How to influence farmer for purchasing a good variety of wheat seed from BISA:** As per observation of farmer from Different district of North Bihar, I was shocked when I told us why you are purchasing BISA seed from in this farm, so they are happily told me I always purchases bulk amount of wheat seed because I am certified through the BISA seed. In this table we can say that out of total 53% of farmers are aware through BISA representative, 27 % of the farmers are aware through fellow farmers and remaining 20% of farmers are aware through Telephone.



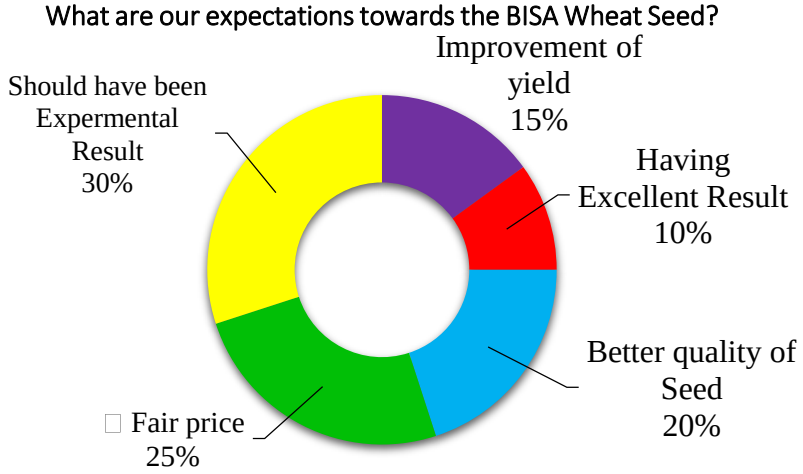

**4.1.12. What problems does the other company seed bring?**

As per the observation of above table we can say that for the selection of other Company seed 37% of farmers are getting to low production, 31% of farmers are suffering from Bad Quality Seed, 13% of farmers are suffering from getting do not equality of wheat seed plant and remaining 19% of farmers are suffering from Need extra care.



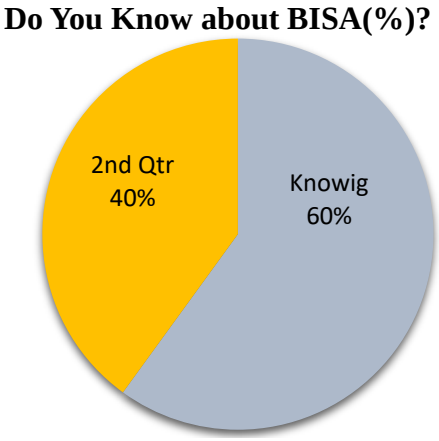

**4.1.12. Expectation of farmers towards the BISA seed:**

As per analysis of above table for expectation of farmers towards the BISA Wheat Seed So we can say that 15% of farmers should Improvement of yield, 10% of farmers have significant results, 20% of farmers should be Better Quality of seed, 25% of farmers have expectation towards fair price and remaining out of total 30 % of farmers should have been experimentally result.



**5.1.13. About BISA:**

It could be observed that the 60% of farmers are known to BISA and remaining 40% of farmers are not aware about BISA.

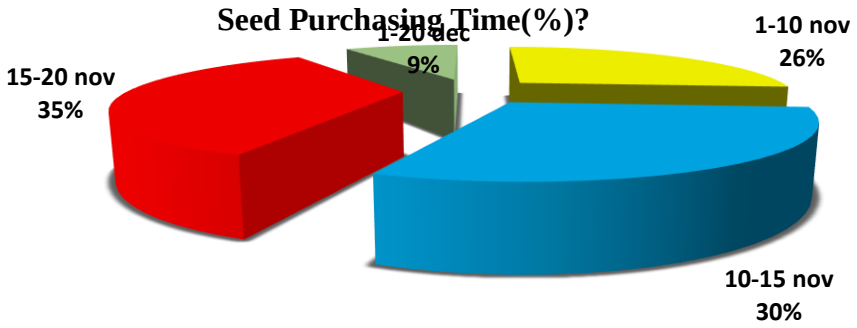



**4.1.14. Seed purchasing time:**

It could be observed that the 29% farmers purchasing wheat seed from 1-10 Nov, 26% of farmers are purchasing wheat seed from 10-15 Nov, 35% farmers purchasing seed from 15-20 Nov and 10% of farmers are purchasing Wheat seed from 1-20 Dec.

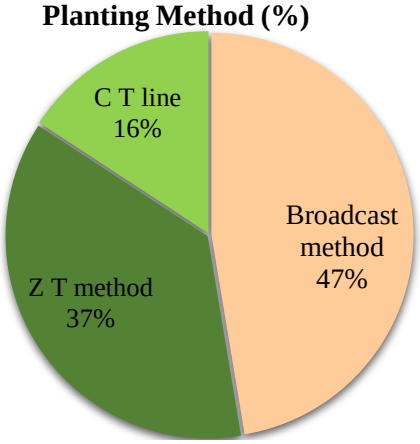
Notes: As Per the Observation of farmers from the various district of North Bihar we can say that 30% farmers purchasing wheat seed from 1-10 Nov, 25% increase of yield production, 26% farmers are purchasing wheat seed from 10-20 Nov the 35% increase of yield production, 35 % farmers are purchasing of wheat seed from 20-30 Nov December the 25 % increase of yield production. 10% of farmers are purchasing Wheat seed from 1-20 Dec the increase of yield production is 15%.

It means framers are timely purchase of wheat seed and timely sowing seed, for improvement of the yield production.




**4.1.15. Planting method:**

It could be observed that the 47% farmers are sowing wheat seed from Broadcast method, 37% of farmers are sowing wheat seed from ZT method, and 16% of farmers are Sowing Wheat seed from CT Line method.



**4.1.16 Area of cultivation for wheat in North Bihar:**

| District Wise | No of Farmers | Cultivated Land/ha |
|---|---|---|
| **Darbhanga** | 15 | 75/ha |
| **Muzaffarpur** | 15 | 55/ha |
| **Vaishali** | 15 | 38/ha |
| Total | **45** | **168/ha** |

It could be observed that in the study area, that more land of wheat cultivation belonged to the 75/ha land using of wheat cultivation , 55 /ha land of Muzaffarpur & 38/ha land using for wheat cultivation in north Bihar.

**4.1.17. Producers' profitability analysis:**

Whenever profitability analysis of any activity is under taken, production costs and revenues (benefits) obtained must be included in the analysis. In the case of wheat, production costs are costs related to production and production process. In economics terms these costs are termed as either fixed or variable costs a farmer incurred in the production and production process of wheat. Fixed costs are costs that do not change with a change in output (production). On the other hand fixed costs simply mean costs incurred regardless of the presence or absence of production. Land rent, of the fixed costs a farmer incurred in the study area. However, variable costs are costs that are liable to change with a change in production. These are costs of fertilizer, seeds, chemical herbicides, labor costs etc.

First, in order for sample farmers understood well the detailed production cost structure and profitability of wheat production, data were collected on the bases of 'timed' unit which is equal to quarter of a hectare. Later on for the purpose of data analysis and readers understanding the 'timed' units were converted in to hectare so that it can fulfil the standard unit of measurement.

**Total Cost of Wheat Production through Zero Tillage Method:**

| Seed rate | ZT method sowing | Fertilizer | Irrigation | Herbicides | Harvesting | Threshing | Labor cost |
|---|---|---|---|---|---|---|---|
| **4000/ha** | 2800/ha | 5600/ha | 3500/ha | 800/ha | 3600/ha | 700/ha | 4400/ha |

Total Invest of Seed Sowing through Zero Tiller =25,400/ha
Production of Yield 44 quintal/ha =110,000

Total Invest Of Seed Sowing –Production of Yield 110,000-25,400=**84, 6000**

**4.1.17. Total Cost of wheat production:**

Grain production through CT line method:

Total invest of seed sowing through the CT LINE Method: 38,000/ha

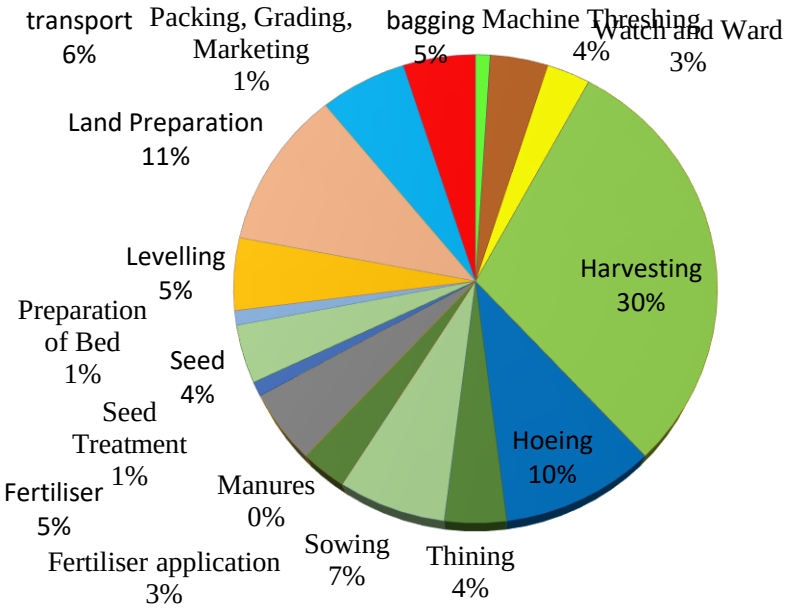
Production of Yield 37quintle/ha=103,000/ha

Total invest of Seed sowing –production of yield=38,000-103,000=**65000/ha**

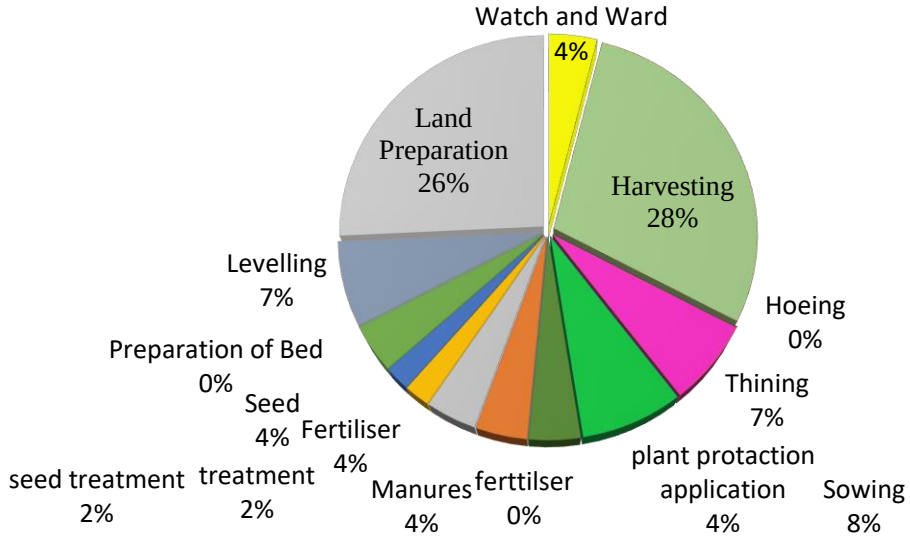
**4.1.19. Yield production through CT line & Zero tillage method:** It could be observed that in the study area, farmers are using different agriculture technology for the better production of wheat grain likes, Zero tillage method, and CT line method. We can say that 60 percent farmers growing wheat seed through Zero tillage method they can saving, water, seed, and fertilizer (5%, 4%, and 3%) & 30 % farmers adopting CT line method or broadcast method they have invest few money comparison to Zero Tillage method.

**4.1.20. Proportion to Total Cost of Seed Production:**

It could be observed that in the study area mostly farmers are producing wheat grain & some farmers are produce as a wheat seed because they are not aware in the production of seed, like as: lack of resource, storage facilities and other problems occurring in their situation. Show the cost of individual practice of seed and grain production. In case of seed production, harvesting (30%), land preparation (11%) and hoeing (10%) account the major share among all the other practices. While the share of harvesting, land preparation and sowing is 29%, 26% and 8% respectively. The share of hoeing is almost negligible in case of grain production. Thus, due to the use of many practices in seed production, the cost per hectare of seed production is more than grain production.

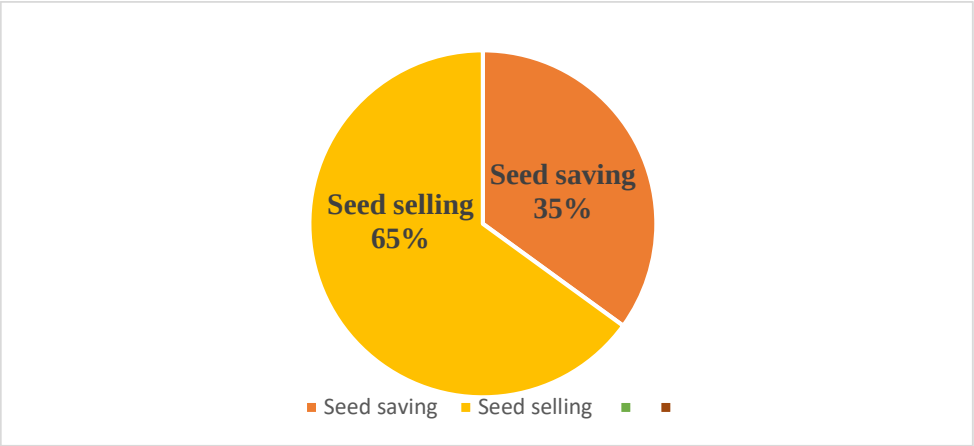



**4.1.21. Proportion of total cost of grain production**




**4.1.22. Marketing of seed & saving of seed.**

The success of a community seed production module lies in the ability of the seed growers to sell their seed and saving at community level. Some farmers have saved seed for next year growing wheat seed and marketing of seed. It could be observed that in the study area the 35 % of saving seed & 65% of selling seed through traders, local vender, and market.



**4.1.23. Wheat marketing participants, their roles and linkages:**
It could be observed that the study area different wholesalers were involved in bringing wheat from the point of production (farm gate) till it reached the final destination (consumers). According to the data obtained market participant identified in the transaction process of wheat in the study area include farmers/producers, farmer traders, urban assemblers, regional wholesalers, retailers. The market participants involved in different activities (wholesale, retail, assembly etc.) in the study area were categorized into different categories.

**4.1.24. Producers/farmers:**
It could be observed that the study area marketing agents who participate both in production as well as marketing of surplus commodities they produce. As the same time, they transport wheat to the nearest markets (village market) or regional markets by themselves, either using pack animals, or animal driven carts, or else medium-size Isuzu trucks. They had several options to sell their product, selling directly or selling through broker to assemblers (rural and urban assemblers) and regional wholesalers.

**4.1.25. Farmer /traders:** It could be observed that the study area who assemble wheat from large number of farmers? Farmers also sell their products directly to traders in the markets. Some of the farmers in the sample also sold their wheat to the consumers in the local market.
Village markets are markets which are closest to farmers' resident, having less marketing facilities such as road, electricity, potable water etc. Farmers sell smaller quantity of wheat on such markets.

**4.1.26. Farmer trader/rural assemblers:** It could be observed that the study area Farmer traders/rural assemblers are farmers or part-time traders in the assembly markets who used to buy large quantity of wheat from farmers in village markets. They use their financial resources and their local knowledge to buy wheat from the surrounding area.

**4.1.27. Brokers:** It could be observed that the study area the agent middlemen who facilitate trades (buying and selling) between farmers and traders (wholesalers, urban assemblers, retailers), but does not usually physically handle products. These agents are not permanent brokers rather their main economic activity is farming during production season of the year. These intermediaries play important role in bringing farmers of their home residence sell their marketable surplus to the trader whom they undertook their brokerage activity.

**4.1.28. Producers Price setting strategy:** It could be observed that the survey result, in North Bihar about 43% of sample farmer respondents reported that market price was set through negotiation and haggling with traders. And 36.5% respondents reported that price was set by the market. The remaining 13.5% and 7% of farmer respondents reported that the selling price of their produce was set by themselves and traders respectively.

**4.1.29. Seed Replacement Rate:** It could be observed that, the seed replacement rate in north Bihar, The farmers in North Bihar mainly use improved varieties like, 2733. Only a very small proportion of farmer is used for sowing farm saved seeds. The farmers in this area save only a small proportion of seeds and it is used for seed purposes. The farmers in North Bihar started using improved variety like 2967 variety in recent years. The seed replacement rate in this region increased from 10-15% in 2017-18 to 15-20% in 2018-2019.

**4.2.1 The Community based seed production module:** It could be observe that the community based seed production module was applying envisages integration of BISA farm seed systems to achieve the objective of providing quality seed of self-pollinated crop (improved varieties) at the right time and at reasonable prices to small-scale farmers. The model can be implemented in district of North Bihar.

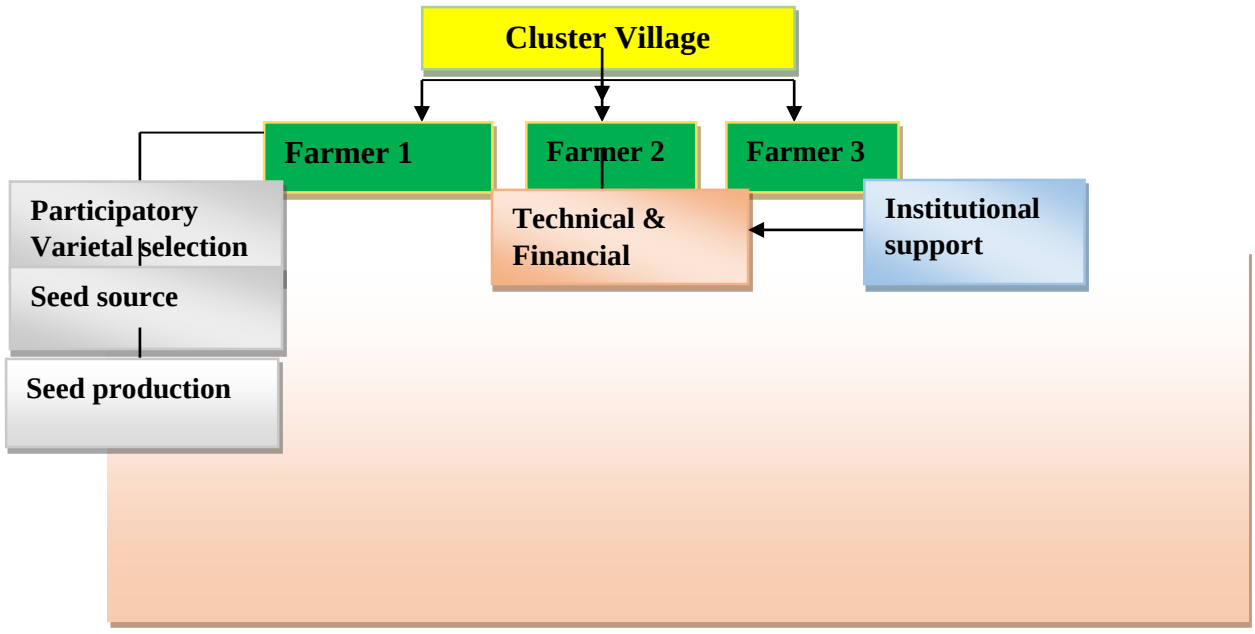


**Figure: 1 Community based seed production module**

It could be observed that in the North Bihar one farmer name of Sanjeev Kumar Yadav in Vaishali district, One farmer name of Fakira Sah in Muzaffarpur district & One farmers name of Rajesh Kumar Yadav in Darbhanga district who has taken a wheat seed from BISA in a bulk amount, after purchasing seed than they can also providing the seed between the around 200 farmers, they provide the technology, for systematic way of sowing wheat seed. Improvement of the yield production, saving of seed for the next time selling of seed at community level.

Farmers are capable of imbibing technology faster – along with the capacity to absorb shocks, if any than small-scale farmers.

(ii) External finance is not required, and resourceful farmers can absorb expenses pertaining to seed production;

iii) Resourceful farmers can afford to take a risk in conducting the trials.

(iv)The general tendency of small farmers is to follow examples set by big farmers and village leaders.

(v) Resourceful farmers on improved varieties and yields spread easily in the village, and hence dissemination of results is faster and more effective

**Step 2**

It could be observe that the Performance of improved varieties is discussed in community level farmers in District of Vaishali of North Bihar. Farmer's activities to be carried out in Step 2 should be discussed in focus group meetings in all the small, marginal farmers in the villages. Community based seed production module should select seed growers for the next season in the cluster villages. After the focus group meetings, stakeholders in the village belonging to community based seed production module will be invited to invest in the CBSP as a micro seed enterprise for procuring seed produced in the village and storing it in the village level for sale next season. This will help to derive two-pronged benefits to the communities in the form of dividend for the good quality seed supply to farmers.

**d) Formation of CBSP committees**

The main function of these committees is to help reduce costs on seed production and delivery of seed and at the same time help farmers reduce their individual cost of production, processing and marketing. Once they become self-reliant, the associations serve as useful mechanisms to broaden the outreach of development programs at little or no additional cost. They help build rural social capital by establishing self-help linkages and encouraging broad based collective action on village level seed enterprises.

The following guidelines may be used for developing and strengthening seed production committees:

• Make farmers understand the advantages of associations.

• Allow all sections of the farm community to join the project.

• Understand small farmers' strengths, potentials and weaknesses in procuring seed.

• Link farmers' associations to research institutions/organizations for procuring foundation seed for seed production.

• Build capacities of farmers in crop production, production of quality seed and scientific storage methods.

**e) Farmer-participatory selection of varieties:**

It could be observed that the farmers are promote uptake of improved varieties having farmer-preferred characters and market traits, foundation seed of selected varieties could be procured from research institutions seed provided at relaxation rates to selected farmers to take up on-farm trials in comparison with their local varieties with the assistance of the village and cluster representative. These varieties need to be evaluated along with the local variety in 45 farmers' fields in the villages. Seed thus produced shall be shared with other interested farmers for sowing in the fourth coming season. At the end of the season, farmers need to be involved in the evaluation of the Varieties based on yield, fodder value, tolerance to moisture stress and other varietal characters like tolerance to pests and diseases. These trials provide an opportunity for the selected farmers to evaluate the varieties under their management conditions and to make a selection using criteria determined on the basis of their preference for specific traits. Regular monitoring visits have to be undertaken to the trial sites during the cropping season and off-type plants have to be removed before harvest.

**f) Seed production:**

The plants grown from the seeds will have similar characteristics to the parent plants, unless the parent plants come from foundation seeds. Seeds should be selected from strong and 1 healthy plants to harvest and save.

• It is very important to remove unhealthy or diseased plants from the field as soon as they are seen. Also try to remove plants with undesirable characteristics from the field before they flower and pollinate other plants, but make sure that there is a diversity of characteristics in the field.

• If a farmer wants to develop or introduce specific characteristics in a plant, they can do this by controlling the pollination of plants for seed production. To combine desirable characteristics in plants, the farmer can transfer the pollen from a chosen individual plant to fertilize another chosen plant. For plants such as maize, which are usually wind pollinated, the farmer can shake the male flower over the female flower to transfer the pollen.

• Seeds must be dried to prescribed levels before storing them to improve their storage life. This is because moisture in the seed may encourage mould, bacteria or other pests and diseases affect seed viability.

• Seeds should not be dried too much or too rapidly as they may crack or lose their ability to germinate. They can be dried outside in the morning sun or partial-shade, but should not be left in strong sunlight.

• To dry seeds, spread them out thinly on paper, cloth, flat basket or plate in a warm place off the ground. They should not be dried on metal as this may become too hot. Turn them over several times a day to ensure that they dry evenly. When the seeds do not feel damp or stick together they are likely to be ready for storage.
• Any seeds that are immature, broken, diseased or infested with pests should be taken out. Stones, dirt and seeds from other plants should also be removed.
• Winnowing can remove smaller light contaminants such as dust, weed seeds and dry leaves. To winnow the seeds, place them in a large flat container and toss them into the air when there is a gentle wind, then catch them in the container. The light contaminants will be blown away by the wind.

**G. Seed Storage** Seeds must be stored in a way that prevents them from being attacked by pests or diseases, and that maintains their quality. Some seeds can be stored for a long time without losing their germination rate, and others can only be stored for a few months. This depends on the type of seed, the moisture content of the seed and the storage conditions. Good storage conditions for seeds are: Low moisture, Low temperature, Low light, Protection against rodents, Protection against insect pests and diseases.

• To keep rodents such as rats and mice away from seeds, they should be stored in a clean hygienic area. The floor should be swept so there are no scraps of food that may attract rodents. Seed containers should be well sealed and if possible kept off the ground so that rodents cannot get in. Sometimes seeds are stored in specially built huts that are raised off the ground.

**h. Capacity building**

A number of training programs need to be conducted on improved production techniques such as method of sowing, sowing by seed cum fertilizer drill, intercultural operations , optimum plant population, spacing, seed storage technology, etc. in the module villages to enhance production. On farm training programs also need to be organized for focus groups in the villages during field visits. A lot of emphasis shall be given to educate farmers and develop awareness on improved method of cultivation.

**I) Institutional linkages**

The pre-project studies need to be conducted to have overall dimension of productivity constraints related to

- Farmers' institutions
- Improved production technologies
- Access to improved-cultivar seeds
- Access to institutions

The interactions with farmers and the project team's previous experiences will help us to decide whether farmers' associations are viable platforms to bring farmers together, build their capacities and enable them to gain access to resources, inputs (seed) and markets. This would directly help them in cutting uncertainty and transaction costs, and empower them to make choices relating to the feasibility, productivity and profitability of village-level seed production.

**4.2.2 Advantage of Community based seed production module in north Bihar:**

• Availability of seed of improved varieties in sufficient quantities within the village
• Assured and timely supply of seed material to farmers
• Decentralized seed production
• Availability of improved-variety seed at lower prices
• Improved seed delivery to resource-poor farmers
• Reduced dependence on external seed sources and effective curbs on spurious seed trade
• Encourages village-level trade and improves village economy
• Social responsibility of seed production and delivery system
• A step toward sustainable crop production
• Availability of true-to-type varieties and healthy seed within the reach of farmers at affordable prices
•The probability of sustainability is high because involving farmers from the beginning of CBSP establishment, seed production, storage and marketing through their own investment and sharing the benefit.

**Summary and conclusion**

State of Bihar where allotted to me for the study. The survey was conducted at various district of North Bihar. The study attempted to investigate Assessment of Community based seed production module in North Bihar of BISA. Selection of the 45 sample in 3 District of North Bihar. To speed up the flow of seed of adapted, acceptable, improved varieties to farmers, there is a need to form a network between research institutes, in quality control and various non-governmental organizations, community based organizations interested in various aspects of seed production and utilization. continued interaction between various institutions, Engage farmers, farmers' organizations, extension services and development organization in For high volume low value crops, the basic farmer demand is for quality seed of improved varieties. The most economical way would be to produce seed at the village level through community-based seed production module and sell it to local communities without incurring the extra costs of processing and certification. Village-based module provides an alternative solution to this problem and help farmers become self-

reliant. This initiative needs organized communities, institutional technical backstopping and to strengthen local seed systems to enhance seed productivity in the village level. Therefore, CBSP is an efficient and sustainable module that can be out scaled to other crops and other areas.

**5.1 Silent finding of the study:**

With the certain observations, statistics and views of different farmers and we arrived at some findings. With the help of analysis and their results the major findings for this study are:

• Farmer recommendation plays very crucial role for the purchasing of the wheat seed and all the seeds.

•Farmers from these regions are found to be very loyal to the variety which they are using. Most of the farmers were found to be using the same variety which they have been using since long back. That is the reason they are using HD-2967 and 2733 it's a bit tedious job to make them understand that 2967 and 2733 is having more productive variety. One of the most fundamental reasons why farmers prefer local variety of wheat seed over the in wheat crop is due price sensitive. If the farmer used HD-2967 variety of wheat seed in wheat crop he would be spend 45/-Per Kg. whereas the farmer goes for only the local Variety of wheat seed he just spends less than 30 Rs per Kg. So the total price differences between the wheat Seed variety 10-15 Rs per Kg. So, the price sensitivity forces the farmers to buy the local variety of wheat seed.

•In District of North Bihar region, farmers are reluctant to change their variety of consumption. Farmers are not easily ready to change their usages and practices pattern.

•Some farmers are hesitating to give their information because they have been cheated by some companies.

**Major problems of the study:**

It could be observe that the study are Production and marketing problems of farmers the farm problems of sample farmer households are usually associated with unstable and relatively lower prices and incomes. Despite the current volume of wheat produced and offered to the market, farmers face a number of problems in the production and marketing process. Based on farmers' perception the major production and marketing problems reported were rain failure, soil erosion, higher fertilizer price and delayed delivery, prevalence of disease, access to credit, poor extension support services, lack of draft power, labor shortage, unfair pricing and scaling , lack of market information providing institutions, and chemical herbicide adulteration.

**Farmers' production problems:**

✓ **Natural calamities:** It could be observed that the majority of the respondents reported that their major production problem is attached to rain, wind storm. Farmers on an average face rain once in these years. The study area being moisture stressed and its agricultural production is exclusively dependent on natural rain needs special attention. Diversification is the only risk management production strategy smallholder farmers adopted to cope with their increasing volatile production and productivity.

✓ **Higher fertilizer price and delayed delivery:** It could be observe that the Although application of fertilizer plays an important role for farmers to increase production and productivity, however price escalation of fertilizer together with limited access to credit has forced farmers to use lower quantity of fertilizer. Beside this untimely delivery of fertilizer by company was also causing a serious challenge to the farmers. Thus, the increase in the price of fertilizer and untimely delivery made farmers not only to use lower quantity of fertilizer but also forced them to switch to private Dealers where there is no assurance of the quality.

✓ **Soil erosion:** It could be observed that the one of the major problem of the respondent reported that their related to soil fertile situation are Conserving the fertility of the soil plays positive role in increasing the production and productivity, thereby marketable surplus to flourish. On top of the technologies, like application of fertilizer that increase production, the protection of soil erosion which to maintain the already existed fertility of the soil plays a critical role in increasing production.

✓ **Labour shortage:** Labour being a factor of production plays constructive role in increasing production and productivity of wheat. As sample respondents reported that labor shortage was very crucial particularly during land preparation and harvest of crops. Thus, absence of sufficient labor force in the family made some farmers to hire additional labours and others form labor cooperation with neighbourhood farmers locally.

✓ **Lack of credit access:** Although the availability of credit is important source of cash for farmers to buy agricultural inputs needed to increase production and marketed surplus of wheat. Only few of the respondents accessed credit from formal sources. As a result farmers were forced to use input below the recommended rate.

✓ **Prevalence of crop diseases:** Prevalence of disease was one of the production problems encountered by farmers in the study area. Based on its occurrence, the most commonly occurred diseases were rust for and wheat only.

**5.2. Limitation of the study:**

- Collection of data was very difficult because people have a tendency of giving under estimated figures for income and high figures for cost.
- Even if the respondent was co-operative he was not be able to given correct figure because of lack of records.

- Farmers do not maintain records and accounts due to which greater reliance was placed on their memory and verbal reports.
- Generally the farmers hesitate in giving the correct information regarding yield and income etc.

**5.4. Suggestion by farmers:**

**1.** With the certain observations, statistics and views of different farmers Company should also focus on medium and small land holding farmers to make its grip strong in the village.
2. Field work is the most necessary part and it should be done with great potential.
3. They disseminating of information about the seed through the newspaper.
4. Farmers suggestion areas wise opening the distribution centre, because farmers are facing more and more problems like,
5. Field activity includes the Farmer meetings, Promotion Vans, Field Trials etc. to make awareness towards the company and its products.
6. Farmer don't show interest in meeting unless they have been given refreshments and something from the company as a gift, other competitors use to give things like pens, key rings with the company logo and name printed on it, so our company can also do the same so that more of the farmers know about the company. But it is very important to give farmers a leaflet in the regional language because whatever they have heard they will forget but a leaflet will make them remember the products for a long time.

**Reference:**

1. Annual Report (2011-12). Directorate of wheat research, Karnal – 132 001.
2. Anonymous. 1998. New policy on seed development. GOI Circular Ref. No. 11–71/88-SDI dated 16 September, Department of Agriculture & Co-operation, Ministry of Agriculture, New Delhi, 198
3. Anonymous. 2011. Proceedings and recommendations of the workshop on "Evolving an Alternative Paradigm for Seeds Systems for Rain fed Agriculture: Revitalizing Rainfed Agriculture (RRA) network", held between 27th – 28th, January 2011, at ICECD Campus, Bhopal, Ahmedabad, organized by Satvik: Promoting Ecological Farming, Bhuj - Kutch (Gujarat).
4. Bihar Department of Agriculture. (2010). Chapter IV: Reforming the Agrarian Sector. In Toward Accelerated Agricultural Development in Bihar (pp. 1-7). Retrieved from http://krishi.bih.nic.in/steering_group.html.
5. Cromwell E. 1996. Governments, seeds and farmers in a changing Africa. Wallingford, UK: CAB International, in association with ODI.
6. Chand R (2001). Wheat exports: Little gain. Economic and Political Weekly 36 (25): 2226-2228. 8.

7. Chand R, Kumar P and Kumar S (2011). Total factor productivity and contribution of research investment to agricultural growth in India, National Centre for Agricultural Economics and Policy Research, Policy Paper 25, March 2011.
8. Dayakar Rao B, Tonapi VA, Hyma Jyothi S and Seetharama N. 2004. Supply and distribution of quality seed: Need for sustained approach. Paper presented at XVII Annual Conference on Agricultural Marketing, Organised by the Indian Society of Agricultural Marketing (ISAM), Acharya NG Ranga Agricultural University, Hyderabad, Andhra Pradesh, 5-7 February 2004. Abstract in Indian Journal of Agricultural Marketing (Conference special). 17: 260.
9. Delouche, J.C. 1982. Seeds quality guidelines for the small farmer. In: Proceedings of the Conference on Improved Seed for the Small Farmer, 9-13 August, CIAT, and Cali, Colombia.

10. Dixit S, Wani SP, Ravinder Reddy Ch, Roy S, Reddy BVS, Sridevi TK, Chourasia AK, Pathak P, Rama Rao M and Ramakrishna A. 2005. Participatory varietal selection and village seed banks for self-reliance: Lessons learnt. Global Theme on Agro ecosystems, Report No 17. Patancheru, Andhra Pradesh, India: International Crops Research Institute for the Semi-Arid Tropics. 20 pp.
11. Food Corporation of India. (2012). Agency wise procurement of wheat during last five years. Retrieved from http://fciweb.nic.in/procurements/view/13
12. Lewis L and Mulvany PM. 1996. A typology of community seed banks. Natural Resources Institute, University of Greenwich, UK.
13. Linnemann, A.R. and G.H. de Bruijn. 1987. Traditional seed supply for food crops. ILEIA Newsletter 3(2):10-11.
14. 41 Louwaars N. 1994. Seed supply systems in the tropics: International course on seed production and seed technology. Wageningen, the Netherlands: International Agricultural Center.
15. Meena Kumari (2006), developing a community based seed system Farmer saved seed".

16. Monyo, E,.,D.D. Rohrbach, and M.A. Mgonja-2003-New partnerships to strengthen seed system in Southern Africa: Innovative community/ commercial seed supply models .Paper presentation to the successful community based production strategies, co-organized by CIMMYT and ICRISAT, 3rd -6th August 2003, CIMMYT/ICRISAT,
17. Nasurudeen P, Anil Kuruvila, Sendhil R and Chandrasekhar V (2006). The dynamics and inequality of nutrient consumption in India. Indian Journal of Agricultural Economics 61 (3): 362-370.Harare, Zimbabwe.
18. Paper presentation at the workshop on successful community based seed production strategies, co-organized by CIMMYT and ICRISAT, 3-6 August 2003, Harare, Zimbabwe
19. Sendhil R, Randhir Singh, Satyavir Singh, Anuj Kumar and Indu Sharma (2012). An exploration into changing food consumption pattern in India. Crop Improvement (Special Issue): 1315-1316.

20. Setimela, P.S-, E-Monyo, and M. Banziger (eds).2004.Sucessful Seed Production Strategies.Mexico, D.f.: CIMMYT.
21. Scowcroft WR and Snowcraft CEP. 2004. Developing a strategy for sustainable seed supply systems in subSaharan Africa: Policies, stakeholders and coordination; 11
22. Tonapi VA and Seetharama N. 2004a. Improved seed systems for small and marginal farms. Paper presented at XVII Annual Conference on Agricultural Marketing, Organised by the Indian Society of Agricultural Marketing (ISAM), and
23. Acharya NG Ranga Agricultural University, Hyderabad Andhra Pradesh, 5-7 February