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A study on pigeonpea growers' knowledge and constraint to ridge and furrow sowing in eastern Uttar Pradesh, India

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Abstract
Krishi Vigyan Kendra (ICAR-IIVR) conducted a survey using the individual discussion approach and a structured interview schedule, with a total sample size of 250 farmers. The investigation was done on the basis of experience and limitations involved in using pigeonpea sowing the ridge and furrow method. The surveyor discovered that most farmers (96.7%) were aware of how to sow pigeon peas using the ridge and furrow technique approach and 96.8% concurred that lower overall variable costs and a higher net return. 96.2 percent of respondents believed that this strategy requires less seed than broadcasting and obtained more yield (96 percent), 95.7 percent respondents are agreed with sowing of pigeonpea on ridge bed technique being a water wise technology, provides the solution. 91.5 percent of respondents ensure proper drainage of the water during the cropping period under this technique, 86.4 percent of respondents agreed that the fertilizers are placed in the proper location and depth, and 84.2 percent said the same about the seeds. Technology that works for rain-fed locations (83.1%), no fertilizer or seed wastage (82.8), given more intercropping options (81.9 percent), Application of herbicides and insecticides is simple during the pod production stage (80,4%). Data reveals that two most significant technical limitations were the difficulty in managing the proper soil moisture at sowing time for ridge and furrow planting (87.2%) and the lack of local equipment availability (92%) for ridge and furrow planting. Therefore, the two most effective social-psychological restrictions were step motherly treatment of pigeon pea as opposed to other crops (84.8%) and a lack of cooperation among pigeon pea growers to share their experience with ridge bed planters (96.8%). Therefore, under the categories of financial and extension related constraints, respectively, the high cost of a ridge bed planter (93.6%) and farmers' lack of awareness of minor ridge bed planter adjustments (94.4%) were also mentioned as significant constraints.

Keywords: Resource conservation technology, ridge bed planting, front line demonstration, constraints

Introduction
Pulses are an essential part of the diet in rural areas since they are a major source of protein and can be grown in a variety of agroclimatic conditions. India consumes more pulses than any other protein, highlighting the importance of pulses in their typical diet. The pigeon pea (*Cajanus cajan* L.), commonly referred to as Red gram, Arhar or Tur, is an ancient crop in India that is significant to the country's economy and food system in addition to being used for a variety of other purposes. This crop's deep root structure enhances its suitability for development in rain-fed conditions and enriches the soil through biological nitrogen fixation, both of which are essential components of a sustainable agricultural farming system. Pigeon peas are the only legume that is produced and farmed on a higher scale next to chickpea. According to Agricultural Statistics at a Glance 2021, India used 4.53 million hectares of land and produced 3.89 million tons with an average productivity of 859 kg ha^{-1}, whereas Uttar Pradesh used 0.29 million hectares of land and produced 0.28 million tons with an average productivity of 980 kg ha^{-1}. Defective cultivation techniques, such as sowing methods, incorrect crop geometry, avoidance of weedicide usage, bio-fertilizer operations, and climate variability, are key causes of pigeon pea potential yield limitation. During 2014-15 to 2018-19, the average pigeonpea production across India, Uttar Pradesh, and demonstration fields was 797 kg ha^{-1}, 916 kg ha^{-1}, and 1594 kg ha^{-1}, respectively. (Figure 1).

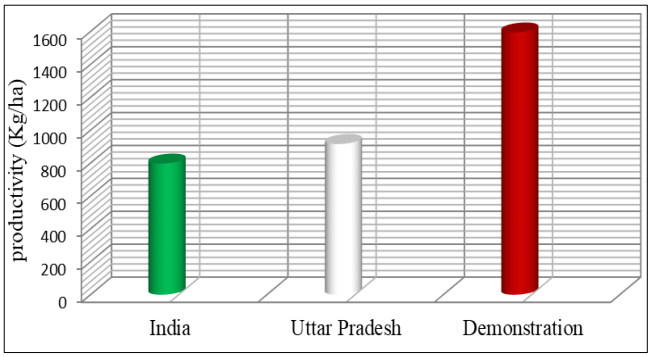

Fig 1: Average productivity (Kg/ha) of pigeonpea in India, Uttar Pradesh and Demonstration during 2014-15 to 2018-19

Materials and Methods

The district of Deoria is located in Uttar Pradesh's NorthEaste rn Plain Zone.The annual rainfall is 1210 mm, and the climate varies from wet to dry sub-humid. Agriculture takes up 73% of the area, and tube wells are the principal method of irrigation for about half of the cultivated land. Deoria is a district in Uttar Pradesh's North-Eastern Plain Zone. The annual rainfall is 1210 mm, and the climate ranges from moist to dry sub-humid. Agriculture covers 73% of the land area, and tube wells are the primary mode of irrigation for around half of the cultivated land. The Uttar Pradesh district of Deoria is divided into sixteen blocks, and five of them, namely Bhatparrani, Bhagalpur, Bhatni, Lar, and Salempur, were chosen at random to undertake an agronomic and economic impact evaluation of ridge and furrow pigeonpea sowing. All farmers over the age of 18 were chosen for the survey (n=250) in 10 villages, namely Bankata mishra, Ruchapar, Sawreji, Nonapar, Kundoli, Jetpura, Laxmanchak, Belpar pandit, Pakari babu, and Piprhiya, which had already implemented the pigeonpea sowing on ridge bed technique. The maximum 49.2 percent respondents were belong between 31 to 45 age group fallowed by 29.6 percent belong to 18 to 30 age group and minimum 2.4 percent respondents belong to above 60 year old (Fig.2).

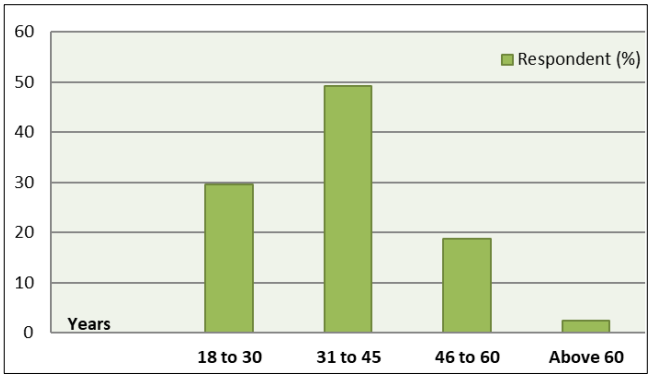

Fig 2: Age group of Respondents

Pigeonpea was chosen as the principal pulse crop by 90 percent of the questioned farmers in kharif, followed by green/black gram (8 percent), while the remaining farmers (2 percent) practiced other pulse crops. In this research, 98 percent of the farmers used rainwater to irrigate their crops, while the remaining 2% used tube-wells (bore wells) to use subsurface water. In the survey, information on irrigation water, labor costs, and crop costs was gathered. Without taking into consideration the land rental value, the cost of pigeonpea cultivation using the ridge and furrow technique and broadcasting method was evaluated. Gross returns were computed by factoring in the minimum support price (MSP)/retail price set by governmental organizations for pigeonpea. For the purpose of determining the economic feasibility of this technique, returns over variable costs were evaluated.

Results and Discussion

Experience based survey of the farmer's: The sequence in Table 1 showed that farmers are aware of the pigeonpea sowing through ridge and furrow technique. Majority (96.8 percent) of respondents agreed that the total variable costs of pigeonpea were lower and higher net return in this technique. 96.2 percent of respondents agreed that there were fewer seed requirements than broadcasting in this technique. More yield was found under pigeonpea sowing ridge and furrow technique (96 percent). Kirar *et al.* 2020 [3] reported that statistically significant higher grain yields under the ridge and furrow method were recorded than other sowing methods. Therefore, the same trends were also reported by Pandey *et al.*, (2014) [4] and Kumar *et al.*, (2012) [2]. 95.7 percent of respondents agreed with pigeonpea sowing through ridge and furrow technique being a waterwide technology, provides the solution. This technique is more water efficient and has an advantage over broadcast pigeonpea. 91.5 percent of respondents ensure proper drainage of the water during the cropping period under this technique. The fertilizers are placed at the right place and depth (88.4 percent), 84.2 percent of respondents agreed with the seeds being placed at the right place and depth. Effective technology for rainfed areas (83.1 percent), no waste of seed and fertilizer (82.8 percent), provides more options for intercropping (81.9 percent), easy application of pesticides and insecticide at the pod formation stage (80.4 percent). Such significant differences between the two pigeonpea cultivation systems are directly related to seed, water, application of insecticide-pesticide and labor savings during the growing period of pigeonpea, which has been a big factor in the acceptance of an advanced technique in the state. Therefore, 80 percent of respondents ensure the saving of surface as well as ground water by this technique. Usage of this method conserves natural resources like soil, water and the environment (76.6 percent) as well as controls soil erosion (72.2). Thus, it improves soil health by use of this technology. Hence 70.1 percent respondents agreed with the provided more option for weed management, easy for irrigation/watering (68.7 percent), Provides more option to be the perfect suited in different cropping systems (66.8 percent), Financially profitable, especially when using irrigation facilities that are assured (64.2 percent), Technology spread between other farmer's (62.0 percent), Less time requirement for irrigation (61.2 percent), The crop growth and development is better than broadcasting (60.2 percent), Improves crop productivity (59.2 percent), Increased water stress tolerance and more effective water utilization (56.8 percent), The government agencies are promoting this technology by providing subsidized machines (56.1 percent), Less drudgery (55.2 percent), No adverse effect on seed germination (55.0 percent), Reduces crop lodging (54.1 percent) and reduced herbicide cost (51.2 percent) table (1).

Table 1: Farmer's reactions with pigeonpea sowing through ridge and furrow technique

S. No	Particulars	Frequency (%)	Rank
1	Less seed requirement than broadcasting	96.2	II
2	The fertilizers are placed at right place and depth	88.4	VI
3	The seeds are placed at the right place and depth	84.2	VII
4	No wastages of seed and fertilizer	82.8	IX
5	Ensures proper drainage of the water during crop period	91.5	V
6	Provides more option to be the perfect suited in different cropping systems	66.8	XVII
7	Reduces crop lodging	54.1	XXVII
8	Effective technology for rainfed areas	83.1	VIII
9	Easy for irrigation/watering	68.7	XVI
10	Provided more option for intercropping	81.9	X
11	Reduced herbicide cost	51.2	XXIX
12	Provided more option for weed management	70.1	XV
13	Low production cost and higher net return	96.8	I
14	Easy application of pesticides and insecticide	80.4	XI
15	Improves crop productivity	59.2	XXII
16	Control the soil erosion	72.2	XIV
17	The crop growth and development is better than broadcasting	60.6	XXI
18	The government agencies are promoting this technology by providing subsidized machines	56.1	XXIV
19	Less time requirement for irrigation	61.2	XX
20	Increased water stress tolerance and more effective water utilization	56.8	XXIII
21	No adverse effect on seed germination	55.0	XXVI
22	Use of this technique conserves natural resources like soil, water and environment	76.6	XIII
23	Technology spread between other farmer's	62.0	XIX
24	Saving of ground water	80.0	XII
25	Effective water saving technology	95.7	IV
26	Financially profitable, especially when using irrigation facilities that are assured	64.2	XVIII
27	More yield	96.0	III
28	Less drudgery	55.2	XXV

Constraints allied with pigeonpea sowing through ridge and furrow technique: Constraits associated with pigeonpea sowing through ridge and furrow technique faced were classified into five categories *viz*. educational and training constraints, scientific/technological constraints, economical constraints, Socio-Psychological constraints and extension constraints. The expected constraints faced by the pigeonpea grower's during adapting the ridge and furrow technique have been presented in table 2 to 4 and figure 4 and 5.

Educational and training Constraits

Regarding the educational and training constraits as evident from the data presented in figure 3. This shows 96.8% of respondents say lack of knowledge to the farmers about ridge bed planters and it is observed as the most serious impediment regarding this technology it got first position, 84% of respondents say lack of communication between the farming community through electronic mass media agencies was observed as the second most serious constraint got second ranked. Therefore, 78.4% of respondents say lack of awareness about the benefits of the ridge bed planting method and it got third position, followed by poor knowledge about calibration of ridge bed planter for maintenance to the optimum the plant population (72.4%) and deficit of training programmes at farming communities in the local areas got fourth and fifth position respectively.

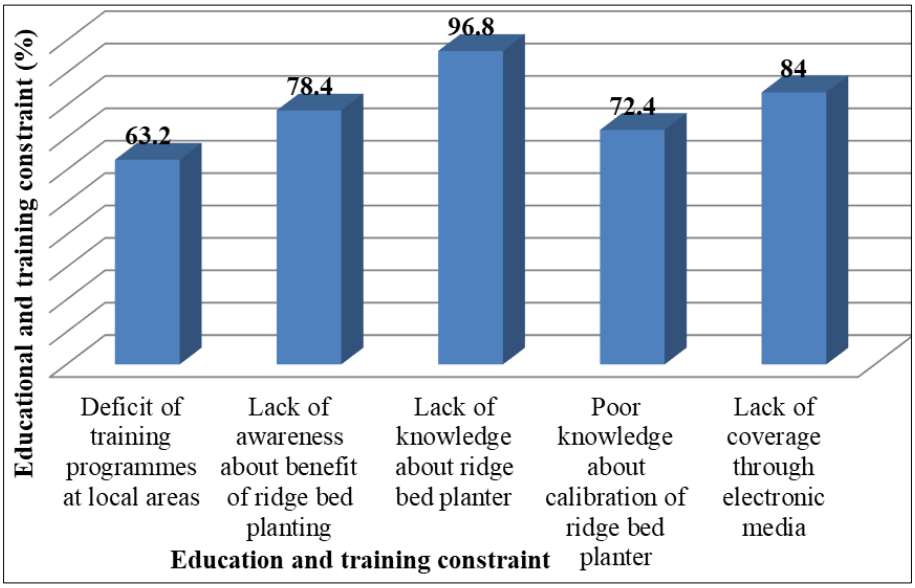

Fig 3: Shows the educational and training constraits faced by adoption of ridge and furrow technique

Technical Constraints: The data pertaining to technical constraints faced by farmers is presented in table 2 that deficit in availability of machine at local level is major problem 92% was the most important problem faced by the farmers as it ranked on first position, Difficulty to management the proper soil moisture at sowing time for ridge bed planting (87.2%) and it got second position. The opinions of 84% respondents were difficulty in running the ridge bed planter in rainy season and it got ranked third position. Therefore 82% respondents agreed with lack of availability of quality ridge bed planter as it got fourth position, Lack of repairer of ridge bed planter machine at local level (79.2%) it found fifth position, Lack of experts at local areas (77.2%) it found sixth position, Lack of knowledge about technical adjustments of ridge bed planter (75.2%) it found seventh position. However the opinions of 68.8% were low quality materials used in subsidized planter and it got eight positions, 64% respondents were says to difficulty to judge the proper moisture level and it got last rank were also constraints in adopting this technology.

Table 2: Number of respondents based on the technical constraits faced by adoption of ridge and furrow technique

Technical constraits	Frequency	Percentage	Rank
Deficit in availability of machine at local level	230	92.0	I
Lack of availability of quality ridge bed planter	205	82.0	IV
Difficulty to management the proper soil moisture at sowing time	218	87.2	II
Lack of experts at local areas	193	77.2	VI
Difficulty to judge the proper moisture level	160	64.0	IX
Lack of repairer of ridge bed planter machine at local level	198	79.2	V
Lack of knowledge about technical adjustments of ridge bed planter	188	75.2	VII
Low quality materials used in subsidized planter	172	68.8	VIII
Difficulty in running the ridge bed planter in rainy season	210	84.0	III

Social-psychological constraits

The data shown in table 3 reveals that among the most serious constraits is lack of cooperation among the pigeonpea growers to share their experience with ridge bed planters (96.8%) got first position Step-motherly treatment with pigeon pea as compared to other crops (84.8%) it got second position. However, 79.2% respondent's shows the community pressure on the pigeonpea grower's about broadcasting of pigeon pea got third position. Poor field appearance (76.8%) it got fourth position, followed by hearsays and rum ours about ridge bed planter (73>2%) got last rank were also constraints in adoption of the sowing of pigeonpea on ridge bed technology.

Table 3: Number of respondents based on the social-psychological constraits faced by adoption of ridge and furrow technique

Social-psychological constraits	Frequency	Percentage	Rank
Hearsays and rum ours about ridge bed planter	183	73.2	V
Community pressure on the pigeonpea grower's	198	79.2	III
Poor field appearance	192	76.8	IV
Lack of cooperation among the pigeonpea grower's to share their experience about ridge bed planter	242	96.8	I
Step-motherly treatment with pigeon pea as compared to other crops	212	84.8	II

Economic or financial constraits: Among the financial constraits, the higher cost of a ridge bed planter (93.6 percent) of respondents reported major constraints. unavailability of funds for the purchase of other inputs at the time of sowing (79.2 percent) got second ranked followed by subsidy usually availed by high profile farmers (79.2 percent) and 72.8 percent of respondents reported that the poor knowledge about incentives or any insurance policy as indicated. in.

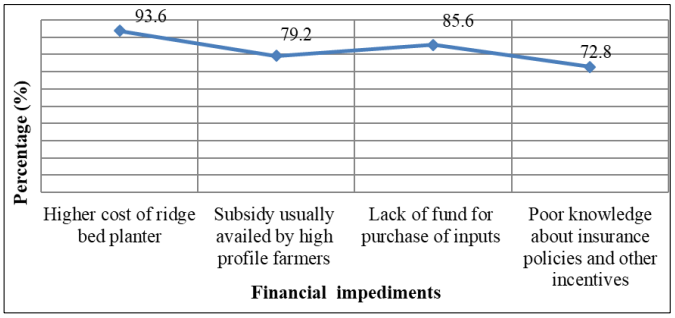

Fig 4: Number of respondents based on the economic or financial constraits faced by adoption of ridge and furrow technique

Extension related constraits

The information in Table 4 demonstrates that the most significant restrictions, such as farmers' ignorance of modest adjustments to ridge bed planters (94.4 percent). Lack of media attention (91.6%) came in second. As a result, according to 88.8% of respondents, the lack of trained field experts who provide method demonstrations of machine calibration at farmers' fields came in third, followed by a lack of extension literature (82.4%), an inadequate extension facility at the disposal of input agencies (76.0%), and a lack of sufficient manpower from state extension agencies (71.2%).

Table 4: Shows the number of respondents based on the extension constraints faced in the adoption of ridge and furrow technique

Extension Constraints	Frequency	Percentage (%)	Rank
Lack of awareness of farmer about calibration of machine	236	94.4	I
Lack of attention in mass media	229	91.6	II
Lack of extension literature	206	82.4	IV
Inadequate extension facility at the disposal of input agencies	190	76	V
Lack of trained field experts who give method demonstration of machine calibration at farmers' field	222	88.8	III
Lack of adequate manpower from state extension agencies	178	71.2	VI

Conclusion

Pigeonpea sowing through ridge and furrow technique is a desirable choice when the future of pigeonpea production is in jeopardy due to worldwide unexpected changes in weather. If suitable soil types from leveled land are chosen, water use efficiency and production in pigeonpea sowing through ridge and furrow technique cultivation may rise. From the present discussion, it can be inferred that pigeonpea sowing through ridge and furrow techniques offers a sizable advantage over the current way of pigeonpea growers in terms of both total production and financial rewards. Pigeonpea sowing through ridge and furrow techniques prevented the failure of crops under high rainfall conditions rather than broadcasting technique, which was a huge relief for the state's growers of the pigeonpea crop during the growing season. Uses of this technique save on additional irrigations compared to broadcasting techniques, which is a very good solution to the state's constantly dropping water table.

Thus, the challenges to pigeonpea sowing through ridge and furrow technique include optimum plant population, weed flora, insect-pest, lodging, and wilt assault. Biotechnological and genetic techniques may be able to deal with these problems. Pigeonpea sowing through ridge and furrow techniques has been shown to be superior than the broadcasting in various research conducted in India and abroad.

References

1. Agricultural Statistics at a Glance. Government of India Ministry of Agriculture & Farmers Welfare Department of Agriculture & Farmers Welfare Directorate of Economics & Statistics; c2020-21. p. 72-74.
2. Kumar P, Rana KS, Rana DS. Effect of planting systems and phosphorous with bio-fertilizers on the performance of sole and intercropped pigeonpea (*Cajanus cajan*) under rainfed conditions. Indian Journal of Agronomy. 2012;57(2):127-132.
3. Neha Singh Kirar, Sasode DS, Rawat GS, Ekta Joshi, Sarika Mahor. Performance of Pigeonpea (*Cajanus cajan* L.) sown on different land configuration techniques. Journal of Pharmacognosy and Phytochemistry. 2020;9(4):224-227.
4. Pandey IB, Tiwari S, Pandey RK, Rakesh Kumar. Effect of bed configuration, fertilizer levels and placement method on the productivity of long duration pigeonpea under rainfed condition. Journal of Food Legume. 2014;27(3):206-209.