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A study of socio-economic characteristics of pigeonpea growers in Parbhani district of Maharashtra state

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Abstract
Pigeonpea is largely grown in Parbhani district of Maharashtra state. The present study has been made to measure the socio-economic characteristics of pigeonpea growers such as age, education, family size, farm size, cropping pattern, farming experience and IPM farming experience etc. of 60 pigeonpea growers from 2 village, sayala and wadgaon tarfe takli of Parbhani district. The primary data were collected from the selected pigeonpea growers with the help of an interview schedule by personal interview method. The results revealed that in case of pigeonpea growers, the overall average age of the farmers was 53.64 years. The average education adopted by farmers ranges from 7th class to 10th class. The average family size of pigeonpea growers was 5.61. The average size of land holding owned by pigeonpea grower was 3.46 ha. Farming experience years of pigeonpea growers counts on an average 35.24 years in overall level. IPM experience measures an average 1.68 years by pigeon pea growers.

Keywords: Average age, land holding, education, farming experience, IPM experience

Introduction
The pigeon pea (*Cajanus cajan*) is a perennial legume from the family Fabaceae. It is widely cultivated in tropical and semitropical regions around the world, being commonly consumed in South Asia, Southeast Asia, Africa, Latin America the Caribbean. The pigeonpea is an important legume crop cultivated in India, Malaysia, Indonesia, Philippines, East & West Africa. Among the pulses, pigeon pea is the second most important legume after chickpea in India and grown predominantly under rainfed conditions. Pigeon pea is one of the protein (20-22%) rich legumes of the semi-arid tropics grown throughout the world. Pigeonpea ranked sixth globally after peas, broad beans, lentils, chickpeas and common beans. Globally, pigeonpea is cultivated on 5.4 million hectare land area with an annual production of 4.49 million tons. It is grown in about eighty-two (82) countries of the world. India accounts for about 72 percent of the area grown to pigeonpea. (FAO Statistics Pigeon Producing Countries. Production and Area Harvested Food and Agriculture Organization of the United Nations, Rome 2017). The pigeon pea production of India was 4.34 million tonnes (leading producer) from an acreage of 5.05 million ha. with a productivity of 859 Kg/ha. (Source: DES, MoAF &W, 2022, fourth advanced estimates)
In Maharashtra 12.81 lakh hectare area is covered under pigeon pea with production and productivity of 11.74 lakh tons and 916 kg/ha. National crop production targets for 2022- 23 of pigeon pea is 4.55 million tons. In Parbhani district area under pigeonpea is 483.04 ha with production of 812.42 tons and productivity of 1681.90 kg/ha. (Source: Ministry of Agriculture and farmers welfare, GOI. 2021-22 Annual report).

Materials and Methods
Parbhani district was selected purposely for the present study because productivity of pigeonpea was highest i.e. 1681.90 kg/ha in Parbhani district than other districts of the farmers who cultivated pigeonpea with IPM technology. A list of farmers who cultivated pigeonpea with IPM technology was obtained from Krishi Vigyan Kendra (KVK) Parbhani and 60 farmers were finalized for the present study.
A schedule of developed and recommended IPM technology in pigeonpea cultivation was collected from subject matter specialists of KVK Parbhani and accordingly an interview schedule was developed. The primary data were collected from the selected pigeonpea growers with the help of an interview schedule by personal interview method. The data were collected for the *kharif* season of the agricultural year 2022-23.

Results and Discussion

Socio-economic characteristics of pigeonpea growers

Socio-economic attributes of pigeonpea growers include their age, education, family size, farm size, farming experience, etc and cropping pattern of pigeonpea growers is also included in the socio-economic attributes. The selected farmers were grouped into three categories i.e. low IPM technology adopters, medium IPM technology adopters and high IPM technology adopters by estimating technology adoption index. Table 1 shows the diverse data collected from the farmers which were inspected to form a conclusion.

Age analysis of pigeonpea growers

Age is one of the important characteristics which influences the strength of the person and decision making ability in the farming business. It is observed from Table 1 that the average age of the sample farmer was 53.64 years. Technology adoption category wise results revealed that more aged farmers were observed in the low adoption group and vice versa. The average age of the medium technology adopter group was 54.3 years and average age of the high adopter group was 46.72 years. While average age of the low adopters group was 59.9 years. It is concluded from the table that technology adoption index was high in case of low aged pigeonpea cultivators while it was low in case of high aged cultivators.

Similar results were seen in the findings of Timprasert *et al.* (2014), in their study on factors affecting adoption of integrated pest management by vegetable growers in Nakhon ratchasima province, Thailand. Their study revealed that age of majority of IPM adopter farmers was 40 years and non-IPM farmers was 60 years of age.

Family size analysis of pigeonpea growers

Family size is also one of the significant factors which affects the supply of family labours in farming business and at the same time adversely affects marketable surplus of the agricultural produce. The family size was reneged from 5 to 6 members per family in low, medium and high IPM technology adopters group in the study area.

Educational status analysis of pigeonpea growers

Education is one the most important factors in consideration to adoption of technology. It influences the managerial and technical ability of the farmer. From present study it is seen that high technology adopters where completed the education upto matric class while, medium adopters completed 9th class education and low technology adopters belonged to middle school education category. It can be concluded that as the education level is high, the rate of technology adoption also increases.

The results of study by Hussain *et al.* (2011) are in line with the present study, and the results revealed that higher the growers level of education, the higher the intention of adoption.

Farm size analysis of pigeonpea growers

It is observed from the table that the average farm size of a selected pigeonpea cultivar at overall level was 3.46 ha. Different technology adoption groups wise picture showed that in case of low technology adoption group the average farm size was 2.6 ha, while in case of medium technology adopters group the average farm size was 2.43 ha and in case of high adoption group the average farm size was 5.34 ha. It means that the rate of technology adoption in case of small and medium farmers was low while it was high in case of large farmers.

Farming experience of pigeonpea growers

Experience helps the farmers in making wise decisions in farming business, it is revealed from the table that at overall level of sample farmers had an average farming experience of 35.24 years. Among the different adoption groups, it is observed that farming experience becomes less and less from low technology adoption group to high technology adoption groups. In case of the low technology adoption group the farming experience was noticed at 42.5 years while in case of medium technology adoption group it was noticed at 33.73 years and for the high technology adoption group farming experience was estimated at 29.5 years.

IPM farming experience of pigeonpea growers

IPM experience was also shown the same results as that of family size, education and farm size. It is observed that at overall level an average pigeonpea cultivar had an IPM experience of 2 years. Different group wise analysis showed that IPM experience was increasing from low technology adoption group to high technology adoption group. It means that the farmers having more IPM experience were categorized into a high technology adoption group, whereas farmers having low IPM experience were grouped into a low technology adopters group.

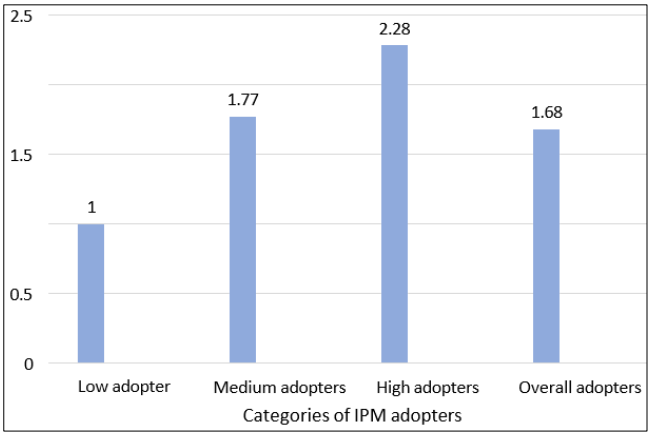

Fig 1: IPM farming experience among adopted sample farmers

Table 1: Socio-Economic characteristics of pigeonpea cultivators

		Adoption Group			
	Particulars	**Low**	**Medium**	**High**	**Overall**
		12	**30**	**18**	**60**
1.	Age (Years)	59.9	54.3	46.72	53.64
2.	Family size(Members)	5.7	5.53	5.61	5.61
3.	Education	7.2	9.37	10.11	8.89
4.	Farm size (ha)	2.6	2.43	5.34	3.46
5.	Farming experience	42.5	33.73	29.5	35.24
6.	IPM Experience	1	1.77	2.28	1.68

Cropping pattern of Pigeonpea growers

Spatial representation of crops rotation in an area in sequence or proportion of area under various crops at a point of time in a unit area. Cropping pattern helps the farmers to grow crops and use land intensively by cultivating different crops in different seasons which strengthen the economic condition of the farmers and also the economy. Cropping patterns are significant because they assist farmers in maximizing land

utilization, optimizing water and fertilizer supplies, and reducing crop failure owing to climatic conditions.

Cropping pattern of low technology adopters

Cropping pattern of low technology adopter group was seen with maximum production of soybean, cotton and followed by pigeonpea in *kharif* season. Out of the total gross cropped area 48.15 percent of land in *kharif* season, 42.59 percent in *rabi* season and 9.26 percent in summer season. Overall area of 2.6 ha was covered by *kharif* crops which measures 48.15% of gross cropped area.

In rabi season jowar occupies the maximum area of 22.22 percent of the gross cropped area followed by chickpea with 16.67 percent. Groundnut and chilli occupied 3.7 percent of each crop area from GCA. The cropping intensity of the low technology adopter group was 207.69 percent.

Cropping pattern of medium technology adopters

The crops grown by the medium adopters during *kharif* season was soybean, tur, mung, cotton, udid were the maximum area covered by soybean and cotton with 15.56 percent each of the crop of gross cropped area. Cross cropped area of the medium adopters is 5.14 ha with a cropping intensity of 210.66 percent.

During *rabi*, chickpea, jowar, and wheat were cultivated 21.01 percent, 23.37 percent and 0.39 percent of the gross cropped area respectively. Which shows the highest area covered by jowar in *rabi* season. Along with this in summer medium adopters covered 8.43 percent of total gross cropped area.

Cropping pattern of high technology adopters

Maximum area covered by high adopters in *kharif* was of soybean with 16.52 percent of total gross cropped area followed by tur with 15.92 percent of GCA. Cotton covered 9.51 percent of GCA and mung with 2.70% of GCA during *kharif* season total kharif area covered is 44.84 percent GCA.

Table 2: Cropping pattern on sample farm

Particulars	Low		Medium		High		Overall	
Kharif	(ha/far m)	percent	(ha/far m)	percent	(ha/far m)	percent	(ha/far m)	percent
Soybean	0.9	16.67	0.8	15.56	1.65	16.52	1.12	16.3
Tur	0.7	12.96	0.8	15.56	1.59	15.92	1.03	15.04
Cotton	0.9	16.67	0.67	13.04	0.95	9.51	0.84	12.26
Mung	0.1	1.85	0.16	3.11	0.27	2.7	0.18	2.58
Udid	0	0	0.01	0.19	0.02	0.2	0.01	0.15
Subtotal	2.6	48.15	2.44	47.47	4.48	44.84	3.18	46.42
Rabi								
Chickpea	0.9	16.67	1.08	21.01	2.4	24.02	1.46	21.31
Jowar	1.2	22.22	1.15	22.37	1.54	15.42	1.3	18.93
Wheat	0.2	3.7	0.02	0.39	0.24	2.4	0.15	2.24
Subtotal	2.3	42.59	2.25	43.77	4.18	41.84	2.91	42.48
Summer								
Groundnut	0.2	3.7	0.18	3.5	0.48	4.8	0.29	4.18
Chilli	0.2	3.7	0.16	3.11	0.48	4.8	0.28	4.09
Brinjal	0.1	1.85	0.11	2.14	0.37	3.7	0.19	2.82
Subtotal	0.5	9.26	0.45	8.75	1.33	13.31	0.76	11.09
GCA	5.4	100	5.14	100	9.99	100	6.85	100
CI (%)	207.69		210.66		222.99		215.41	

Cropping pattern of overall technology adopters

Gross cropped area of overall adopters was 6.85 ha with covered maximum with high technology adopters in *kharif* followed by *rabi* season. In *kharif* season soybean covered 16.30 percent of the GCA and tur with 15.04 percent of the CGA. This is the maximum of all the crops. *Rabi* season covered 42.48 percent of total GCA and summer with 11.09 percent GCA.

Cropping intensity was higher adopters is observed to be highest with 222.99 percent, followed by medium adopters 210.66 percent and low adopters with 207.69 percent. While it is seen from the table that overall intensity is 215.41 percent.

Similar results were found by Pawar *et al*. (2023) [9], in their study on Identification of factors affecting decision making of cauliflower farmers on adoption of integrated pest management technology in state of Haryana. Their study revealed that the IPM adopters had a larger area under vegetable cultivation, as compared to non-IPM adopters. On an average cropping intensity for all the farms was 226.93 percent.

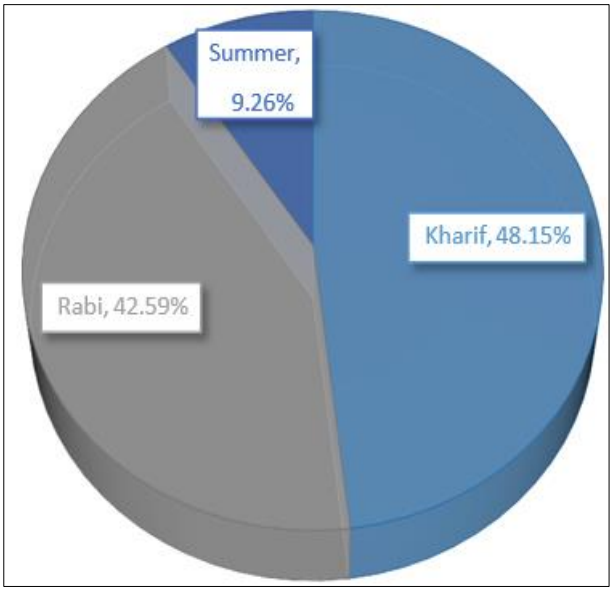

Fig 2: Cropping pattern of low technology adopter group

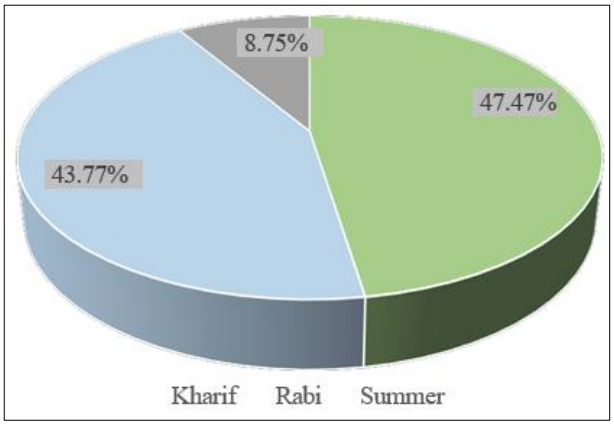

Fig 3: Cropping pattern of medium technology adopter group

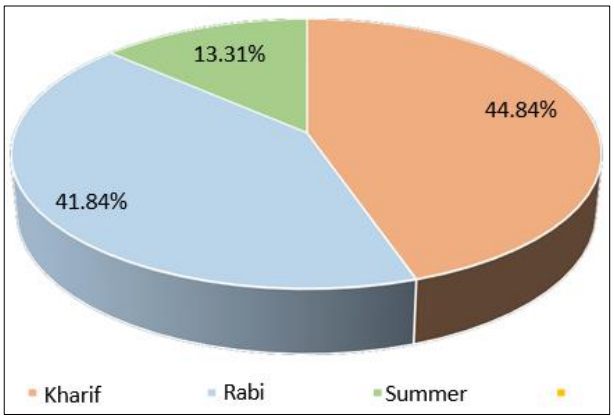

Fig 4: Cropping pattern of high technology adopters group

Conclusion

The selected farmers were grouped into three categories i.e. low IPM technology adopters, medium IPM technology adopters and high IPM technology adopters by estimating technology adoption index. Socio-economics characteristics *viz* age, family size, education, farm size, farming experience and IPM experience were revealed that technology adoption index was high in case of low aged pigeonpea cultivators while it was low in case of high aged cultivators. Technology adoption category wise results revealed that more age farmers were observed in the low adoption group, similarly the average age of the medium technology adoption group was 54.3 years and average age of the high adopter group was 46.72 years.

Education is one the most important factors in consideration to adoption of technology. It influences the managerial and technical ability of the farmer. From present study it is seen that high technology adopters where completed the education upto matric class while, medium adopters completed 9th class education and low technology adopters belonged to middle school education category. It can be concluded that as the education level is high, the rate of technology adoption also increases.

Cropping patterns of low adopters occupied 2.6 ha area in *kharif*, 2.3 ha area in *rabi* and 0.5 ha area in summer from a total gross cropped area of 5.4 ha. In *kharif* soybean crop covered the maximum area of 16.67% of total gross cropped area, in *rabi* maximum area is under jowar and summer occupied 9.26% area of total crops. In low adopters cropping intensity is 207.69%. Medium adopters covered maximum area under soybean and tur are the same i.e. 15.56% in *kharif* season, jowar occupied 22.37% of GCA in *rabi* which is maximum and in summer ground covered maximum area. Cropping intensity of medium adopters is 210.66%. High technology adopters covered maximum area of soybean followed by pigeonpea with 16.52% and 15.92% of gross cropped area in *kharif* season, 24.02% of area is covered by chickpea in *rabi* season which is maximum. Cropping intensity of high adopters is 222.99%.

In overall technology adopters maximum area is covered by soybean with 16.30% of GCA followed by pigeonpea 15.02% area covered from CGA. cropping intensity of 215.41% overall adopters measured.

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