



E-ISSN: 2278-4136

P-ISSN: 2349-8234

www.phytojournal.com

JPP 2020; 9(4): 1510-1515

Received: 13-05-2020

Accepted: 17-06-2020

Krishnamurthy ATAssociate Professor, Department
of Agricultural Extension,
College of Horticulture,
Mudigere, Karnataka, India**Meti SK**Director of Education, College of
Agriculture, UAS, Raichur,
Karnataka, India**Chandargi DM**Dean (Agri.), College of
Agriculture, UAS, Raichur,
Karnataka, India**Wali VB**Assistant Professor, Department
of statistics, College of
Agriculture, UAS, Raichur,
Karnataka, India

Extent of adoption of improved cultivation practices of pigeonpea crop among small and marginal farmers

Krishnamurthy AT, Meti SK, Chandargi DM and Wali VB

Abstract

The study was conducted in twelve villages of Hyderabad-Karnataka region to know the extent of adoption of improved cultivation practices of pigeonpea among small and marginal farmers with the sample of 120. The study revealed that, majority of small and marginal farmers belonged to medium adoption categories and majority of them were adopted soil type, summer ploughing, varieties, recommended implements for sowing, seed rate, spacing, hand weeding, application of phosphorus, potash and plant protection measures. Further, thinning and nipping in pigeonpea crop were not adopted by the cent per cent of the small and marginal farmers. Whereas, majority of small (70.00%) and marginal (88.33%) farmers did not use the herbicides for management of weeds. With respect to integrated pest management practices, deep summer ploughing & selection of suitable varieties, I spray, II spray, III spray and IV sprays were adopted by the majority of the pigeonpea small and marginal farmers.

Keywords: Extent of adoption, pigeonpea, improved cultivation practices, small and marginal farmers

Introduction

Pigeonpea (*Cajanus cajan*), is grown throughout the world especially in South Asia, Eastern and Southern Africa, Latin America, Caribbean countries and Australia. According to FAO statistics (2005), worldwide pigeonpea was grown in about 4.58 million hectares and its production was 3.27 million tonnes in. India is the largest producer of pigeonpea accounting 73.21 per cent of total production and 76.30 per cent of total area of the world. Other major pigeonpea producing countries are Kenya (4.36 Per cent) Myanmar (11.77 per cent), Malawi (2.68 per cent) and Uganda (1.83 per cent). The productivity is the highest in Uganda (1000 kg/ha) followed by Myanmar (925 kg/ha) Nepal (896 kg/ha) and India (685 kg/ha). (Anonymous, 2011-12). Hence, a major role in the production of pigeonpea by India, the interventions as the revolutionary of production matrix required to enhance the productivity levels in order to face competitions at all levels.

Pigeonpea commonly known as tur and arhar is one of the major pulse crops of tropics and subtropics, it is an ancient crop of the country. It finds an important place in cropping systems of small farmers in developing countries. After chickpea, Pigeonpea is the second most important pulse crop in the country. Pigeonpea is considered to be native of peninsula, India. It is a short annual crop in India, the crop has a deep root system and hence highly drought tolerant. The main use is in the form of dhal in the Indian diet. Its green seeds are used as vegetable. It has good nutritive value. Besides the human diet, the green leaves and dry seeds of Pigeonpea are used as fodder for animals. green manure, wind breaks, as live fence for boundaries of small farms.

Among major pigeonpea growing states, Maharashtra accounts 30.11 per cent of the total area in the country followed by Karnataka (14.27%), Andhra Pradesh (12.40%), Uttar Pradesh (11.7%), Madhya Pradesh (9.91%) and Gujarat (9.84%), whereas, productivity is highest in Bihar (1281 kgs/ha) followed by Uttar Pradesh (1142 kgs/ha), Madhya Pradesh (837 kgs/ha) and Maharashtra (757 kgs/ha).

Methodology

Study conducted during the year 2014-15, in twelve villages of three districts of Hyderabad-Karnataka region, to know the adoption level of improved cultivation practices of pigeonpea among small and marginal farmers. From each selected villages 10 pigeonpea (5 small and 5 marginal farmers) were selected by using simple random sampling technique. Thus, the study sample comprised of 120 pigeonpea growers (60 small and 60 marginal farmers).

Corresponding Author:**Krishnamurthy AT**Associate Professor, Department
of Agricultural Extension,
College of Horticulture,
Mudigere, Karnataka, India

The total sample selected for the study was 120 respondents. The pigeonpea cultivation practices recommended by the University of Agricultural Sciences, Raichur were considered for study. The adoption level of a particular practice was calculated by the following procedure.

Table 1: The score were assigned for the adoption of each of the recommended practices by farmers in the following way

Sl. No.	Adoption pattern	Score
1	Full adoption	2
2	Partial adoption	1
3	Non-adoption	0

Partial adoption refers to any deviation from the normal recommendation. The total practices selected for the study were 23. The total score for a respondent is obtained by summing up the score obtained on each individual practice. The maximum score that one could get was 46 and minimum was zero. The respondents were categorized in to three categories based on the following criteria.

Table 2: Adoption category Score

Sl. No.	Adoption category	Score
1	Low	Less than (Mean - 0.425 SD)
2	Medium	Between (Mean \pm 0.425 SD)
3	High	More than (Mean + 0.425 SD)

Result and Discussion

Overall adoption of improved cultivation practices of pigeonpea among small and marginal farmers

Table 3 and Fig. 1 indicated that, 55.00 per cent of small farmers and 40.00 per cent of marginal farmers belonged to medium adoption category respectively. This might be due to fact that, chickpea being a pulse crop requires more knowledge and utmost care. Majority of the farmers had middle school to high school level education, medium to high economic motivation, medium to high risk bearing ability, medium to high innovativeness and more exposure to mass media. Hence, all these factors might have influenced them to adopt correct recommended cultivation practices. Further, increase in income naturally will be having more risk bearing ability and more orientation towards economical returns. And also because of good education and more exposure to mass media, participation in extension activities and contact of extension personnel have increased their knowledge level and hence fell in medium to high adoption category so as to gain more income.

The findings are in accordance with the results obtained by Tripathi *et al.* (2006)^[1] and Raghavendra *et al.*, (2006)^[2].

As per the Mann Whitney-U test analysis, there was a significant difference existed among the small and marginal farmer categories in adoption of improved cultivation practices of chickpea crop.

Adoption level with respect to improved cultivation practices of pigeonpea among small and marginal farmers

The results presented in the Table 4 indicated that, majority of the small and marginal farmers of pigeonpea crop was adopted soil type as per recommendation. The study was conducted in the Raichur, Gulbarga and Bidar districts of Hyderabad-Karnataka region, as these districts predominantly covers recommended soil type for pigeonpea crop *ie.*, deep block soils. Like land preparation, sowing, summer ploughing is an age old practice followed by small and marginal farmers irrespective of crop. Usually small and marginal farmers are

well versed with summer ploughing and its advantages. These might be reasons for majority of small and marginal farmers of pigeonpea crop adopted summer ploughing. Whereas, more than fifty per cent of small (53.33%) and marginal (51.67%) farmers not applied the FYM as per the recommended quantity. The reasons for non adoption of FYM by majority of the respondents were not possessed animals and the respondents belonged to medium to low level of livestock possession.

Majority of the small and marginal farmers correctly followed the sowing season and used the recommended implements for sowing. Whereas, 76.67 and 71.67 per cent of small and marginal farmers used the recommended variety. Whereas, seed rate as per recommendation was adopted by 86.67 and 78.33 per cent of the small and marginal farmers, respectively.

The reasons for adoption of these practices as per recommendation might be the simplicity and low cost of these practices which can be practiced by making use of meagre knowledge and their own resources without dependence on any external agency. Further, farmers as a result of their farming experience, extension participation, extension contact and mass media participation etc. have realized the usefulness of these practices.

It was noticed from the results that, 78.33 and 83.33 per cent of the small and marginal farmers did not treat the seeds before sowing. It may be due to lack of knowledge regarding seed treatment procedure and also non availability *Rhizobium* culture in the village.

Spacing was fully adopted by 63.33 and 55.00 per cent of the respondents. Under good conditions plant growth such as greater fertility of the soil, availability of moisture, recommended spacing is convenient for intercultivation which in turn minimises the labour cost for manual weeding. These could be the reasons for adoption of recommended spacing in pigeonpea crop.

Thinning and nipping in pigeonpea were not adopted by the cent per cent of the small and marginal farmers. The reasons expressed by the farmers in the study area were lack of knowledge and these two practices are labour intensive and time consuming in nature.

Intercropping practice was not adopted by the majority of the small (66.67%) and marginal (73.33%) farmers. Whereas, none of the small and marginal farmers followed the mixed cropping in pigeonpea crop. This is because of the respondents opined that, intercropping and mixed cropping reduces the crop stand which minimise the yield. Generally, farmers follow intercropping and mixed cropping as mutual insurance. If a crop gets infected with disease or pest, the other crop at least could survive to recover the expenses incurred. Pigeonpea as it is resistant to major pest and diseases, farmers would have thought to go for mono-cropping to obtain higher yield. This might be the reasons for above findings.

Hand weeding method was adopted by majority of the small (70.00%) and marginal (53.33%) farmers to manage the weeds in pigeonpea. As they traditionally take up intercultural operation is traditional practice carried out by bullock drawn implements for management of weeds, this minimises the weed intensity. This might be the reasons for above findings, Majority of small (70.00%) and marginal (88.33%) farmers did not use the herbicides for management of weeds. At the time of data collection, the farmers expressed that, the black soils have lesser weed intensity and 2-3 times intercultural operation was taken up by bullock drawn implements to

manage the weeds. Further, due to lack of knowledge about weedicide and high cost might also be the probable reasons for above findings.

Growth regulator in pigeonpea crop was not used as per recommendation by majority of small (53.33%) and marginal (81.67%) farmers. This may be due to lack of knowledge and high cost of growth regulator.

The small (55.00%) and marginal (78.33%) farmers carried out the intercultivation operation as per the recommendation in pigeonpea, whereas, 45.00 per cent of small and 21.67 per cent of marginal farmers carried out intercultivation operation partially. The probable reason could be, intercultural operation loosens the soil, conserve the moisture. In addition to this, earthing up through intercultivation helps in proper crop stand and weed control.

With respect to N fertilizer, majority (75.00%) of small farmers and 53.33 per cent of marginal farmers applied as per the recommendation. Whereas, majority (70.00%) of small farmers and 46.67 per cent of marginal farmers applied P fertilizer as per recommendation. Purchase and application of recommended and sufficient quantity of chemical fertilizers is expensive which cannot be affordable by small and marginal farmers due to their poor economic status. Also there could be inadequate knowledge among the small and marginal farmers about the benefits of applying fertilizers as per the recommendation and non availability adequate quantity of fertilizer in time. This might be the reasons for above findings.

None of the farmers applied the micronutrients like Zinc and Magnesium Sulphate. This may be due to lack of knowledge and they did not know the availability of micronutrients.

Further, majority of the respondents not used the Neem seed kernel extract and chilly & garlic solution for management of pests. The respondents expressed that, non availability of sufficient quantity of Neem seeds and preparation of solution is a complex procedure and it is time consuming process, might be the reasons for non adoption of above said practices. Majority of small farmers (71.67%) and marginal farmers (63.33%) adopted the plant protection measures as per recommendation, while, 28.33 and 36.67 per cent of small and marginal farmers, respectively partially adopted the plant protection measures against the management of pod borer. Further reason this, pod borer is one of the major pests in pigeonpea crop, if farmers did not take up management measures, it causes the huge economic losses to farmers. For this reason the majority of the small and marginal farmers followed the correct management measures for pod borer in

pigeonpea crop.

These findings were in agreement with the findings of the study conducted by Dwivedi *et al.* (2011)^[3] and Khare (2013)^[4].

Integrated pest management practices like, deep summer ploughing & selection of suitable varieties, I spray, II spray, III spray and IV sprays were adopted by the majority of the pigeonpea small and marginal farmers. This might be due to the intensive extension activities organised by the Krishi Vigyan Kendra and Karnataka State Department Agriculture to create mass awareness among the farming community regarding integrated pest management role in management of pests in pigeonpea crop. Further, farming experience, extension participation, extension contact, mass media participation, innovativeness and scientific orientation have direct influence on adoption of integrated pest management practices.

The other practices *viz.*, mechanical collection of larva, erection of bird perches and pheromone traps were not adopted by cent per cent of small and marginal farmers. This might be due to lack of knowledge about the use and maintenance of pheromone traps, high cost and not easily accessible intimaes might have resulted in no adoption of pheromone traps.

Correlation coefficient (r) between extent of adoption of pigeonpea among small and marginal farmers with their independent variables

The results revealed in Table 5 that, out of selected 20 variables, farming experiences, cropping intensity, farm implements, extension participation, and risk orientation were found to be positively significant at 1 per cent level of probability with adoption level of improved cultivation practices of a small farmers of pigeonpe crop, while, education and extension contact were significant at 5 per cent level of probability with adoption level of small farmers of pigeonpea crop.

The Table also revealed that, land holding, annual income, cropping intensity, farm implements, livestock possession, economic motivation and management orientation were found to be positively significant at 1 per cent level of probability of marginal farmers of pigeonpea crop with adoption level, while education, extension participation, mass media participation, scientific orientation and achievement motivation were positively significant at 5 per cent level of probability of marginal farmers of pigeonpea crop with their adoption level.

Table 1: Overall adoption of improved cultivation practices of pigeonpea among small and marginal farmers n=120

Sl. No.	Categories	Small farmers (n ₁ =60)		Marginal farmers (n ₂ =60)		Pooled data	
		F	%	F	%	F	%
1	Low (Mean - 0.425*SD)	3	5.00	16	26.67	19	15.84
2	Medium (Mean ± 0.425*SD)	38	63.33	23	38.33	61	50.83
3	High (Mean + 0.425*SD)	19	31.67	21	35.00	40	33.33
	Mean	21.40		19.67		20.53	
	SD	2.12		2.52		2.48	
	Mann Whitney-U test	SF Vs MF- .000**					
		** = Significant at 1% level					

Table 2: Extent of adoption of improved cultivation practices of pigeonpea crop among small and marginal farmers n=120 (s=60, m=60)

Sl. No.	Practices	Full Adoption		Partial Adoption		Non Adoption		
		F	%	F	%	F	%	
1	Soil type	Small farmers	53	88.33	0	0.00	7	11.67
		Marginal farmers	49	81.67	0	0.00	11	18.33
2	Summer ploughing	Small farmers	47	78.33	13	21.67	0	0.00

		Marginal farmers	41	68.33	19	31.67	0	0.00
3	FYM application	Small farmers	32	53.33	28	46.67	0	0.00
		Marginal farmers	31	51.67	23	38.33	6	10.00
4	Sowing time	Small farmers	52	86.67	0	0.00	8	13.33
		Marginal farmers	47	78.33	0	0.00	13	21.67
5	Varieties	Small farmers	46	76.67	0	0.00	14	23.33
		Marginal farmers	43	71.67	0	0.00	17	28.33
6	Seed cum fertilizer drill	Small farmers	38	63.33	0	0.00	22	36.67
		Marginal farmers	31	51.67	0	0.00	29	48.33
7	Seed rate	Small farmers	52	86.67	8	13.33	0	0.00
		Marginal farmers	47	78.33	13	21.67	0	0.00
8	Seed treatment	Small farmers	13	21.67	12	20.00	35	58.33
		Marginal farmers	10	16.67	14	23.33	36	60.00
9	Spacing	Small farmers	38	63.33	22	36.67	0	0.00
		Marginal farmers	33	55.00	27	45.00	0	0.00
10	Thinning	Small farmers	0	0.00	18	30.00	42	70.00
		Marginal farmers	0	0.00	12	20.00	48	80.00
11	Trans planting method	Small farmers	9	15.00	0	0.00	51	85.00
		Marginal farmers	4	6.67	0	0.00	56	93.33
12	Nipping	Small farmers	13	21.67	0	0.00	47	78.33
		Marginal farmers	9	15.00	0	0.00	51	85.00
13	Intercropping	Small farmers	20	33.33	0	0.00	40	66.67
		Marginal farmers	16	26.67	0	0.00	44	73.33
14	Mixed cropping	Small farmers	0	0.00	0	0.00	60	100.00
		Marginal farmers	0	0.00	0	0.00	60	100.00
15	Weed management							
a	Hand weeding	Small farmers	42	70.00	18	30.00	0	0.00
		Marginal farmers	32	53.33	28	46.67	0	0.00
b	Herbicides	Small farmers	28	46.67	20	33.33	12	20.00
		Marginal farmers	17	28.33	22	36.67	21	35.00
16	Growth regulator	Small farmers	28	46.67	24	40.00	8	13.33
		Marginal farmers	11	18.33	31	51.67	18	30.00
17	Intercultivation	Small farmers	33	55.00	27	45.00	0	0.00
		Marginal farmers	47	78.33	13	21.67	0	0.00
18	Fertilizer application							
a	N	Small farmers	15	25.00	45	75.00	0	0.00
		Marginal farmers	28	46.67	32	53.33	0	0.00
b	P	Small farmers	18	30.00	42	70.00	0	0.00
		Marginal farmers	18	30.00	28	46.67	14	23.33
c	K	Small farmers	9	15.00	46	76.66	5	8.33
		Marginal farmers	7	11.67	44	73.33	9	15.00
19	Micronutrients							
a	Zinc	Small farmers	0	0.00	0	0.00	60	100.00
		Marginal farmers	0	0.00	0	0.00	60	100.00
b	Magnesium Sulphate	Small farmers	0	0.00	0	0.00	60	100.00
		Marginal farmers	0	0.00	0	0.00	60	100.00
20	Plant protection measures							
a	Pod borer	Small farmers	43	71.67	17	28.33	0	0.00
		Marginal farmers	38	63.33	22	36.67	0	0.00
b	Wilt	Small farmers	11	18.33	14	23.33	35	58.33
		Marginal farmers	5	8.33	11	18.33	44	73.33
c	Sterility mosaic	Small farmers	0	0.00	0	0.00	60	100.00
		Marginal farmers	0	0.00	0	0.00	60	100.00
21	Neem seed kernel extract/ Neem oil	Small farmers	0	0.00	12	20.00	48	80.00
		Marginal farmers	0	0.00	9	15.00	51	85.00
22	Use of chilly and garlic solution	Small farmers	0	0.00	0	0.00	60	100.00
		Marginal farmers	0	0.00	0	0.00	60	100.00
23	Integrated Pest Management							
a	Deep summer ploughing	Small farmers	47	78.33	13	21.67	0	0.00
		Marginal farmers	41	68.33	19	31.67	0	0.00
b	Selection of suitable varieties	Small farmers	46	76.67	0	0.00	14	23.33
		Marginal farmers	43	71.67	0	0.00	17	28.33
c	I Spray (At the stage of 50% flowering)	Small farmers	35	58.33	21	35.00	4	6.67
		Marginal farmers	34	56.67	18	30.00	8	13.33
d	II Spray-When population is high	Small farmers	45	75.00	15	25.00	0	0.00
		Marginal farmers	35	58.33	19	31.67	6	10.00
e	II Spray-When population is less	Small farmers	32	53.33	23	38.33	5	8.33
		Marginal farmers	24	40.00	28	46.67	8	13.33
f	III Spray	Small farmers	41	68.33	10	16.67	9	15.00

		Marginal farmers	39	65.00	11	18.33	10	16.67
g	IV Spray	Small farmers	17	28.33	30	50.00	13	21.67
		Marginal farmers	12	20.00	42	70.00	6	10.00
h	When larval population is more	Small farmers	0	0.00	0	0.00	60	100.00
		Marginal farmers	0	0.00	0	0.00	60	100.00

Table 3: Correlation coefficient (r) between extent of adoption of pigeonpea among small and marginal farmers with their independent variables
n= 120

Sl. No.	Characteristics	Small farmers (n ₁ = 60)	Marginal farmers (n ₂ = 60)
1	Age	0.027 ^{NS}	-0.184 ^{NS}
2	Education	0.259*	0.246*
3	Farming experiences	0.164**	0.195 ^{NS}
4	Land holding	-0.0201 ^{NS}	0.327**
5	Annual income	-0.067 ^{NS}	0.356**
6	Cropping intensity	0.331**	0.494**
7	Household materials	-0.033 ^{NS}	0.234 ^{NS}
8	Farm implements	0.338**	0.452**
9	Livestock possession	-0.152 ^{NS}	0.452**
10	Extension participation	0.178**	0.275*
11	Extension contact	0.146*	0.153 ^{NS}
12	Mass media participation	0.022 ^{NS}	0.258*
13	Social participation	0.121 ^{NS}	0.244 ^{NS}
14	Cosmopolitaness	-0.218 ^{NS}	0.174 ^{NS}
15	Scientific orientation	0.016 ^{NS}	0.244*
16	Innovativeness	0.150 ^{NS}	0.084 ^{NS}
17	Achievement motivation	-0.010 ^{NS}	0.269*
18	Economic motivation	-0.101 ^{NS}	0.085 ^{NS}
19	Risk orientation	0.198**	0.043 ^{NS}
20	Management orientation	-0.036 ^{NS}	0.284**

* = Significant at 5% level ** = Significant at 1% level NS = Non Significant

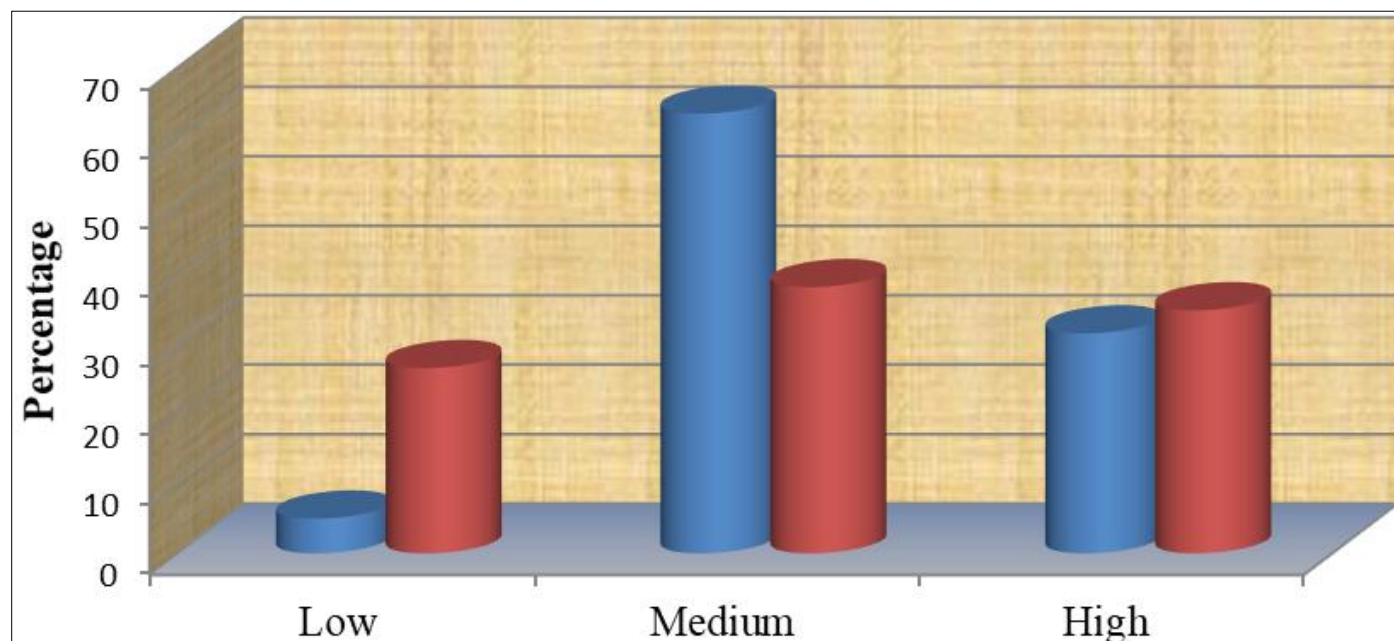


Fig 1: Overall adoption of improved cultivation practices of pigeonpea among small and marginal farmers

Conclusion

It could be concluded from the study that, majority of small and marginal farmers belonged to medium adoption categories and majority of them were adopted soil type, summer ploughing, varieties, recommended implements for sowing, seed rate, spacing, hand weeding, application of phosphorus, potash and plant protection measures. On the other hand major chunk of the both small and marginal farmers of pigeonpea crop did not adopted the simple practices like nipping, transplanting method, use of growth regulator and micro nutrients. The study clearly indicated that, adoption level of improved cultivation practices of pigeonpea

crop have clearly shown difference between among the small and marginal farmers.

Recommendations

- The differential rate of adoption of improved cultivation practices of pigeonpea crop among small and marginal farmers calls for intensification of efforts by the extension agencies.
- It pin points that the extension agencies should not wait for a technology to take its own time to 'trickledown' in a social system, however promising the technology may be, they should contact farmers belonging to different

categories and persuade them to adopt the innovations in the shortest possible time.

- Further, the administrators, planners and policy makers must give prime importance to execute the concept and special orientation should be given to the departmental staff to train the farmers and grass root level extension workers through department programmers.

References

1. Tripathi SK, Mishra B, Sing P. Knowledge extent of farmers about chickpea production technology. *Indian Res. J Ext. Edu.* 2006; 6(3):1-3.
2. Raghavendra MR, Natikar KV, Angadi JG. Adoption level of farmers about post-harvest technologies of bengalgram in Gulbarga district, Karnataka *J Agric. Sci.* 2006; 19(4):963-965.
3. Dwivedi AP, Singh SRK, Anupam Mishra, Singh RP, Mamta Singh. Adoption of improved production technology of pigeonpea. *J Com. Mob. & Sus. Dev.* 2011; 6(2):150-154.
4. Khare AL. Farmers knowledge in improved cultivation practices of Gram. *Indian J Appl. Res.* 2013; 3(10):1-3.