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MAHARASHTRA SOCIETY OF EXTENSION EDUCATION
C/O, Head, Department of Extension Education,
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Editorial

Maharashtra Society of Extension Education (MSEE) registered in 1982, has the foremost objective to publish the research journal. Accordingly, the society was publishing the journal entitled Maharashtra Journal of Extension Education. Since the year 2004 this journal has been renamed as Asian Journal of Extension Education.

The journal includes research articles from the researchers and extension workers in the field of extension education from various faculties of various institutes in the country. Extension education plays an important role not only in transfer of innovative technologies but also in developing appropriate methodology in the field of extension more suited for field application. The innovative research methods can be very well communicated for its application and use in further research by the extension fraternity. This can be achieved by publishing research articles.

Asian Journal of Extension Education is a very humble attempt to provide platform towards this goal of networking with the all extension professionals who could kindle the minds of their peers and young scientists through their research articles.

I have immense pleasure to present this 35th issue of Asian Journal of Extension Education for the year 2017. The Journal has received an encouraging response from all corners of the country. We have made an effort to encompass the best articles for the issue. Thanks are due to all the authors who have contributed for this issue.

I extend sincere thanks to Capt. Dr. L. B. Kalantri, Hon'ble President, Dr. D. M. Mankar, Vice President and Respected Member of Executive Body Dr. N. R. Koshti, Dr. N. V. Kumbhare for their constant inspiration, valuable guidance and concrete suggestions to maintain the quality of the journal.

I appreciate the tireless contribution of my colleagues and Joint-Secretary Dr. M. K. Rathod and Dr. S. D. More for their endless efforts in publishing this issue. I am confident that this issue of the Journal will be appreciated by the extension scientists, researchers, students and readers for its usefulness and contents. I solicit their suggestions for further enhancement of quality of the Journal.

Akola
Date: June 2019

P. K. Wakle
Chief Editor

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RESEARCH ARTICLE

Constraints and Suggestions of Soybean Growers in Adoption of Soybean FLDs under K.V.K in Ujjain District of Madhya Pradesh

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ABSTRACT

The study was conducted in Ujjain district of M.P. where FLDs programme were conducted by the Krishi Vigyan Kendra of Ujjain district (M.P.). On the basis of area, soybean is a 3major kharif crop. Krishi Vigyan Kendra Ujjain conducted FLD in 6 villages i.e. Tarana, Semalia, Jhardha, Narajpur, Berchhi, Amarikhedi which selected purposively. The data indicated that cent per cent of soybean FLDs beneficiaries faced the problem of timely monitoring is not done by experts, Package of practices are given in only theoretically classes (91.11% and ranked II), Information given to the farmers is not more exhaustive (83.33 % and ranked III). As regards suggestions, 94.44 per cent farmers had suggestions regarding information given to the farmers must be more exhaustive (ranked I) , Post demonstration contacts must be maintained (86.66% and ranked II), Credit facility on marginal rate of interest must be available (55.55% and ranked III).

Key Words: Constraints, front line demonstration, soybean, suggestions

INRODUCTION

The population is increasing in a geometric progression leading to an increased demand of soybean but there is no possibility of further increase in area due to growing urbanization, diversification, dwindling water resources, micro-nutrient deficiencies and soil health deterioration. Therefore, the need to produce more soybeans has to be met out with fewer resources in a sustainable and cost effective manner. The soybean production, currently, is around 11 to 13 million tons. The frontline demonstration is to demonstrate newly released crop production and protection technologies and its management practices in the farmers' field under different agro-climatic regions and farming situation. The objective of Front Line Demonstration (FLD) is to demonstrate newly released crop production and protection technologies and its management practices on the

farmers' field to study the constraints of production, factors contributing for higher production and thereby to generate production data and feedback information.

METHODOLOGY

The study was conducted in Ujjain district of M.P. where FLDs programme were conducted by the Krishi Vigyan Kendra of Ujjain district (M.P.). On the basis of area, soybean is a 3major kharif crop. Krishi Vigyan Kendra Ujjain conducted FLD in 6 villages i.e. Tarana, Semalia, Jhardha, Narajpur, Berchhi, Amarikhedi which selected purposively. Out of the list of beneficiary farmers in the six selected villages 90 farmers were selected randomly. Equal numbers of farmers were selected from the list of non-beneficiary farmers randomly 15 farmers from each villages. Thus, the total of 180 respondents were selected to constitute the sample of the study.

RESULTS AND DISCUSSION

Constraints faced by the beneficiaries in adoption of soybean FLDs:-The important constraints faced by the farmers in adoption of soybean FLDs are presented in Table 1. A perusal of the data indicate that cent per cent of soybean FLDs beneficiaries faced the problem of timely monitoring is not done by experts, Package of practices are give in only theoretically classes (91.11% and ranked II), Information given to the farmers is not exhaustive (83.33 % and ranked III), Low cost technology is not introduced (81.11 % and ranked IV), Lack of knowledge about soil fertility (74.44% and ranked V), Lack of knowledge about proper diagnosis of insect and disease infestation (64.44% and ranked VI), Lack of knowledge about HYVs seeds (57.77% and ranked VII), High cost of HYVs seeds (50.00% and ranked VIII), Lack of knowledge about proper spacing (43.33% and ranked IX), Non available of credit facility on marginal rate of interest in time (40.00% and ranked X), Non availability of fertilizers at the peak season (31.11% and ranked XI) and High cost of insecticides pesticides (24.44% and ranked XII)

Table 1: Constraints faced by the beneficiaries in adoption of soybean FLDs

S. No.	Constraints	Frequency	Percentage	Rank
1.	Timely monitoring is not done by experts.	90	100.00	I
2.	Package of practices are give in only theoretically classes.	82	91.11	II
3.	Information given to the farmers is not more exhaustive.	75	83.33	III
4.	Low cost technology is not introduced.	73	81.11	IV
5.	Lack of knowledge about soil fertility.	67	74.44	V
6.	Lack of knowledge about proper diagnosis of insect and disease infestation.	58	64.44	VI
7.	Lack of knowledge about HYVs seeds.	52	57.77	VII
8.	High cost of HYVs seeds.	45	50.00	VII
9.	Lack of knowledge about proper spacing	39	43.33	IX
10.	Non available of credit facility on marginal rate of interest in time.	36	40.00	X
11.	Non availability of fertilizers at the peak season.	28	31.11	XI
12.	High cost of insecticides pesticides.	22	24.44	XII

Table 2: Suggestions measures for strengthening the FLD Programme

S. No.	Suggestion	Frequency	Percentage	Rank
1.	Information given to the farmers must be more exhaustive.	85	94.44	I
2.	Post demonstration contacts must be maintained.	78	86.66	II
3.	Credit facility on marginal rate of interest must be available	50	55.55	III
4.	Fertilizers must be available at the peak season	45	50.00	IV
5.	Low cost technology must be introduced.	41	46.66	V
6.	Demonstration should be repeated regularly	36	40.00	VI

Suggestions measures for strengthening the FLD Programme:-

Table 2. presents the information regarding suggestions perceived by soybean growers in FLDs programme. It is obvious from table that 94.44 per cent farmers had suggestions regarding information given to the farmers must be more exhaustive (ranked I) , Post demonstration contacts must be maintained (86.66% and ranked II), Credit facility on marginal rate of interest must be available (55.55% and ranked III), Fertilizers must be available at the peak season (50.00% and ranked IV), Low cost technology must be introduced (46.66% and ranked V), Demonstration should be repeated regularly (40.00% and ranked VI).

CONCLUSION:

The problems faced by the farmers in adoption of soybean FLDs are presented in present study. A perusal of the data indicated that cent per cent of soybean FLDs beneficiaries faced the problem of timely monitoring is not done by experts, Package of practices are give in only theoretically classes (91.11% and ranked II), Information given to the farmers is not more exhaustive (83.33 % and ranked III), Low cost technology is not introduced (81.11 % and ranked IV), Lack of knowledge about soil fertility (74.44% and ranked V), Lack of knowledge about proper diagnosis of insect and disease infestation (64.44% and ranked VI), Lack of knowledge about HYVs seeds (57.77% and ranked VII), High cost of HYVs seeds (50.00% and ranked VIII), Lack of knowledge about proper spacing (43.33% and ranked IX), Non available of credit facility on marginal rate of interest in time (40.00% and ranked X), Non availability of fertilizers at the peak season (31.11% and ranked XI) and High cost of insecticides pesticides (24.44% and ranked XII)

In the present study the information regarding suggestions perceived by soybean growers in FLDs programme. It is obvious from the result that 94.44 per cent farmers had suggestions regarding information given to the farmers must be more exhaustive (ranked I) , Post demonstration contacts must be maintained (86.66% and ranked II), Credit facility on marginal rate of interest must be available (55.55% and ranked III), Fertilizers must be available at the peak season (50.00% and ranked IV), Low cost technology must be introduced (46.66% and ranked V), Demonstration should be repeated regularly (40.00% and ranked VI).

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RESEARCH ARTICLE

Medicinal Plants used for the Treatment of Jaundice

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ABSTRACT

The present investigation was conducted in Nanded and Parbhani districts of Maharashtra State. Two villages, Kundalwadi and Biloli from Nanded district and three villages Asola, Jamb and Pedgaon from Parbhani district (total five villages) were selected for the study. The data were collected by using PRA techniques and also the semi structured interview schedule. Keeping in view the importance of medicinal plants in treatment of different diseases the present investigation was undertaken to study the different medicinal plants used for the treatment of Jaundice and to know the method of preparation of dose of different medicinal plants used for the treatment of Jaundice.

The collected information was then validated scientifically by consulting Ayurvedic experts and by referring books on medicinal plants, drug index etc. Investigation revealed that fruits of Dates, Decoction made from Rhizomes of Ginger, tablet made from seeds of Black pepper, juice extracted from the Fruits and Leaves of Indian goose berry, Leaves of Parnfuti and Decoction made out of Bulbs of garlic are used for the treatment of Jaundice

INTRODUCTION

Medicinal plants are those plants which are rich in secondary - metabolites and are potential source of drugs. The value of medicinal plants, herbs and spices as herbal remedies is being lost due to lack of awareness and deforestation. As a result many valuable medicinal herbs are becoming rare and precious information is lost.

In 1985, it was estimated in the Bulletin of the World Health Organization (WHO) that around 80 % of the world's population relied on medicinal plants as their primary healthcare source. Even though a more recent figure is not available, the WHO has estimated that up to 80 % of the population in Africa and the majority of the populations in Asia and Latin America still use traditional medicine for their primary healthcare needs.

India is the largest producer of medicinal herbs and is called the botanical garden of the world. In rural India, 70 per cent of the population depends on the traditional type of medicine, the Ayurveda. In the Indian systems of medicine, most practitioners formulate and dispense their own recipes; hence this requires proper documentation and research.

M Sumarjit Singh and N Rajendro Singh in their study reported that people of Manipur in Northeast India have been using different kinds of forages, herbs, shrubs, vegetables, cereals and all kinds of fruits and trees as medicine since time immemorial.

Medicinal plants are those plants which are rich in secondary - metaboliters and are potential source of drugs. the balue of medicinal plants, herbs and spices as herbal remedies is being lost due to lack of awareness and deforestation.

Plants have been used as a source of medicine for curing cold, cough, asthma, bronchitis, jaundice, piles, insect bites, muscular pain, diarrhea, dysentery, stomach ulcers, headache, bleeding, sinuses, indigestion, boils, irregular menstruation, burns, sores, skin diseases, throat trouble, high blood pressure, low blood pressure, constipation, impotency, falling hair, paralysis, leprosy, anemia, gout, allergy, hydrocele, epilepsy, enlargement of liver and spleen and chronic fever.

Keeping in view the importance of medicinal plants in treatment of different diseases the present investigation was undertaken with following objectives

- To study the different medicinal plants used for the treatment of Jaundice.
- To know the method of preparation of dose of different medicinal plants used for the treatment of Jaundice.

METHODOLOGY

The present investigation was conducted in Nanded and Parbhani districts of Maharashtra State. Biloli and Parbhani blocks were selected from Nanded and Parbhani districts respectively. Two villages, Kundalwadi and Biloli from Nanded district and three villages Asola, Jamb and Pedgaon from Parbhani district (total five villages) were selected for the study. The data were collected by using PRA technique with the help of pre designed interview schedule. The respondents were asked about the name of the particular plant that is used by them for the particular disease, the part of the plant used, proportion, method of preparation, form of medicine and dosage. The collected information

was then scientifically validated by consulting Ayurvedic experts and by referring books on medicinal plants, drug index etc.

Results and Discussion

Medicinal plans used for the treatment of Jaundice Fruits of *Phoenix dactylifem,* popularly known as khariq were used to get rid off *Jaundice*.

Date (*Phoenix dactylifem)*

It is observed from Table 1 that fruits of *Phoenix dactylifem,* popularly known as khariq were used to get rid off *Jaundice*. It is revealed from the scientific validation that the fruits are having Stimulant property which cures liver disorders, Digestive property which increases digestion capacity, It was also observed that its Appetiser property which increases hunger and Hepato protective property which protects the liver and regulates bile flow

The dose is prepared by deseeding the dry date and filling cumin powder in the hollow seeds. The fruit is closed and then soaking it in lime juice for 7 hours. one such fruit is consumed per day for 7 days. This plant is also used in Karnataka to get relief from jaundice.

Ginger (*Zingi-ber offici-nale)*

It is clear from the table, that Ginger (*Zingiber officinale,),* locally known as Aale was also used in Maharashtra for the same purpose. the Analgesic property of Ginger gives relife from pain, Liver stimulant property Cures liver disorders and Digestive property Improves bowel movement The sufferer can consume the decoction prepared by grinding 1/2" rhizome of *Zingiber officinale* and a small bulb of *Allium cepa(* onion) . The paste is added in two cups of water and boil to make one cup of decoction.

Black pepper (*Piper nigrum)*

Black pepper (*Piper nigrum*) locally known as Meere was another plant used for the treatment of the patients suffering from jaundice. Its scientific validation illustrates that fruits of Black pepper are having Digestive property that is useful in increasing digestion capacity, property helps in curing liver disorders whereas property activates movement of bowel and property cures inflammation, oedema. l0g each of *Piper nigrum , Zingiber officinale, Terminalia chebula,and, Emblie a officinalis is p*owdered the powder is boiled in a little water in an iron vessel till the water evaporates for making tablets. One tablet daily needs to be consumed by the patient.

Indian goose berry (*Emblica Officinalis*

Table 1 also shows that fruits of Aamla *(Phyllanthus emblica)* were used to get rid from jaundice . 1 0 g fresh juice of the Aamla fruit is mixed with 20 g ms ofsugarcane juice and 1 tea spoon of honey . The Liquid is taken twice a day for 15-20 days. Secondly Juice of 10-15 leaves is extracted and mixed with water. The Liquid is taken in the morning for *3-4* days.

Scientific validation indicates that the fruits of Aamla were having Liver tonic property, which cures liver disorders, The anti inflammatory property helps in cures inflammation, oedema. Aamla is widely used in near about all the states of India as a household remedy for jaundice

Miracle leaf *(Bryophyllum pinnatum)*

Bryophyllum pinnatum is popularly known as parnfuti is used for the treatment of Jaundice. It was found that the leaves of *Bryophyllum pinnatum were having* Carminative property which activates movement of bowel, liver stimulant property which cures liver disorders and appetizer property which increases hunger

Garlic (*Allium sativum*)

It was observed that the bulbs of *Allium sativum were* used for the treatment of the patients suffering from jaundice. The garlic is having liver stimulant property helps in curing liver disorder; digestive property increases digestion capacity whereas vermifuge property kills the worms and anti pyretic property cures the fever of the patient

CONCLUSION

It is concluded that fruits of Dates, Decoction made from Rhizomes of Ginger, tablet made from seeds of Black pepper, juice exracted from the fruits and leaves of Indian goose berry, leaves of Parnfuti and Decoction made out of Bulbs of garlic are used for the the treatment of Jaundice

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Table 1. Medicinal plants used for treatment of jaundice

SN	Local Name	Botani-cal name	English name	Part used	Pharmacological status	Pharmaceutical status	Dosage	Form	
					Properties	Action	Method of preparation		
1.	khariq	*Phoenix dactylifem*	Date	fruits	• Stimulant • Digestive • Appetiser • Hepato protective	• Cures liver disorders • Increases digestion capacity • Increases hunger x Protects the liver and regulates bileflow	Deseed the dry date and fill cumin powder in the hollow. Close the fruit and soak in lime juice for 7 hours.	Solid	Consume one such fruit per day for 7 days
2.	Aale	*Zingi-ber offici-nale*	Ginger	Rhizomes	• Appetiser • Analgesic • Liver • stimulant • Digestive	• Increases the hunger • Cures pain • Cures liver disorders • Improves bowel movement	Grind 1/2" rhizome of *Zingiber officinale* and a small bulb of *Allium cepa(* onion) .Add paste in two cups of water and boil to make one cup of decoction	Decoction	Drink once a day for 3 days
3.	Meere	*Piper nigrum*	Black pepper	seeds	• Digestive • Stimulant • Carminative • Anti inflammatory	• Increases digestion capacity • Cures liver disorders • Activates movement of bowel • Cures inflammation, oedema	Powder 10g each of *Piper nigrum* , *Zingiber officinale Terminalia chebula*, *Em b lie a officinalis* them. Boil the powder in a little water in an iron vessel till the water evaporates for making tablets. Make tablets the size of 1/2 a bullet	Solid	Consume one tablet daily
4.	Aavla	*Emblica Officinalis*	Indian goose-berry	Fruit	• Liver tonic • Anti inflammatory	• Cures liver disorders • Cures inflammation, oedema	Mix 1 0 g fresh juice of the fruit and 20g sugarcane juice with 1 tea spoon of honey OR	Liquid	Twice a day for 15-20 days

SN	*Local Name*	*Botani-cal name*	English name	Part used	Pharmacological status	Pharmaceutical status	Dosage	Form	
					Properties	**Action**	**Method of preparation**		
				Leaves			Extract Juice *of 10-15* leaves and mix with water.	Liquid	Take in the morning for *3-4* days
5.	Parnfuti	*Bryophyllum pinnatum*	Miracle leaf	Leaves	• Carminative • Liver stimulant x Appetiser	• Activates movement of bowel • Cures liver disorders x Increases hunger	Crush 20g of leaves to extract the juice	Juice	Consume 2 to 3 times daily
6.	Lasun	*Allium sativum*	garlic	Bulb	Liver stimulant Digestive Anti inflammatory Vermifuge Anti pyretic	• Cures liver disorder • Increases digestion capacity • Cures inflamation, oedema • Kills the worms Cures fever	Boil one small bulb of *Allium sativum*, 10-15 . leaves of *Eclipta parostrata* and 2 small pieces of *Acacia catechu* in two glasses of water till water reduces to one glass	Decoction	Drink twice daily for 11 days

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RESEARCH ARTICLE

Demonstrations of pendimethalin for control of weeds in onion (*Allium cepa* L.) crop

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ABSTRACT

The present study was carried out in Barnala district of Punjab during *Rabi*-2015-16. Front line demonstrations on pendimethalin for control of weeds in onion crop were carried out in different farmers fields. On comparison with farmers practices, it was recorded that the application of pendimethalin @ 750 ml/acre + hand weeding at 40-55 days after transplanting (DAT) resulted less weeds population, weed dry weight and maximum WCE as compared to other farmers practices *viz.* oxyfluorfen @ 380 - 400 ml/acer + one hand weeding at 80 to 90 DAT, one hand weeding and two hand weeding . Application of pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT also result more plant height, leaves per plant, bulb yield, net return and B: C ratio as compared to other farmers practices. Lack of knowledge about pendimethalin for weed control in onion (38 %), fear of pendimethalin side effect on crop (24%), fear of ineffectiveness of pendimethalin (12 %) and busy schedule at the time of sowing (12 %) were the major reasons towards non-adoption of pendimethalin for weed control in onion. Publicising the details in respect to dose, time and method of application and intensive training programme on pendimethalin use in farmers' field were felt as a crucial steps for increasing the adoption level.

Key Words: Onion, Weeds, Pendimethalin, Weed control, Economics

INTRODUCTION

Onion (*Allium cepa* L.) is an important vegetable crop which used in daily diet of people in the whole world. It becomes a major cash crop with higher market demand and price due to its culinary, dietary and medicinal values. There are several constraints in onion cultivation of which weeds pose serious problems. *Amaranthus viridis L., Parthenium hysterophorus L., Eleusine indica L., Cyperus rotundus L., Chenopodium album L., Gnaphalium*

luteo-album, Nicotiana plumbaginifolia, Alternanthera philoxeroides, Euphorbia hirta L., and Physalis minima L. were the dominant weed species *(*Kalhapure *et al.* 2014 and Chattopadhyay *et al.* 2016). Onion has very poor competitive ability with weeds due to its inherent characteristics such as short stature, non branching habit, sparse foliage, shallow root system (Kizilkaya *et al.*, 2001; Ghosheh, 2004; Carlson and Kirby, 2005; Qasem, 2006; Chattopadhyay *et al* 2016). Weeds compete with crop plants for moisture, nutrients, light and space. In addition they also serve as an alternative host for several insect pests and diseases. Yield loss due to weeds infestation in onion was to the tune of 40-80 per cent (Verma and Singh 1997, Channapagoudar and Biradar 2007, Kalhapure *et al.* 2014, Chattopadhyay *et al* 2016). The conventional methods of weed control such as hoeing, weeding, etc. are laborious and very expensive. More over weeding during critical growth stages is very difficult due to increased cost of human labors and its scarce availability. Use of pre- emergence herbicides may prove economically suitable alternative. Keeping these points in view the demonstrations on pendimethalin for pre-emergence control of weeds in onion were conducted in different farmers' fields for adoption of this technology.

METHODOLOGY

The present study was carried out in Barnala district of Punjab during *Rabi*-2015-16. Front line demonstrations on pendimethalin for control of weeds in onion crop were carried out in Barnala district of Punjab, in order to demonstrate the benefits of this herbicide. As a whole, 42 numbers of FLD were conducted. Beneficiary selection for FLDs was made through discussion and personal contact with farmers on the basis of certain socio-personal characteristics like SES, innovativeness, progressiveness and risk orientation. The area under each demonstration was one acre. Application of pendimethalin @ 750 ml/acre + one hand weeding at 40 to 55 DAT (Days After Transplanting) was compared with existing weed control methods of farmers (oxyfluorfen @ 380 - 400 ml/acer + one hand weeding at 80 to 90 DAT, one hand weeding and two hand weeding). Weedy and weed free plots were also maintained for comparison. Through, farmers meeting and field visit during the cropping period, time to time monitoring of FLD plots were carried out and farmers were advised to carry out operations accordingly. The knapsack sprayer fitted

with flat fan nozzle was used for spray with volume of 200 litres per acre. Agronomic cultivation practices like field preparation, fertilizer application, and plant protection measures were done as per PAU, packages and practices. Five random samples of one meter square area from each demonstration fields were selected for weeds data .Weed population and dry weight were recorded at harvest. The dry weight of weed was calculated on sundry basis. The data on growth and bulb yield was recorded at the time of crop harvest. Weed control efficiency (WCE) was calculated by using the formula:

$$WCE = \frac{\text{Weed dry weight in weedy plot} - \text{Weed dry weight in treated plot}}{\text{Weed dry weight in weedy plot}} \times 100$$

Results and Discussion

Weed population

The application of pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT in different fields of farmers recorded less weed population as compared to weedy check. The population of weeds ranges from 1 to 7 per m^2 in farmers fields treated with pendimethalin @ 750 ml/acre followed by hand weeding at 40-55 DAT while it ranges from 20 to 34 per m^2 in weedy plots of farmers (fig.1). On comparison with farmers practices, it was recorded that the application of pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT resulted less weed population as compared to other farmers practices (oxyfluorfen + one hand weeding, one hand weeding and two hand weeding) (table-1). The average weed population was 3.8 per m^2 in farmers fields treated with pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT while 27.5 per m^2 in weedy plots. In different farmers practices, oxyfluorfen + one hand weeding, one hand weeding and two hand weeding results average weed population of 8.6, 16.5, and 4.2 per m^2 respectively which was less than pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT. Application of pendimethalin showed better management of weed flora than oxyflourfen, indicating the ability of pendimethalin to suppress the growth of all types of weed flora through its higher persistency in the soil in comparison to oxyflourfen. These results were in good conformity with the observations of Al Kothayari and Hassan (1990), Anonymous, (2015) and Chattopadhyay *et al*, (2016).

Weed dry weight

The application of pendimethalin @ 750 ml/acre + hand weeding at 40-55

DAT in different fields of farmers recorded less dry weight of weeds as compared to weedy check. The dry weight of weeds ranges from 57 to 281 g/m^2 in farmers' fields treated with pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT while it ranges from 705 to 976 g/m^2 in weedy plots (fig.2). On comparison with farmers practices, it was recorded that the pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT resulted less dry weight of weeds as compared to other farmers practices (oxyfluorfen + one hand weeding, one hand weeding and two hand weeding) (table-1). The average dry weight of weeds was 192.5 g/ m^2 in farmers fields treated with pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT while 857.7 g/m^2 in weedy plots. In different farmers practices, oxyfluorfen + one hand weeding, one hand weeding and two hand weeding results average 352.4, 658.0, and 245.0 g/m^2 respectively which were less than pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT. Similar result was reported by Al Kothayari and Hassan (1990), Channappagoudar and Biradar, (2007), Anonymous, (2015) and Chattopadhyay *et al*, (2016).

Weed control efficiency (WCE)

The highest weed control efficiency was recorded under weed free treatment (table 1). The weed control efficiency (WCE) ranges from 67 to 92 % in farmers' fields treated with pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT (fig.3). The average weed control efficiency (WCE) was 76.6% in farmers fields treated with pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT while farmers practices *i.e.* oxyfluorfen + one hand weeding, one hand weeding and two hand weeding results average 58.9, 23.3, and 71.4 % respectively which was less than pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT. The higher WCE is attributed to lower dry weight of weeds under pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT. Similar result were reported by Channappagoudar and Biradar, (2007) and Chattopadhyay *et al*, (2016).

Growth parameters

The maximum plant height and leaves per plant were recorded with weed free plots followed by pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT (table-2). The respective average plant height and leaves per plant were 64.8 cm and 7.5 per plant, observed with pendimethalin @ 750 ml/acre + hand

weeding at 40-55 DAT which was more than other farmers practices *i.e.* oxyfluorfen + one hand weeding, one hand weeding and two hand weeding. The weedy plots in farmers fields result less plant height and leaves per plant as compared to other methods of weed control *i.e.* pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT, oxyfluorfen + one hand weeding, one hand weeding and two hand weeding. Application of pendimethalin showed better management of weed flora indicating the ability of pendimethalin to suppress the growth of all types of weed flora through its higher persistency in the soil. As a result it reduced the crop-weed competition and facilitated the vegetative growth. Similar result was reported by Chattopadhyay *et al*, (2016).

Bulb yield

The maximum bulb yield was recorded with weed free plots followed by pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT (table-2). The bulb yield in forty two farmers' fields treated with pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT ranges from 67 to 94 q/acre (fig.4).On comparison with farmers' practices, it was recorded that the application of pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT resulted more bulb yield as compared to other farmers practices (oxyfluorfen + one hand weeding, one hand weeding and two hand weeding) (table-1). The average bulb yield in different farmers fields treated with pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT was 78.9 q/acre while 40.5 q/acre in weedy plots of farmers. In different farmers practices, oxyfluorfen + one hand weeding, one hand weeding and two hand weeding results average yields of 75.8, 65.4, and 77.5 q/acre respectively which were less than pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT. This may be due to the reason that application of initial pendimethalin controlled the germination of the weed seeds satisfactorily. In addition weeding at 40 to 55 DAT controlled the weed flora completely. Therefore less competition from weeds was observed with the crop. Verma and Singh (1997), Jayakumar and Bharati (2003), Channappagoudar and Biradar, (2007) and Chattopadhyay *et al*, (2016) also obtained very good results with pendimethalin in reducing the weed population and increasing the yield of onion crop.

Economics

The maximum cost of cultivation was recorded with weed free plots while lowest was in weedy field (table-2). Application of pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT results lowest cost of cultivation as compared to other weed control treatments (oxyfluorfen + one hand weeding, and two hand weeding) in different farmers fields (table-1). The maximum gross return was observed with weed free plots which were followed by pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT. The maximum net return and benefit cost ratio was observed with pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT as compared to weed free plot, oxyfluorfen + one hand weeding, one hand weeding, two hand weeding, and weedy. The pendimethalin application result highest net profit and benefit cost ratio was also reported by Chattopadhyay *et al*, (2016).

Reasons for Non-Adoption

The different reasons cited by the non-adopters towards their decision of non-adoption of the pendimethalin for weeds control in onion crop are enlisted in table 3. Lack of knowledge about pendimethalin for weed control in onion was found to be the most important and frequently cited reason for the non-adoption (38 %). Fear of pendimethalin side effect on crop (24%), fear of ineffectiveness of pendimethalin (12 %) and busy schedule at the time of sowing (12 %) were the other major reasons towards non-adoption. Dissatisfaction with pendimethalin performance (10%), and fear of low benefit: cost ratio (5 %) were other reason responded by some farmers for non-adoption of pendimethalin for weed control in onion. Altogether most of non-adopters did not go with the technology because of lack of knowledge and fear factors.

Farmers suggestions for adoption

The results as given in table 4 indicate that there is urgent need of intensive extension work in this region to popularize the technology among the farming community. Most of the farmers had suggested publicising the details in respect to dose, time and method of application, safe handling measures, etc. through various extension activities. Besides that the need of conducting intensive training programme on pendimethalin use in farmers' field was also felt as a crucial step for increasing the adoption level. A significant faction of the respondents (33 %) wanted intensive training on weed control in onion crop by an extension personnel regarding quantity

of herbicide and water to be use for prepare the solution, spraying technique, stage of crop when herbicide is to be applied.

CONCLUSION

It was concluded that application of pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT resulted effective control of weeds. Application of pendimethalin @ 750 ml/acre + hand weeding at 40-55 DAT also result more plant height, leaves per plants, bulb yield, net return and B: C ratio as compared to other farmers practices. Lack of detail knowledge, technical information and fear factors prevailing in the mind of farmers regarding pendimethalin use for control of weeds in onion crop were the important reasons for non-adoption. Publicising the details in respect to dose, time and method of application and intensive training programme on herbicide use in farmers' field were felt as a crucial steps for increasing the adoption level.

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Table 1. Bio-efficacy of different herbicides for control of weeds in onion crop.

Treatments	Dose (ml/acre)	Population at harvest (No./m^2)	Dry matter at harvest (g/m^2)	Weed control efficiency at harvest (%)
Pendimethalin + One hand weeding*	750	3.8	192.5	77.6
Oxyfluorfen + One hand weeding**	350-400	8.6	352.4	58.9
One hand weeding (40 to55 DAT)	-	16.5	658.0	23.3
Two hand weeding (40 to55 and 80 to 90 DAT)	-	4.2	245.0	71.4
Weed free	-	0.0	0.0	100.0
Weedy	-	27.5	857.7	0.0

* Hand weeding at 40 to55 DAT (Days After Transplanting) ** Hand weeding at 80 to 90 DAT.

Table 2. Effect of different herbicides on growth, yield and economics of onion crop.

Treatments	Dose (ml/acre)	Plant height at harvest (cm)	Leaves per plant (No.)	Bulb yield (q/acre)	Cost of cultivation (Rs/ acre)	Gross Return (Rs/ acre)	Net return (Rs/ acre)	B:C ratio
Pendimethalin + One hand weeding*	750	64.8	7.5	78.9	30804	78900	48097	1.6
Oxyfluorfen+ One hand weeding**	350-400	63.7	5.8	75.8	30841	75800	44959	1.5

One hand weeding (40 to55 DAT)	-	62.5	5.6	65.4	30541	65400	34859	1.1
Two hand weeding (40 to55 and 80 to 90 DAT)	-	64.5	7.1	77.5	33541	77500	43959	1.3
Weed free	-	68.5	7.6	81.2	36541	81200	44659	1.2
Weedy	-	53.6	3.6	40.5	27541	40500	12959	0.5

* Hand weeding at 40 to55 DAT ** Hand weeding at 80 to 90 DAT.

Table 3: Reason for non- adoption of pendimethalin for control of weeds in onion crop

S. No.	Reasons	No.	%	Range
1	Lack of knowledge about pendimethalin for weed control in wheat	16	38	I
2	Busy schedule at the time of sowing	5	12	III
3	Fear of pendimethalin side effect on crop	10	24	II
4	Fear of ineffectiveness of pendimethalin	5	12	III
5	Fear of low benefit : cost ratio	2	5	V
6	Dissatisfaction with pendimethalin performance	4	10	IV

Total no. of respondent farmers: 42

Table 4. Farmers suggestion to bring improvements in adoption of pendimethalin of weeds in onion crop.

S. No.	Suggestions	No.	Response (%)	Rank No
1	Intensive training on weed control in onion crop	14	33	I
2	Laying out more number of adoptive trails/ demonstration	11	26	II
3	Publicising detail instruction of handling, and time and method of use of herbicides.	7	17	IV
4	Organising camps and field day for awareness about technology	9	21	III
5	Supply of herbicides through co-operative societies (No profit no loss basis)	1	2	V

Total no. of respondent farmers: 42

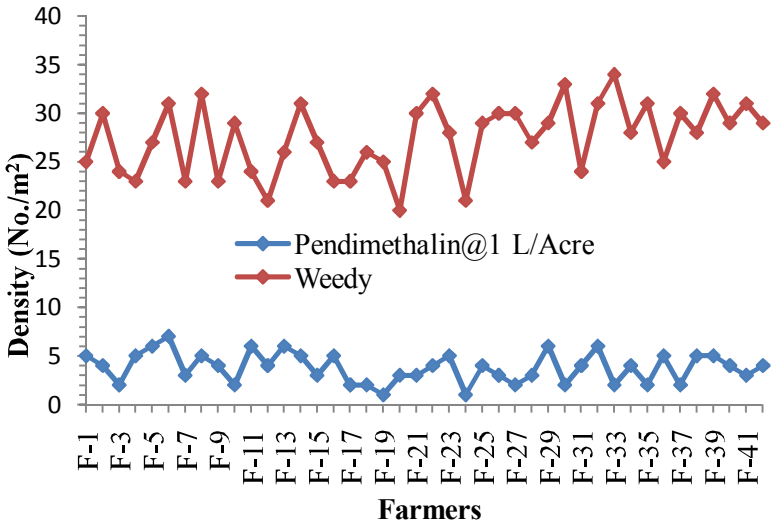

Fig 1. Effect of pendimethalin on weeds density in different farmers fields

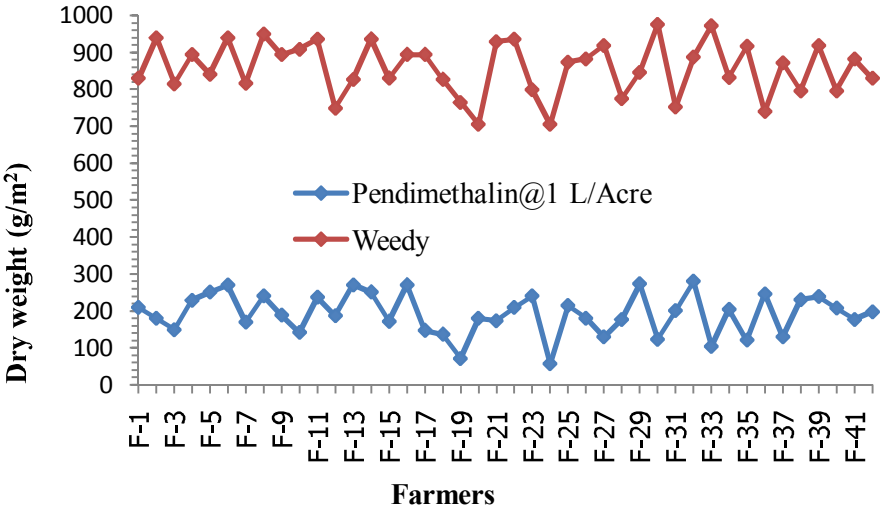

Fig 2. Effect of pendimethalin on dry weight of weeds in different fields of farmers

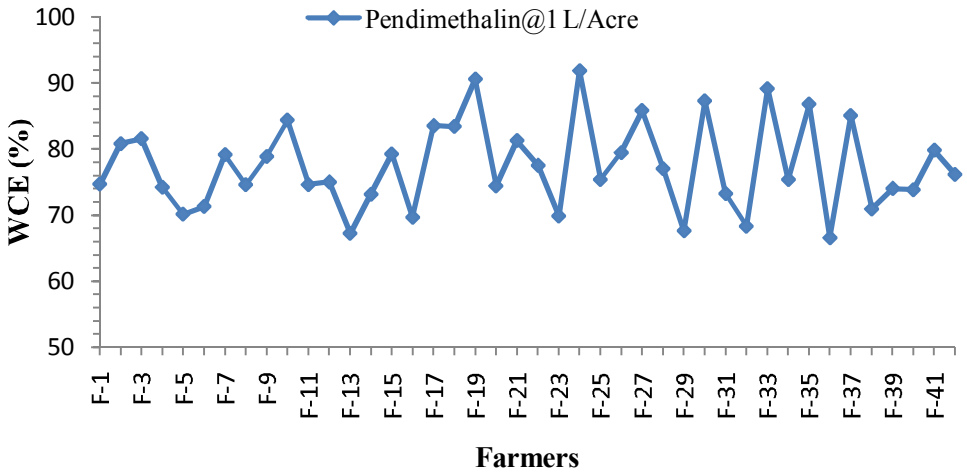

Fig 3. Effect of pendimethalin on weed control efficency (WCE) in dfferent farmers fields

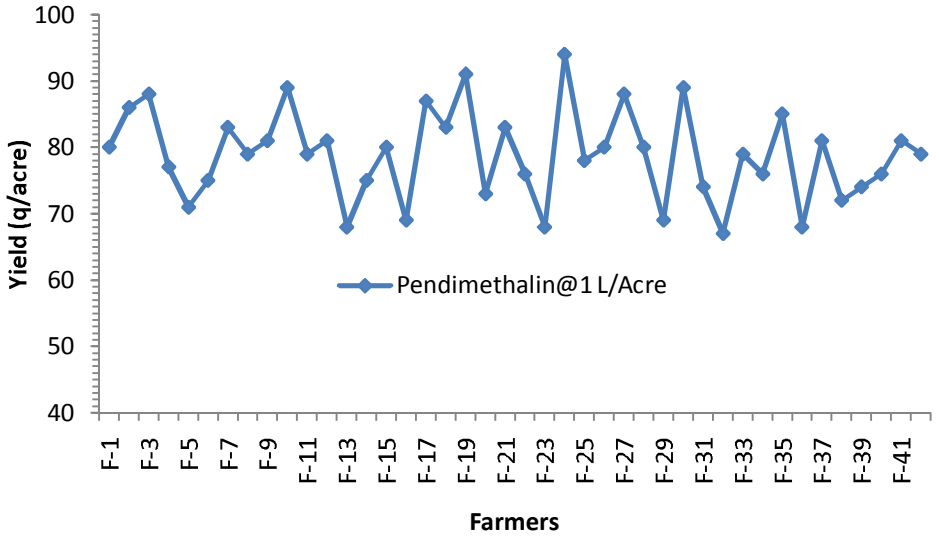

Fig 4. Effect of pendimethalin on bulb yield of onion at different farmers field

RESEARCH ARTICLE

Attitude of Farmers towards Contract Farming

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ABSTRACT

Contract farming is becoming an increasingly important aspect of agricultural development and the cultivators are interested to enter into contract farming mainly to overcome the problems as like farm produce marketing, market risk, transportation, and uncertain income as well. The present study was conducted in the native state of Haryana. Four districts i.e. Hisar, Sirsa, Kurukshetra and Karnal were selected purposively from all the districts of Haryana state findings revealed that Majority of the contract farmers, more than three-forth (80.00%) of the respondents, had highly favourable attitude towards contract farming, whereas 12.5 per cent had favourable attitude and only 7.5 per cent of total respondents had unfavourable attitude towards contract farming. There was a significant association between age of respondents and attitude towards contract farming (x^2) = 0.025*. It was also found that there was highly significant association between attitude and farm income (x^2) = 0.048**

Key Words: Attitude, Contract, Farming

INTRODUCTION:

Diversification of agriculture has been considered very necessary to raise income of the cultivators and generate additional employment for the rural community. Contract farming may help in the diversification of agriculture by providing financial support, technology and assured market to the growers. Various agricultural and horticultural crops such as tomatoes, potatoes, chillies, gherkin, baby corn, onions, cotton, wheat, basmati rice, groundnuts, flowers, medicinal plants, etc. are cultivated in the form of contractual agreements with farmers in India (Eaton & Shephard, 2001). The commercial processing firm has to obtain agricultural products along with various kinds of specifications to satisfy the demand of its consumers. It may procure its demand of agricultural products either from the open market or produce itself (corporate farming) or produce under contract farming.

Contract farming is a system for production and supply of agricultural / horticultural produce under forward contracts between producers/suppliers and

buyers (Haque, 2000). Under contract farming, selected crops are grown by framers under a buy-back arrangement with an agency engaged in processing or marketing. The essence of such deals is a commitment made by the cultivator to provide an agricultural produce of particular type to a known buyer who commits to purchase the same.

Contract farming is becoming an increasingly important aspect of agricultural development and the cultivators are interested to enter into contract farming mainly to overcome the problems as like farm produce marketing, market risk, transportation, and uncertain income as well. In this environment, contract farming offers the best of both small and large forms of agricultural production system. Small land holders are frequently the most efficient agricultural producers and have the advantages over large cultivators in the form of labour-related transactions cots in particular the inspection and motivations.

METHODOLOGY

The present study was conducted in the native state of Haryana. Four districts i.e. Hisar, Sirsa, Kurukshetra and Karnal were selected purposively from all the districts of Haryana state. There are nine blocks in Hisar district, six blocks in Sirsa district, five blocks in Kurukshetra district and six blocks in Karnal district. Out of these, two blocks from each district were selected randomly. A list of all the villages of the two selected blocks was prepared and two villages from each block were again selected randomly. Thus, 16 villages were selected for the study. Further 10 farmers were selected randomly from each village thus, making a total sample size of 160. A list of farmers involved in contract farming was obtained from the respective contracting companies e.g. HAFED – Haryana State Co-operative Supply and Marketing Federation Limited, NSC – National Seed Corporation, HSDC – Haryana Seed Development Corporation Ltd., Dept. of Agriculture, Govt. of Haryana, Kingfisher Breweries, Skol Breweries India Ltd, etc. A village-wise list of contract farmers was prepared and from that list, 10 farmers were selected randomly.

The attitude was not response but it was state of readiness to respond. So, it was measured indirectly on the basis of inferences drawn from the individual`s behaviour. The attitude of farmer`s towards contract farming was measured through Likert`s Summated Rating Scale. The self-developed scale was standardized by procedure given by Edwards (1957).

RESULTS & DISCUSSION:

An attitude is an often defined as a tendency to react favourable or unfavourable towards a designated class of stimuli such as national or racial group, a custom or an institution.

Table 1: Farmers` attitude towards contract farming **N=160**

S. No.	Level of Attitude	Frequency	Per cent
1.	Less favourable (74 to 85 score)	12	7.5
2.	Moderately favourable (85 to 96 score)	20	12.5
3.	Highly favourable (96 to 107 score)	128	80.0
	Total	**160**	**100.0**

It is evident from Table 1 that more than three-forth (80.00%) of the respondents had highly favourable attitude towards contract farming, whereas 12.5 per cent had favourable attitude and only 7.5 per cent of the total respondents had unfavourable attitude towards contract farming.

Respondent's attitude towards contract farming was measured by self-developed farmers rating on a 24 item Likert type scale. The ratings ranged from 1 (Strongly disagree) to 5 (Strongly agree) for negative statements and vice-versa for positive statements. Table 2 presents the mean score by statement in rank order as well as the overall level of attitude towards contract farming. The mean score of the items in the scale represented the farmer's attitude towards contract farming. Results revealed that the farmers overall mean score for attitude scale was 3.5 indicating a positive attitude.

Farmers rated the following three statements with highest agreement: 1. Contract farming can be commercially practised (4.46), 2. Contract farming aims at improving the economic status of farmers (4.45) and 3. Contract farming reduces exploitation by middlemen (4.45). The statements which received lowest agreement were: 1. Contract farming takes away control and freedom of farmers over farm (3.15) and 2. Contract farming results in farmers' total dependence over companies (3.65).

Association between Socio-economic and Personal Characteristic of the farmers and their Attitude towards Contract Farming

In order to determine the association between the socio-economic and personal characteristics of the respondents and their attitude towards contract farming, Chi-square analysis test (x^2) was employed for studying the association between the characteristics of the respondents and their attitude was necessary for identifying the factors responsible for their relationship.

Table 2: Association between socio-economic and personal characteristics of the farmers and their attitude towards contract farming N=160

Sr. No.	Independent Variable	Chi-square (x^2)
1.	Age	0.025*
2.	Education	0.642
3.	Land Holding	0.339
4.	Farm Power	0.163
6.	Irrigation Facility	0.618
7.	Innovativeness	0.941
8.	Farm Income	0.048**
9.	Social Participation	0.348
10.	Risk Orientation	0.248
11.	Mass Media Exposure	0.667
12.	Economic Motivation	0.227
13.	Area under Contract Farming	0.944

**** Significant at 0.01 level of probability** *** Significant at 0.05 level of probability**

The study revealed that there was a significant association between age of respondents and attitude towards contract farming (x^2 = 0.025*). It was also found that there was highly significant association between attitude and farm income (x^2 = 0.048**) and remaining variables like education, land holding, farm power, irrigation facility, innovativeness, social participation, risk orientation, mass media exposure, economic motivation, area under contract farming, etc were non-significant association with attitude. These findings are in line with finding of Bahaman Abu *et al*. (2010).

Table 2: Statement wise farmers` attitude towards contract farming **N=160**

S. No.	Statements	SA	A	UD	DA	SD	Total weighted score	Weighted mean score	Rank
1.	Contract farming is real boon to the small farmers. (+)	**85** (52.5)	**54** (33.8)	**21** (13.1)	-	-	**704**	**4.40**	**V**
2.	Contract farming takes away control and freedom of farmers over farm. (-)	**17** (10.6)	**42** (25.6)	**34** (21.3)	**34** (21.3)	**33** (20.6)	**504**	**3.15**	**XXIV**
3.	Contract farming improves and encourages quality production. (+)	**23** (14.4)	**91** (56.3)	**34** (21.9)	**11** (6.9)	-	**603**	**3.76**	**XXII**
4.	Contract farming reduces market risk. (+)	**57** (35.6)	**69** (42.5)	**32** (20.0)	**02** (1.3)	-	**661**	**4.13**	**XVI**
5.	Contract farming gives farmers better access to capital and modern inputs. (+)	**63** (38.8)	**66** (41.3)	**30** (18.8)	**01** (0.6)	-	**671**	**4.19**	**XIV**
6.	Contract farming results in farmers' total dependence over companies. (-)	**06** (3.8)	**30** (18.1)	**50** (31.3)	**61** (38.1)	**13** (8.1)	**585**	**3.65**	**X**
7.	Contract farming is a well thought out programme. (+)	**76** (47.5)	**52** (32.5)	**32** (19.4)	-	-	**684**	**4.27**	**XI**
8.	Contract farming aims at improving the economic status of farmers. (+)	**82** (50.6)	**69** (43.1)	**09** (5.6)	-	-	**713**	**4.45**	**II**
9.	There is no upliftment in social status of beneficiaries through contract farming. (-)	**11** (6.9)	**07** (3.8)	**04** (2.5)	**65** (40.6)	**73** (45.6)	**662**	**4.13**	**XV**
10.	Contract farming will give lesser yield. (-)	**06** (3.8)	**03** (1.9)	**03** (1.9)	**68** (41.9)	**80** (50.0)	**693**	**4.33**	**VII**
11.	Contract farming produce is easily marketable. (+)	**79** (48.8)	**64** (40.0)	**16** (10.0)	**01** (0.6)	-	**701**	**4.38**	**VI**

12.	Contract farming can be commercially practised. (+)	**82** (50.6)	**71** (44.4)	**07** (4.4)	-	-	**715**	**4.46**	**I**
13.	Contract farming is successful in both small and large holdings. (+)	**76** (47.5)	**76** (47.5)	**08** (5.0)	-	-	**708**	**4.42**	**IV**
14.	Contract farming is more complicated than regular farming. (-)	**08** (5.0)	**03** (1.3)	**11** (6.9)	**65** (40.0)	**74** (46.3)	**677**	**4.23**	**XIII**
15.	Contract farming is about maximizing profits from farm business. (+)	**60** (36.9)	**91** (56.9)	**08** (5.0)	**01** (0.6)	-	**690**	**4.31**	**IX**
16.	Young farmers should take up the contract farming to encourage the local people. (+)	**49** (30.6)	**67** (41.3)	**45** (27.5)	-	-	**648**	**4.05**	**XVIII**
17.	Contract farming is of little or no value in today's context. (-)	**02** (1.3)	**04** (2.5)	**25** (15.0)	**70** (43.8)	**59** (36.9)	**660**	**4.12**	**XVII**
18.	Contract farming does not offer potential for food security. (-)	**05** (3.12)	**06** (3.8)	**11** (6.9)	**68** (42.5)	**72** (45.0)	**682**	**4.26**	**XII**
19.	Contract farming is very difficult to practise due to difficulties in obtaining resources. (-)	**06** (3.8)	**05** (3.1)	**34** (21.3)	**73** (45.0)	**42** (26.4)	**620**	**3.87**	**XXI**
20.	The contract standards are too complicated to be practical. (-)	**01** (0.6)	**07** (4.4)	**14** (8.8)	**100** (61.9)	**38** (23.8)	**647**	**4.04**	**XIX**
21.	It is very difficult to get all the inputs required on farm itself. (-)	**04** (2.5)	**02** (1.3)	**37** (23.1)	**71** (43.8)	**46** (28.7)	**633**	**3.95**	**XX**
22.	Contract farming promotes processing and value addition. (+)	**57** (35.6)	**97** (60.0)	**06** (3.8)	-	-	**691**	**4.31**	**VIII**
23.	Contract farming generates employment in rural area. (+)	**72** (45.0)	**61** (37.5)	**27** (16.9)	-	-	**685**	**4.28**	**X**
24.	Contract farming reduces exploitation by middlemen. (+)	**84** (52.5)	**70** (43.8)	**04** (3.1)	-	-	**712**	**4.45**	**III**

Figures in parentheses indicate percentage. Multiple response figures.

CONCLUSION:

Contractor may provide production inputs, credits and extension services to the growers in return for market obligations on such consideration as the method of production, the quantity that must be delivered and the quality of the product. Majority of the contract farmers, more than three-forth (80.00%) of the respondents, had highly favourable attitude towards contract farming, whereas 12.5 per cent had favourable attitude and only 7.5 per cent of total respondents had unfavourable attitude towards contract farming. There was a significant association between age of respondents and attitude towards contract farming(χ^2) = 0.025*. It was also found that there was highly significant association between attitude and farm income(χ^2) = 0.048** and remaining variables like education, land holding, farm power, irrigation facility, innovativeness, social participation, risk orientation, mass media exposure, economic motivation, area under contract farming, etc. had non-significant association with attitude.

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RESEARCH ARTICLE

Constraints faced by Bt Cotton Growers in Adoption of in Integrated Nutrient Management Practices in Yavatmal District of Vidarbha Region

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ABSTRACT

The study entitled "Adoption of Integrated Nutrient Management Practices by Cotton Growers" was undertaken in Yavatmal Panchayat Samiti of Yavatmal district in Vidarbha region of Maharashtra state. Ex-post facto research design was used for the same.

The findings of the study revealed that, with regards to level of adoption of integrated nutrient management practices by Bt cotton growers, higher proportion of Bt cotton growers (63.33%) were medium in adoption level whereas 18.67 per cent Bt cotton growers were in high level of adoption of integrated nutrient management practices. Only 18.00 per cent Bt cotton growers were in low level of adoption of integrated nutrient management practices. With regards to constraints, it could be noted that, majority of the respondents the (70.00%) were observed in facing problems of lack of technical knowledge and skill involved in seed treatment, followed by the respondents (66.00%) lack of knowledge about biofertilizers, (PSB), most of the respondents (57.33%) faced the constraints of lack of guidance about integrated nutrient management, were as 31.33 per cent were observed in facing constraints as unknown doses of fertilizers. Further a glance at financial constraints cleared that 16.67 per cent cotton growers stated high cost of chemical fertilizers while 48.37 per cent Bt cotton growers stated lack of finance as major financial constraints and higher proportion of Bt cotton growers (34.00%) stated, non availability of biofertilizers at proper time and no proper storage faculty for the harvested produce (25.33%) considering situational constraints.

Key words: Adoption, Bt Cotton growers, INM, Vidarbha

INTRODUCTION

Cotton is well known as "White gold", occupies place of pride among the cash crops of Indian agriculture in general and Vidarbha in particular. Cotton has significant role in Indian agriculture, Industrial development, employment and in national economy.

Bt. cotton has so far been commercialized in 9 countries – the USA

(first introduced in 1996), Mexico (1996), Australia (1996), China (1997), Argentina (1998), South Africa (1998), Colombia (2002), India (2002) and Brazil (2005). In 2010, it occupied globally 15 m ha which comprised 43% of the total cotton area of 35 m ha. With 6.2 million hectares under cotton, India occupied, the first position in terms of area occupied followed by China with 3.8 m ha.

Cotton cultivation in India covers an area of approximately 110.55 lakhs hectors out of which area under Bt. Cotton occupied 96.14 lakhs hectares during 2010-2011. The average yield of cotton, 503 kg lint ha^{-1} is still far below the world average of 759 kg lint ha^{-1}. India ranks first in the world in respect of area and third in total production of cotton. (Anonymous, 2010) Maharashtra, Gujarat, Madhya Pradesh, Andhra Pradesh, Karnataka, Tamil Nadu, Rajasthan, Punjab and Haryana are the major states in India. Maharashtra ranks first in acreage with 35.30 lakh ha and second in production yielding 67.00 lakh bales next to Gujarat (95 lakh bales) with average productivity of 325 kg lint ha^{-1} which is low as compared to the national average (494 kg lint ha^{-1}), Low productivity is mainly due to maximum area (85-90 percent) under rainfed condition. Vidarbha account to 15.14 lakh ha area with productivity of 325 kg lint $ha^{-1.}$(Anonymous 2010).In Vidarbha region Yavatmal, Amravati, Buldana, Wardha, Washim, Nagpur and Akola are the prominent district of cotton cultivation. There is need to increase the productivity of cotton for improvement of financial status of farmers.

The area under this crop is increasing day by day with an increasing product. As adoption behaviour of farmers is influenced by various factors and if they are identified it would be easy to increase area as well as productivity by the use of integrated nutrient management practices recommended for Cotton. Keeping this view in mind, present study was undertaken with objective as to study the knowledge of cotton growers about integrated nutrient management practices

METHODOLOGY:

For the present study, ex-post facto design of social research was used. The present study was confined to the Yavatmal Panchayat Samiti in Yavatmal district in Vidarbha region of Maharashtra State. Out of 16 Panchayat Samiti in Yavatmal district, Yavatmal Panchayat Samiti was purposively selected on the basis of more area of Bt Cotton.

As per discussion with Taluka Agriculture Officer, Yavatmal, about cotton production in this tahsil, it was noticed that, mostly farmers were growing

Bt cotton under rain fed condition. On this basis, list of Bt cotton growing villages in Yavatmal Panchayat Samiti was obtained from Taluka Agriculture Officer amongst which 10 villages were selected purposively on the basis of larger area under Bt. cotton cultivation during the year 2009-10. The selected villages were Kinhi, Arjuna, Boya, Manpur, Hivari ,Bham, Magul, Belura, Wai, Rui.

The list of farmers growing Bt cotton since last three years consecutively in the selected villages was obtained from Taluka Agriculture officer, Yavatmal and from each selected village, 15 Bt. cotton growers as respondents were selected randomly to constitute sample size of 150 respondents.

RESULTS AND DISCUSSION

Table 1 Distribution of the respondents according to their adoption of INM practices of Bt cotton practices.

Sr. No.	INM practices	Adoption (n=150)		
		Complete	Partial	No adoption
1	Soil testing	48 (32.00)	53 (35.33)	49 (32.67)
2	Recommended dose of FYM/ha in Bt cotton.	57 (38.00)	79 (52.67)	14 (09.33)
3	Time of application of FYM.	51 (34.00)	70 (46.67)	29 (19.33)
4	Recommended dose of vermicompost	49 (32.67)	52 (34.66)	49 (32.67)
5	Time of application of vermicompost	24 (16.00)	88 (58.67)	38 (25.33)
6	Seed treatment with bio-fertilizers.	25 (16.67)	56 (37.33)	69 (46.00)
7	Recommended dose of nitrogenous fertilizers for Bt cotton crop.	65 (43.33)	77 (51.34)	08 (05.33)
8	Time of application of Nitrogenous fertilizers	69 (46.00)	72 (48.00)	09 (06.00)
9	Spraying of 2% urea (200gms+10 lit water) at the time of flowering	43 (28.67)	65 (43.33)	42 (28.00)
10	Recommended dose of Phosphatic fertilizers for Bt cotton crop. (60 kg Phosphorus/ha.)	38 (25.33)	88 (58.67)	24 (16.00)
11	Spraying of DAP 2% at the boll development stage	90 (60.00)	05 (03.33)	55 (36.67)
12	Recommended dose of potassium fertilizer for Bt cotton crop. (60 kg Potassium/ha.)	39 (26.00)	56 (37.33)	55 (36.67)
13	Spraying of $ZnSO_4$ twice at an interval of 4-5 days	23 (15.33)	88 (58.67)	39 (26.00)

14	Recommended dose of Zinc sulphate for Bt cotton crop. (50 kg ZnSO4/ha.)	44 (29.33)	69 (46.00)	37 (24.67)
15	Spraying of 1% MgSo4 (10gm of MgSo4 in 1 lit. of water at 45 and 75 days after sowing	44 (29.33)	71 (47.33)	35 (23.34)
16	Recommended dose of Calcium nitrate for Bt cotton crop. (25 to 35kg CaNO4/ha.)	24 (16.00)	52 (34.67)	74 (49.33)
17	Spraying of Bt cotton with 0.5to 1% potassium chloride and 0.5 to 1.00% ferrous sulphate	36 (24.00)	14 (09.33)	100 (66.67)
18	Dose of spraying of Polyfeed (@ 1.5 to 2.00 % i.e. 15 to 20 grams per liter of water)	38 (25.33)	70 (46.67)	42 (28.00)
19	Dose of spraying of multi-K with Boron(15-20 grams /liter of water with Boron @0.1% i.e. 1 gm/liter of water) (To enhance boll set and development)	38 (25.33)	70 (46.67)	42 (28.00)
20	Time of application of Multi-K with Boron (after 105 of sowing)	32 (21.33)	52 (34.67)	66 (44.00)
21	Spraying of the crop with 0.5 to 1% potassium chloride and 0.5 to 1% ferrous sulphate	30 (20.00)	75 (50.00)	45 (30.00)
22	Placement of fertilizer at 7-10 cm away from plant and 7-10 cm depth	75 (50.00)	15 (10.00)	60 (40.00)
23	Spraying of Bt cotton crop with 0.1% (1 gm of boric acid in 1 lit. of water) to overcome Boron deficiency.	30 (20.00)	79 (52.67)	41 (27.33)

(Figures in parenthesis indicates in percentage)

Distribution of the respondents according to their adoption of integrated nutrient management practices of Bt cotton depicted in Table 1. It is apparent from Table 1, that most of the respondents (60.00%) (46.00%) and (43.33%) were in complete adoption of integrated nutrient management practices spraying of DAP 2%, time of application of nitrogenous fertilizers and recommended dose of nitrogenous fertilizers respectively. It was followed by the respondents (43.33%), (38.00%) and (34.00%) were in complete adoption of integrated nutrient management practices such as recommended dose of nitrogenous fertilizers, recommended dose of FYM/ha

and time of application of FYM respectively.

As regards to the practices such as, recommended dose of vermicompost, soil testing and recommended dose of zinc sulphate were having complete adoption of (32.67%), (32.00%) and (29.33%) respectively. In case of respondents (28.67%) (26.00%) and (25.33%) were in complete adoption of integrated nutrient management practices such as spraying of 2% urea, recommended dose of potassium fertilizers and dose of spraying of polyfeed respectively. The proportion of the respondents, (34.00%),(21.33%) and (20.00%) were in observed in complete adoption of integrated nutrient management practices such as, time of application of FYM, time of application of Multi-K with Boron and spraying of the crop with 0.5 to 1% potassium chloride and 0.5 to 1% ferrous sulphate respectively. Very few percent of the respondents, (16.67%),(16.00%) and 15.33 per cent were complete adoption of, seed treatment with bio-fertilizers, time of application of vermicompost and recommended dose of calcium nitrate and spraying of $ZnSO_4$ respectively

In case of the partial adoption of integrated nutrient management practices, the majority of the respondents, (58.67%), (52.67%) and (51.34%) were in, partial adoption time of application of vermicompost, recommended dose of vermicompost and recommended dose of nitrogenous fertilizers respectively. With regards to adoption about integrated nutrient management practices such as, spraying with 1 gm boric acid, spraying with 0.5 to 1% potassium chloride and ferrous sulphate and time of application of nitrogenous fertilizers were in partial adoption by the respondents, (52.67%), (50.00%) and (48.00%) respectively. The proportion of the respondents, (46.67%), (46.67%) and (47.33%) were in observed in partial adoption of, integrated nutrient management practices such as, dose of spraying of polyfeed, dose of spraying of multi-K with Boron and spraying of $ZnSO_4$ respectively.

It was followed by the respondents (46.00%), (43.33%) and (37.67%) were having partial adoption of recommended dose of zinc sulphate, spraying of 2% urea and seed treatment with biofertilizers respectively. The proportion of the respondents (37.33%) (34.67%) and 34.67 per cent respondents were in observed in Recommended dose of potassium fertilizer, Recommended dose of Calcium nitrate and Time of application of Multi-K with boron respectively. In case of partial adoption of

the respondents (35.33%), (9.33%) and (3.33%) such as soil testing , Spraying with 0.5 to 1% potassium chloride, 0.5 to 1% ferrous sulphate and Spraying of DAP 2% respectively.

It is revealed from Table 16 that, large majority of the respondents (66.67%),(49.33%) and (46.00%) were in non adoption of Spraying with 0.5 to 1% potassium chloride,0.5 to 1% ferrous sulphate, Recommended dose of Calcium nitrate and seed treatment with biofertilizers respectively. It was followed by the respondents (44.00%), (40.00%) and (36.67%) were in time of application of Multi-K, placement of fertilizer at 7-10 cm away from plant and 7-10 cm depth and recommended dose of potassium fertilizer, respectively. As regards to practices such as spraying of DAP 2%, soil testing and recommended dose of vermicompost were having non adoption such as (36.67%), (32.67%) and 32.67 per cent of respondents.

It was followed by the respondents, (30.00%), (28.00%), (27.33%) and (26.00%) were in non adoption of Integrated Nutrient Management practices such as spraying with 0.5 to 1% potassium chloride, 0.5 to 1% ferrous sulphate, spraying of 2% urea and spraying with 0.1% of boric acid and spraying of $ZnSO_4$ respectively. The proportion of the respondents, (25.33%), (23.34%), and (19.33%) were having non adoption of practice wise Integrated Nutrient Management practices, time of application of vermicompost , recommended dose of zinc sulphate, spraying of 1% MgSo4 and time of application of FYM, respectively.

Few of the respondents, (16.00%), (9.33%), (6.00%) and 5.33 per cent of respondents were having non adoption of practice-wise Integrated Nutrient Management practices such as, recommended dose of phosphate fertilizers.

Table 2 Distribution of the respondents according to their level of adoption

Sr. No.	Adoption	Respondents (n=150)	
		Frequency	Percentage
1.	Low	27	18.00
2.	Medium	95	63.33
3.	High	28	18.67
	Total	**150**	**100.00**

The data with regards to level of adoption of integrated nutrient management practices by Bt cotton growers furnished in Table 2, indicates that, relatively higher proportion of Bt cotton growers (63.33%) were medium in adoption level whereas 18.67 per cent Bt cotton growers were in high level of adoption of integrated nutrient management practices. Only 18.00 per cent Bt cotton growers were in low level of adoption of integrated nutrient management practices.

Thus, it could be inferred that, majority of the Bt cotton growers had medium level of adoption of integrated nutrient management practices.

These findings in accordance with the findings of Shetwad (2000),Landge (2001) and Bodake (2003) who reported that, majority of respondents had medium adoption of cotton practices.

Table 3. Distribution of Bt cotton growers according to constraints encountered by them in adoption of integrated nutrient management practices

Sr. No.	Constraints	Respondents (n = 150)	
		Frequency	Percentage
Technical constraints			
1	Lack of knowledge about biofertilizer, PSB	99	66.00
2	Lack of technical knowledge and skill involved in seed treatment	105	70.00
3	Lack of guidance about integrated nutriment management from extension personnel	86	57.33
4	Correct doses of fertilizers are not known	47	31.33
Financial constraints			
1	High cost of fertilizers	25	16.67
2	Lack of finance	73	48.67
Situational constraints			
1	Non availability of biofertilizer at proper time	51	34.00
2	No proper storage facility	38	25.33

From the data presented in Table 3, it could be noted that technical constraints majority of the respondents the (70.00%) were observed in facing problems of lack of technical knowledge and skill involved in seed treatment, followed by the respondents (66.00%) lack of knowledge about Biofertilizer, (PSB), most of the respondents (57.33%) faced the constraints of lack of guidance

about integrated nutrient management, were as 31.33 per cent were observed in facing constraints as unknown doses of fertilizers.

Further a glance at financial constraints cleared that 16.67 per cent cotton growers stated high cost of chemical fertilizers while 48.37 per cent Bt cotton growers stated lack of finance as major financial constraints and majority of Bt cotton growers (34.00%) stated that non availability of biofertilizers at proper time and no proper storage faculty for the harvested produce (25.33%) considering situational constraints.

Briefly, the important constraints in adoption of integrated nutrient management practices of Bt cotton faced by Bt cotton grown were non availability of biofertilizers at proper time, no proper storage facility, lack of guidance about integrated nutrient management from extension personnel, no proper knowledge of correct doses of fertilizers as per recommendation of integrated nutrient management lack of finance due to low income.

The above findings emphasize need of equipping the Bt cotton growers with knowledge of integrated nutrient management practices through imparting training and guidance by providing literature on integrated nutrient management to increases their yield of Bt cotton in which simple and understandable language. Organizing result and method demonstrations on integrated nutrient management can help extension personnel for convincing the Bt cotton growers.

CONCLUSION

It is concluded that majority of the Bt cotton growers (70%) faced the constraints of lack of technical knowledge and skill involved in seed treatment followed by more than three fourth (66.00%) were observed in facing lack of knowledge about biofertilizers, PSB, as constraints. In case of lack of guidance about integrated nutrient management practices from extension personnel less than three forth of the respondents (57.33%) were found in facing of this constraint.

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RESEARCH ARTICLE

Aspirations of Tribal Students

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ABSTRACT

The present study was undertaken with objectivesto study the aspirations of the tribal students and the relationship between profile of tribal students and their aspirations.It was conducted in purposively selected Satana tahsil of Nashik district of Maharashtra state as Satana tahsil is having highest tribal population in Western Maharashtra region. Total 120 tribal students were selected for the study. The study revealed that majority (65.00%) of the tribal students had 'medium' level of aspirations. It was observed that majority of them had desired to complete 'graduate studies' and the same to secure 'Job in government organization'. More than half (53.33 %) of the tribal students had aspiration towards 'farming'. Further, 60.83 per cent of the tribal students aspired to start 'business' at 'medium scale'. About 27.50 per cent of the tribal students aspired to be 'Teacher' or 'Engineer' (25.83 %).It was observed that in case of tribal students the age, family education status, size of family, type of family, family occupation, annual income of family, mass media exposure had positive significant relationship with their aspirations. The study made it clear that though majority of the tribal students had moderate level of aspirations, the former group had higher educational and professional aspirations than the later group, while the later group had higher self-employment aspirations than the former group. These findings suggested that tribal students should be helped in training and guiding them in fulfilling their educational and professional aspirations.

Keywords: *Aspirations,Tribal students*

INTRODUCTION

Tribals are those people who are living in and around thick forest, which are often called as "The Kings of Forest" or "The Sons of Forest". These people are still extremely poor and entirely depend upon the resources obtained from forest. India has the second largest tribal concentration in the world after Africa. The largest number of 62 tribes is in the

state of Madhya Pradesh, followed by Bihar, Andhra Pradesh and Maharashtra. Maharashtra accounts for 8.85 per cent tribals of the total population (Anonymous, 2001).Education is a basic human right, vital to personal and social development and well-being. Education enhances lives. It ends generation cycle of poverty and provides the mean for sustainable development. A quality basic education will better equip girls and boys with knowledge and skills needed to adopt healthy life styles.

An aspiration is a hope or ambition of achieving something or a strong desire to achieve something. Knowledge of aspirations is important to sociologists, since a man does not have notice of desirability regarding his future status and does not believe that, by his own selection and decision, he can materially affect the role he will acquire and discharge. Failing to reach ones professed goals, particularly work goals in any competitive oriented society, is to invite personal adjustment problems, such as frustration and feelings of deprivation. Therefore, studying aspirations of students has significance. There are various factors, which determine level of aspirations and educational achievement. The socio-economic and family background of the student may greatly influence aspirations and professional achievements. However, sufficient information on aspirations of tribal students, the factors which determined their aspirations based on scientific facts was not available and hence, a study entitled, "Aspirations of tribal students from Satana tahsil of Nashik district" was conducted.

METHODOLOGY

The present study was conducted in purposively selected Satana tahsil of Nashik district of Maharashtra state.The tahsil Satana was selected purposively on the basis of maximum tribal population. Ten villages having Ashram school upto secondary level were selected purposively from Satana tahsil where maximum number of tribal population was observed. A village-wise list of school going tribal students in 10th class was prepared in consultation with Ashram schools. Accordingly, from the list, 12 tribal students from each village were randomly selected to form a sample of 120 students.Information pertaining to the objectives was collected from the tribal students with help of prepared interview schedule by personal interview method. The statistical tools such as frequency, percentage, mean, standard deviation and correlation were used for analysis of the collected data.

RESULTS AND DISCUSSION

Aspirations of tribal students

1. Overall aspiration level

The data regarding overall aspiration level of tribal students are presented in Table 1.

Table 1: Distribution of tribal students according to their level of aspirations

Sl. No.	Aspiration level	No. of respondents (N=120)	
		Frequency	Per cent
1.	Low (Upto18)	30	25.00
2.	Medium (19 to 23)	78	65.00
3.	High (24 and above)	12	10.00
	Total	**120**	**100.00**

It was observed from Table 1 that majority (65 00 %) tribal students had 'medium' level of aspiration, while, 25.00 per cent of tribal students had 'low' level of aspiration. On the contrary, 10.00 per cent of the tribal students had 'high' level of aspiration. It means most of the tribal students had satisfactory level of aspiration.

2. Specific area wise aspiration of the tribal students

Efforts were made in present study to obtain information about aspirations of tribal student's in selected areas. The information is presented here under.

2.1 Educational aspirations

The data with regard to educational aspiration of the tribal students are presented in Table 2.

Table 2: Distribution of the tribal students according to their specific educational aspirations

Sl. No.	Educational aspirations	No. of respondents (N=120)	
		Frequency	Per cent
1.	To complete higher secondary education	10	08.33
2.	To complete graduate studies	55	45.83
3.	To complete short certificate course	03	02.50

4.	To complete post graduate studies	44	36.66
5.	To complete diploma studies	08	06.68
	Total	**120**	**100.00**

It was noticed from Table 2 that maximum number (45.83 %) of the tribal students had desired to complete graduate studies, while, 36.66 per cent of the tribal students had desire to complete post graduate studies. About 8.33 per cent of the tribal students had desire to complete higher secondary education and 6.68 per cent students desire to complete diploma. Remaining 2.50 per cent students desire to complete short certificate course. These findings are similar with the findings of *Ahmad et al* (2012) and Joshi and Mary (2012).

2.2 Job aspirations

The data in respect of job aspirations of the tribal students are presented in Table 3.

Table 3: Distribution of the tribal students according to their specific job aspirations

Sl. No	Job aspirations	No. of respondents (N=120)	
		Frequency	Per cent
1.	Administrative position in education department	32	26.66
2.	Job in defence service	18	15.00
3.	Job in government organization	55	45.83
4.	Job in private organization	07	05.86
5.	Job in co-operative sector	02	01.66
6.	Job in nationalized banks	03	02.50
7.	Job in Panchayat Raj Institutions	01	0.83
8.	Job in Abroad (other country)	02	01.66
	Total	**120**	**100.00**

It is evident from Table 3 that 45.83 per cent of the tribal students aspired to secure 'Administrative position in government department' and 26.66 per cent tribal students wished to join 'Administrative job in education department', while, 15 per cent of the tribal students aspired for 'job in defence service'. While, 'Job in co-operative sector' was aspired by 1.66 per cent of the tribal students, whereas, 1.66 per cent of the tribal students wished to 'Job in Abroad (other country)'. Only 5.83 per cent of the tribal students aspired to hold

'Job in private organization'. Thus, it could be said that most of the tribal students had aspiration of securing jobs in Administrative position in government department. This might be because of the security and stability of the job in these organizations. The findings are in the line with the findings of Wattamar and Suryavanshi (2003).

2.3. Self-employment aspirations

The data in respect of self-employment aspirations of these tribal students are presented in Table 4.

Table 4: Distribution of the tribal students according to their specific self-employment aspirations

Sl. No.	Self-employment aspirations	No. of respondents (N=120)	
		Frequency	Per cent
1.	Farming	64	53.33
2.	Fruit processing unit	08	6.66
3.	Poultry	23	19.16
4.	Nursery	07	5.86
5.	Dairy	18	15.00
	Total	**120**	**100.00**

The data presented in Table 4 indicated that majority (53.33 %) tribal students had aspirations towards 'farming', 15.00 per cent of the tribal students wished to have 'dairy', while, 6.66 per cent of the tribal students aspired for 'fruit processing' as means of self-employment. Further 19.16 per cent each of tribal students wished to have 'poultry' and 5.86 per cent of the tribal students aspired for 'nursery'. Thus, it is clear that majority of the tribal students aspired for 'farming' as a means of self-employment. This might be because majority of the tribal students had 'farming' as their traditional family occupation. This could be seen from the finding that the aspirations for different self-employment jobs were related to agriculture like, poultry, dairy and fruit processing. These findings are similar with the findings of Waman *et al* (2000).

2.4 Level / scale of self-employment aspirations

The information regarding the aspirations of the tribal students for level / scale of self-employment is presented in Table 5.

Table 5: Distribution of the tribal students according to their aspirations for level /scale of self-employment

Sl. No.	Scale of self-employment	No. of respondents (N=120)	
		Frequency	Per cent
1.	Small scale	15	12.50
2.	Medium scale	73	60.83
3.	Large scale	32	26.67
	Total	**120**	**100.00**

The data regarding the scale of self-employment indicate that majority of the tribal students (60.83 %) aspired to start 'enterprise' on 'medium scale', while, 26.67 per cent each of the tribal students aspired to start the enterprise on 'large scale'. On the contrary, 12.50 per cent aspired to start enterprise on 'small scale'. It is a sign of progressive attitude and aspirations among the tribal students. The concerned employment organizations may render help and guidance to fulfil these aspirations. These findings are similar with the findings of Tarde *et al* (2003).

2.5 Professional aspirations

Tribal students had expressed professional aspirations that are presented in Table 6.

Table 6: Distribution of the tribal students according to their specific professional aspirations

Sr. No.	Professional aspirations	No. of respondents (N=120)	
		Frequency	Per cent
1.	Doctor	12	10.00
2.	Engineer	31	25.84
3.	Lawyer	06	05.00
4.	Teacher	33	27.50
5.	Farmer	16	13.33
6.	Other	22	18.33
	Total	**120**	**100.00**

It was observed from Table 6 that more than one fourth (27.50 per cent) of the tribal students aspired to be a 'teacher', followed by 'engineer' (25.83 per cent), while, 18.00 per cent of the students aspired to be the 'other'.13.33 per cent of the tribal students aspired to be 'farmer' and 10.00 per cent students

aspired to be 'doctor', while, 5.00 per cents students aspired for 'lawyer'. This indicated that most of the tribal students wanted to become 'teacher' or 'engineer'. However, considering their family status, they may need financial support so as to fulfil their aspirations. The findings are in the line with the findings of Brown (1999).

2.6 Economic aspirations

The expectations about the monthly income were considered for this purpose. The data in respect of economic aspirations of the tribal students are presented in Table 7.

Table 7: Distribution of the tribal students according to their specific economic aspirations

Sl. No.	Economic aspirations	No. of respondents (N=120)	
		Frequency	Per cent
1.	UptoRs. 20000 /-	01	0.83
2.	Rs. 20001/- to Rs. 30000/-	16	13.36
3.	Rs. 30001/- to Rs. 50000/-	56	46.67
4.	Rs. 50001/- to Rs. 100000/-	44	36.68
5.	Rs. 100001/- and Above	03	02.70
	Total	**120**	**100.00**

The data form Table 7 indicated that maximum number (46.67 %) of the tribal students aspired to earn 'Rs.30,001/- to Rs. 50,001 /- '. While, 36.68 per cent of the tribal students aspired to earn 'Rs. 50,001/- to Rs. 1,00,000/-', and 13.36 per cent of the tribal students aspired to earn 'Rs.20,001/- to Rs. 30,000/-'. 2.70 per cent of the students aspired to earn above Rs 1,00,001 and 0.83 per cent aspired to earn upto Rs. 20000. It means, majority of the tribal students desired to earn 'Rs. 30,001/- to Rs. 50,000/-'. It can be inferred that the tribal students were unable to express their economic aspirations rationally in the context of the future source of earning aspired by them.These findings are similar with the findings of Iswalkar (2001) and Hande (2009).

3. Relationship between personal, social and economic characteristics of tribal students and aspirations.

The details about the relationship between personal, social and economic characteristics of tribal students with aspiration are presented in Table8.

Table 8: Relationship between personal, social and economic characteristics of tribal students and aspirations

Sl. No.	Variables	Correlation coefficient (r)
1.	Age	0.195*
2.	Family education status	-0.040 NS
3.	Size of family	0.294**
4.	Type of family	0.189*
5.	Land holding	-0.05 NS
6.	Family occupation	0.282**
7.	Annual income of family	0.261**
8.	Mass media exposure	0.187*

*** Significant at 0.05 level of probability** **** Significant at 0.01 level of probability**

3.1 Age and aspirations

The relationship between age of the tribal students and their aspirations was positive and highly significant (r =0.195*). It means age of the tribal students had remarkable influence on their aspirations.

3.2 Family education status and aspirations

The relationship between family education status and aspirations of the tribal students was negative but statistically non-significant (r = -0.040) meaning there by that the family education status of the tribal students had least impact on their aspirations. In other words, tribal students from high family education status category had high aspiration level and vice versa.

3.3 Size of family and aspirations

The relationship between size of family and aspirations of tribal students was positive and highly significant (r =0.294**) meaning thereby that the size of family had remarkable influence upon their aspirations.The tribal students from all the family size groups might have been equally distributed in all the categories of aspirations. As a result, the family size has demonstrated a noteworthy relationship with aspirations of the tribal students. The findings are in the line with findings of Furtado (2000).

3.4 Type of family and aspirations

The correlation between type of family and aspirations of the tribal students was positive and highly significant (r = 0.189*) meaning thereby that the type of family had remarkable influence upon their aspirations. It was

assumed that tribal students from nuclear family might have had higher aspirations. However, it hold true for present study, possibly because the tribal students from both the type of families might have similar level of aspirations. These findings are similar with the findings of Surve (2005).

3.5 Land holding and aspirations

The relationship between land holding and aspirations of the tribal students was negative but statistically non-significant (r = -0.005) meaning that the land holding of the tribal students had least impact on their aspirations. The negative relationship indicated that the tribal students belonging to smaller land holdings had lower aspirations, but this statistically proved, because some of the tribal students having smaller land holdings might have had lower degree of aspirations and those having bigger land holdings might have had higher level of aspirations. These findings are similar with the findings of Bothikar (2008).

3.6 Annual income of family and aspirations

The relationship between annual income of family and aspirations of the tribal students was significant (r=0.261**), meaning that aspirations of the tribal students were dependent upon their annual income of family. The findings of the present study are similar with the findings of More (2004) and Khole (2011).

3.7 Family occupation and aspirations

The correlation between family occupation and aspirations of the tribal students was positively significant (r=0.282**), meaning thereby that aspirations of the tribal students were dependent upon their family occupation. It was observed that occupation of the family of majority of tribal students was farming. Thus, there was no much variation in the family's occupation. Further, whatever little variation in the major occupation was noticed, that might not have been strong enough to decide theaspiration level of the students. So also, aspirations being the personal and psychological trait of the students have been remarkably influenced by their parents' occupation. The findings of the present study are somewhat similar with the findings of Khole (2011).

3.8 Mass media exposure and aspirations

The relationship between mass media exposure and aspirations was positive but statistically significant (r=0.187*). It means that the mass media exposure of the tribal students had remarkable effect upon their aspirations. In other words, mass media exposure had

least influence on the behavior and career choices of the tribal students. This could be attributed to varying degree of mass media exposure of the tribal students the type of media used, as well as, purpose, nature and quality of mass media used by them.

CONCLUSIONS

The study made it clear that though majority of the tribal students had moderate level of aspirations, the former group had higher educational and professional aspirations than the later group, while the later group had higher self-employment aspirations than the former group. These findings suggested that tribal students should be helped in training and guiding them in fulfilling their educational and professional aspirations. The government and non-government organizations will have to work together in this regard.

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RESEARCH ARTICLE

Perceived Exertion and Job Satisfaction of Working Women

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ABSTRACT

Woman is the essence of the society because of the key role; she plays at home and as well as outside the home. While performing multiple roles as a daughter, wife, daughter-in-law and mother, she carries out numerous household activities (viz. cooking, washing clothes and utensils, sweeping, fetching water, child care, marketing etc.) However her contribution to the upliftment of home and society is always neglected from economic point of view and these activities were often noticed as general and routine household activities. This study was conducted to assess the exertion of working women while performing the different professional activities as well as their job satisfaction. A purposive sample was selected by random method for conducting the survey and noting the activities. The total sample consisted of 150 working women of different professions. It was observed that all the activities were felt light to moderately heavy by all the respondent except heming and cleaning of machine by the tailors. None of the respondent was highly satisfied or highly satisfied or highly dissatisfied regarding their professions. All the respondents were ranging from satisfied to dis-satisfied category.

Key words: Exertion, job satisfaction, working women

INTRODUCTION

In day to day life woman in society is professionally performing several activities equal to men folk both in high and low socio economic range. The high society woman plays professional roles such as teacher, lecturer, doctor, lawyer etc. The low society or illiterate woman performs various activities such as tailor, construction worker, scavenger, sweeper, vender and maid servant etc. These activities are performed in addition to her regular household activities. Thus woman plays double role inside the home as a homemaker and outside the home as a professional worker.

It is also true that Gender Empowerment is essential to meet the Millennium Development Goals. It is the

prime objective of all development programmes and policies. It is an active process which enables women to realize their identity and power in all aspects of life (Rekha Bhagat *et al* , 2009). According to the Premlata (2009) there was a strong relation between women empowerment and micro finance. Micro finance programmes targeting women are not only reaching but also empowering large number of very poor women borrowers, through their contribution to women's ability to earn an income, increased well being and, wider social and political empowerment. According to Mason (2006) women's empowerment is determined not only by individual traits such as earning and education but also shared cultural consensus that has the right to power resources. Varghese *et al*.. (1989) studied workload and perceived exertion in household work. Results indicated that the physiological workload based on energy expenditure and heart rate responses was highly correlated with the corresponding perceived exertion of subjects. They concluded that the perceived exertion experienced by an individual while performing manual tasks could be used to evaluate the physiological stress and fatigue using the proposed RPE scale.

Looking the multidimensional role of working women this study was conducted to assess the exertion while performing the different professional activities as well as their job satisfaction.

METHODOLOGY:

1. Selection of the sample:

A purposive sample was selected by random method for conducting the survey and noting the activities. The total sample consisted of 150 working women of different professions. Brief information about the respondents is given below

i. **Tailors -** Near about 4 to 6 pieces of cotton and synthetic material were stitched by the tailor respondent. The cutting activity was performed on ground level.

ii. **Sweepers -** All the respondents were municipality workers. The activity was observed at morning hours. Long handle brooms and bamboo baskets were generally used by them.

iii. **Venders -** Traditionally weighing balance was used by the respondents while perform the activity.

iv. **Construction workers -** On the site, 8 – 12 bricks in a single trip was lifted and carried on the head by the respondents.

v. **Maid servants -** The activity was performed in squatting and standing position. In a single day near about

30 – 40 pieces of utensils were cleaned which were not very soiled.

2. Survey

In the survey questionnaire and data collection was used for assessing the information regarding general background, musculo problems and job satisfaction etc.

3. Preparation of questionnaire schedule

The data was collected through pre planned interview schedule. The questionnaire was carefully prepared to assess the general information. Whenever respondents were carried out different activity the number of respondents the number of carrying such activity are considered as 100% for that corresponding activity and the percentage is calculated accordingly.

4. Rate of perceived exertion

Rate of perceived exertion of the respondents was recorded by using five point scale developed by Varghese *et al.* (1994) viz. Very light (01), Light (02), Moderately heavy (03), Heavy (04) and very heavy (05).

5. Incidence of muscular skeletal problems:

Incidence of muscular skeletal problems was assessed by using the five point scale which ranges from very severe to very light. Body map was also used for assessing the right information by the respondents.

6. Level of Job Satisfaction:

Job satisfaction level was assessed by using the five pint scale developed by Rekha Upadhyay (1996) viz highly Dissatisfied (01), Dissatisfied (02), Neutral (03), Satisfied (04), Highly satisfied (05)

FINDINGS

Table 1 explains the physical characteristics of the selected subjects with respect to their anthropometric measurements. The mean age of the tailor respondents were noted to be 37.73 $\pm$ 4.88 years while sweeper was 38.7 $\pm$ 6.5 years. The venders and construction workers were having the mean age of 36.20 $\pm$ 6.48 and 33.43 $\pm$ 6.05 respectively. The domestic servants had mean of age i.e. 33.8 $\pm$ 5.31. The mean age of the total sample was found to be 35.96+6.3. Overall age of the selected respondents was ranging between 21 to 50 years. The mean height of the respondents belonging to tailors, sweepers, venders, construction workers and domestic servant's category ranged between 146.02 to 149.88 cm. When considered the individual height of the respondents it ranged between 124.95 to 161.54 cm. The mean weight of the respondents varied slightly from one group to the other (47.6 to 50.96). The

body mass index was found to be better in sweeper respondents with 23.71 ± 4.65 per cent while domestic servants exhibited low values with 22.10 ± 3.76 per cent. The oxygen consumption pattern was highest in tailor respondents followed by domestic servants, venders (1.45 ± 0.18 to 1.60 ± 0.19lit/min.).

Table 1. Physical characteristics of the selected subjects with respect to their height and weight

Variables	Respondents					Total (N=150)
	Tailors (N=30)	Sweepers (N=30)	Venders (N=30)	Construction workers (N=30)	Domestic Workers (N=30)	
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
Age (yrs)	37.73 ± 4.88 (26 - 42)	38.7 ± 6.5 (29 - 50)	36.20 ± 6.48 (21- 46)	33.43 ± 6.05 (25 – 50)	33.8 ± 5.31 (23 - 42)	35.96 ± 6.33 (21.50)
Height (Cms)	149.88 ± 11.73 (124.96 – 161.54)	146.11 ± 14.22 (124.96 – 161.54)	146.02 ± 13.03 (124.96 – 161.54)	148.31 ± 11.99 (125.27 – 161.54)	148.35 ± 9.76 (124.95 – 158.49)	47.99 ± 13.17 (124.96 – 161.54)
Weight (kg)	50.96 ± 6.46 (38 - 62)	49.45 ± 4.97 (38 - 60)	47.6 ± 3.34 (41 – 58)	47.61± 1.83 (45 - 53)	47.83 ± 1.77 (45 - 51)	48.69 ± 4.31 (38-62)
BMI	23.25 ± 5.47 (17.92 – 39.74)	23.71 ± 4.65 (18.07 – 35.25)	22.88 ± 4.40 (17.84 – 31.41)	22.24 ± 4.54 (18.07 – 33.97)	22.10 + 3.76 (18.53 – 32.05)	23.02 ± 4.8 (17.84 – 39.74)
Vo_2 Max (lit/min)	1.60 ± 0.19 (1.22- 2.01)	1.45 ± 0.18 (1.13 – 1.77)	1.51 ± 0.24 (1.22– 2.00)	1.53 ± 0.19 (1.12– 1.90)	1.59 ± 0.17 (1.32 – 1.91)	1.54 ± 0.20 (1.12 – 2.01)

(Figure in Parenthesis indicated percentage)

Table 2 gives the classifications of the respondents in to different above stated categories. The overall sample revealed that 71 respondents were fit for the work being mesomorph, whereas 46 and 33 respondents respectively were found to be ectomorph and endomorph. The percent of respondents belonging to the mesomorph category ranged from 40 to 56.66. This was followed by respondents belonging to ectomorph (23.33 to 46.66). Less per cent of respondents were found to be belonging to endomorph category (13.33 to 26.66).

Table 2. Classification of the respondents according to body type (BMI)

Body type	Respondents					Total N=150
	Tailors (N=30)	Sweepers (N-30)	Venders (N = 30)	Construction workers (N = 30)	Domestic Workers (N = 30)	
Ectomorph	9 (30.00)	7 (23.33)	9 (30.00)	14 (46.66)	9 (30.00)	46 (30.66)
Mesomorph	14(46.66)	15 (50.00)	13 (43.33)	12 (40.00)	17 (56.66)	71 (47.33)
Endomorph	7 (23.33)	8 (26.66)	8 (26.66)	6 (20.00)	4 (13.33)	33 (22.00)

(Figure in Parenthesis indicated percentage)

Rate of perceived exertion of working women while performing the activities is depicted in Table 3. No activity was described highly exerting by the respondents. Most of the activities were graded either neutral or difficult. The activities that were graded as difficult was mostly performed by sweepers, venders, construction workers and domestic servants. Among the activities stitching was graded as difficult (70.0%) while 30.00 per cent described it as neutral. Carrying garbage by sweepers, carrying vegetables/ fruits basket by venders, carrying mixture of sand and cement by construction workers and lifting washed vessels by domestic servants were described by majority of them as difficult. Among the tailoring activities 3.33 per cent respondents felt hemming as very light while 40 per cent of respondents felt cleaning of machine as very light. On the other hand only 26.66 per cent of them felt stitching as neutral. In contrast, majority of them i.e. 66.66 to 70.00 per cent of the respondents described cutting and hemming as easy. The percentage of respondents ranging from 3.33 to 36.66 per cent described sitting, carrying garbage, selling vegetables/ fruits, washing vessels and lifting washed vessels as easy. 40 per cent of respondents expressed cleaning of machine as very easy while only 3.33 per cent described hemming as very easy.

Table 3. Rate of perceived exertion of the working women while performing the professional activities

Professional Activities	Rate of perceived exertion					Mean ± SD
	1	2	3	4	5	
Tailors						
Cutting	--	21(70.00)	9(30.00)	--	--	2.30 0.45
Stitching	--	--	8 (26.66)	22 (73.33)	--	3.73 0.44
Hemming	1 (3.33)	20 (66.66)	9 (30.00)	--	--	2.26 0.51

Cleaning of machine	12 (40.00)	--	18 (60.00)	--	--	2.60 0.48
Sweepers						
Sweeping	--	6 (20.00)	18 (60.00)	6 (20.00)	--	3.20 0.47
Carrying garbage	--	1 (3.33)	22 (73.33)	7 (23.33)	--	3.20 0.47
Venders						
Carrying Veg/ fruits basket on head	--	--	7 (23.33)	23 (76.66)	--	3.76 0.46
Selling vegetables/ fruits	--	11 (36.66)	18 (60.00)	1 (3.33)	--	2.66 0.53
Construction Workers						
Carrying bricks	--	--	13 (43.33)	17 (56.66)	--	3.56 0.49
Carrying mixture of sand and cement	--	--	11 (36.66)	19 (63.33)	--	3.63 0.48
Domestic workers						
Washing of vessels	--	2 (6.66)	23 (76.66)	5 (16.66)	--	3.10 0.47
Lifting washed vessels	--	1 (3.33)	20 (66.66)	9 (30.00)	--	3.26 0.51

(Figures in parenthesis indicate percentage)

The incidence of musculo skeletal problems in different groups at upper extremities is presented in Table 4 (A). 100 per cent incidence was noted with respect to vender's and construction worker's activities for shoulder joint, upper arm, upper back or cervical problems. In case of other professional's 100 per cent incidence was scored for sweeping activity of sweepers for upper back/ cervical problems, for washing vessels by domestic servants. For shoulder joint, upper arm problems. Following this maximum incidence was noted for finger/ palm problems for cutting activity of tailors, upper arm problems for sweeping activity of sweepers and construction workers who were carrying mixture of sand and cement and for upper back cervical problems for both the tailors activity, carrying garbage of venders and washing vessels of domestic servants activities. Minimum incidence i.e. 3.33 per cent was noted with respect to head problems too sweeping in sweeper respondents.

Table 4 (A). Incidence of musculo skeletal problems at upper extremities among selected respondents

Respondents	Incidence of Pain (%) at Upper Extremities							
	Head	Eye	Neck	Shoulder Joint	Upper arm	Lower arm	Fingers/Palm	Upper back / Cervical
Tailors								
i) Cutting	3 (10.00)	8 (26.66)	23 (76.66)	15 (50.00)	14 (46.66)	4 (13.33)	29 (96.66)	29 (96.66)
ii) Stitching	19 (63.33)	12 (40.00)	27 (90.00)	6 (20.00)	14 (46.66)	--	2 (6.66)	29 (96.66)
Sweepers								
i) Sweeping	1 (3.33)	8 (26.66)	25 (83.33)	25 (83.33)	29 (96.66)	19 (63.66)	28 (93.33)	30 (100.00)
ii) Carrying garbage	12 (40.00)	4 (13.33)	27 (90.00)	22 (73.33)	21 (70.00)	7 (23.33)	5 (16.66)	29 (96.66)
Venders								
i) Carrying vegetables/ fruits basket on head	18 (60.00)	2 (6.66)	23 (76.66)	30 (100.00)	30 (100.00)	13 (43.33)	7 (23.33)	30 (100.00)
ii) Selling veg/ fruits	--	--	9 (30.00)	30 (100.00)	30 (100.00)	15 (50.00)	5 (16.66)	30 (100.00)
Construction workers								
i) Carrying breaks	21 (70.00)	--	17 (56.66)	30 (100.00)	30 (100.00)	6 (20.00)	7 (23.33)	30 (100.00)
ii) Carrying mixture of sand and cement	21 (70.00)	--	17 (56.66)	30 (100.00)	29 (96.66)	7 (23.33)	7 (23.33)	30 (100.00)
Domestic workers								
i) Washing vessels	5 (16.66)	--	15 (50.00)	30 (100.00)	30 (100.00)	20 (66.66)	3 (10.00)	29 (96.66)
ii) Lifting washed vessels	--	--	2 (6.66)	25 (83.33)	25 (83.33)	16 (53.33)	8 (26.66)	27 (90.00)

(Figure in Parenthesis indicated percentage)

The incidence of musculo skeletal problems at lower extremities is depicted in Table 4 (B).100 per cent incidence was recorded for lower back problems for stitching in tailors, for both the activities of sweepers, for selling of vegetables and fruits by venders, for both the activities of construction workers for leg/ knee problems by vender while carrying vegetables/ fruits basket on head and for ankles/ feet, again in venders while carrying vegetables/ fruits. No incidence of leg/ knee problems recorded by respondents while performing the activity cutting. However 96.66 percentage of the same respondents suffered with lower back problems. Even the domestic servants while washing vessels and

venders while carrying vegetables/ fruits basket also suffered with the same problems. The incidence of leg/ knee problems was also found to be 96.66 per cent in sweepers in sweeping activity. Minimum incidence i.e. 3.33 per cent was noted with ankles/ feet problems of tailor while performing the cutting activity.

Table 4 (B): Incidence of musculo skeletal problems at lower extremities among selected respondents

Sr. No.	Respondents	Incidence of Pain (%) at Lower extremities			
		Lower Back	Thigh Muscles	Leg / Knee	Ankles / Feet
1	**Tailors**				
	i) Cutting	29 (96.66)	3 (10.00)	--	1 (3.33)
	ii) Stitching	30 (100.00)	23 (76.66)	28 (93.33)	16 (53.33)
2.	**Sweepers**				
	i) Sweeping	30 (100.00)	22 (73.33)	29 (96.66)	25 (83.33)
	ii) Carrying garbage	30 (100.00)	19 (63.33)	27 (90.00)	23 (76.66)
3.	**Venders**				
	i)Carrying vegetables/ fruits basket on head	29 (96.66)	28 (93.33)	30 (100.00)	30 (100.00)
	ii) Selling veg/ fruits	30 (100.00)	9 (30.00)	22 (73.33)	22 (73.33)
4.	**Construction workers**				
	i) Carrying bricks	30 (100.00)	20 (86.66)	24 (80.00)	24 (80.00)
	ii) Carrying mixture of sand and cement	30 (100.00)	24 (80.00)	23 (76.66)	24 (80.00)
5.	**Domestic servants**				
	i) Washing vessels	29 (96.66)	24 (80.00)	27 (90.00)	26 (86.66)
	ii) Lifting washed vessels	28 (93.33)	17 (56.66)	14 (46.66)	12 (40.00)

(Figure in Parenthesis indicated percentage)

The level of satisfaction of the respondents while performing the activity is depicted in Table 5. None of the respondents was highly satisfied with any activity i.e. performed by her similarly none of them recorded as very dissatisfied with any activity. Majority of them expressed neutral satisfaction for different activities. This was found to be highest in venders and domestic servants followed

by sweepers, construction workers and tailors. 29.33 per cent of the respondents were satisfied about the activities performed by them with the maximum percentage being present in construction workers and tailors followed by venders, sweepers and domestic servants. Majority (33.33%) of domestic servants expressed dissatisfaction about their activity followed by sweepers (23.33%). However the percentage of respondents dissatisfied were less in construction workers followed by tailors. Among the venders 16.66 per cent recorded dissatisfaction.

Table 5.Level of satisfaction of the respondents while performing the professional and household activities

Sr. No.	Respondents	Level of satisfaction				
		Highly satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
1.	Tailors (N = 3)	--	13 (43.33)	13 (43.33)	4 (13.33)	--
2.	Sweepers (N = 30)	--	7 (23.33)	16 (53.33)	7 (23.33)	--
3.	Venders (N = 30)	--	8 (26.66)	17 (56.66)	5 (16.66)	--
4.	Construction workers (N = 30)	--	13 (43.33)	14 (46.66)	3 (10.00)	--
5.	Domestic workers (N = 30)	--	3 (10.00)	17 (56.66)	10 (33.33)	--
	Total	**--**	**44 (29.33)**	**77 (51.33)**	**29 (19.33)**	**--**

(Figure in Parenthesis indicated percentage)

CONCLUSION:

From the findings it was observed that regarding perceived exertion in profession, it was observed that all the activities were felt light to moderately heavy by all the respondents except heming and cleaning of machine by the tailors. Several health problems were noted among the respondents while conducting the survey, the incidence of different problems was already enlisted. Maximum construction workers and sweepers suffered with upper and lower back problems followed by venders who suffered mostly with upper back problems and to some extend lower back problems.

On the whole it is crystal clear that none of the respondent was highly

satisfied or highly dissatisfied regarding their professions. All the respondents were ranging from satisfied to dissatisfied category. Maximum percentages of domestic servants were dissatisfied regarding their job, probably because of low income and less job security as compare to other respondents. Whereas maximum per cent construction workers expressed satisfaction about their professional activities even though they were considered as the highly drudgery prone activities

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RESEARCH ARTICLE

Correlates of perception of brinjal growers about use of pesticides

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ABSTRACT

The present study was conducted in Akola district of Vidarbha region in Maharashtra State. The results revealed that the majority of the respondents were belong to middle age group, completed 'middle school' education, having medium family size, had small family size, medium (4.01–10.00ha.) land holding, followed by having annual income up to Rs.1,00,000 to Rs. 1,50,000 medium area under brinjal, medium experience in vegetable cultivation, had medium extension contact and belongs to medium category of use of information sources. Majority of the respondents were included in the category of medium innovativeness and had medium level of economic motivation. It is observed that more than half of respondents had favourable attitude towards pesticide use in Brinjal cultivation. Majority of respondent were high perceivers of pesticide use. It is revealed that, out of twelve independent variables, nine variables viz., age, education, family size, annual income, extension contact, source of information, innovativeness, economic motivation, attitude towards pesticide use were shown positively significant correlation with perception, further land holding shows negative correlation with perception, whereas area under brinjal crop and experience in vegetable cultivation were found non significantly correlated with perception.

Key words: Perception, Brinjal grower, Pesticide use, Vegetable

INTRODUCTION

Pesticide use in Indian agriculture is an essential part of production technology. Therefore farmers in developing countries are perceived as over using of pesticides, both in quantity and quality, with mixtures of chemicals, being the favoured form of application (Crissman *et.al*.1994). In India pesticides were introduced in 1948 but production was started in the year 1952. Farmers were then becoming dependent to

pesticides and to some extent they used excessively and inappropriately until today.

Brinjals are grown in every part of our country under varied agro-climatic and soil conditions in plains as well as in hilly regions. It is one of the most common vegetable grown throughout the country. In Vidarbha region, it is consider as very important vegetable crop Chandrapur, Bhandara and Wardha, Akola are the most important brinjal growing districts and productivity is 8-9 t/ha. In Akola district area under brinjal crop is about 678 ha. The Brinjal growers are excessively using pesticides weedicides and other insecticide for more production. Among the major vegetable more pesticide are used in lady's finger, chilli, brinjal and onion. Therefore, the present study was planned to find out the perception of Brinjal growers about use of pesticide.

METHODOLOGY

The present study was conducted in Akola district of Vidarbha region in Maharashtra State because it considers as a progressive agricultural belt of Vidarbha region and the university head quarter is also located in the study area. For the present study the exploratory design of social research was used. Patur and Balapur tahsils of Akola district were selected purposively for study because having maximum area under cultivation of brinjal crops. For the present study random sampling method was used and villages were selected on the basis of maximum area under cultivation of brinjal crop. Five villages from Patur and five villages from Balapur tahsils of Akola district were selected randomly. Fifteen respondents were selected from each village by random sampling method. In all 150 brinjal growers were selected randomly from 10 villages of Balapur and Patur tahsils of Akola district. The dependent variable in the study was perception of brinjal growers about pesticide use. It refers the process by which an individual perceived the information or stimuli from our environment and translate into psychological awareness (Dahama and Bhatnagar, 1985). For the measurement of perception teacher made scale was used. The different aspects related to the use of pesticide were considered with the discussion with committee members, experts in Extension Education, experts from Entomology, experts from Horticulture. Accordingly, total 15 statements were short listed for the measurement of perception. Responses from the respondents were collected on the three point's continuum viz. Agree,

Undecided, Disagree, perception by assigning score 2, 1 and 0 respectively. The perception score was converted into perception index by using following formula.

$$\text{Perception index} = \frac{\text{Perception score actually obtained}}{\text{Maximum obtainable perception score}} \times 100$$

The respondents were categorized as follows

Sl. No.	Perception level	Index score
1.	Low	Upto 33.33
2.	Medium	33.34 to 66.66
3.	High above	66.67

Results and Discussion

A. Personal & socio economic characteristics

The distribution of respondents according to their personal, socio-economic characteristics was ascertained and has been presented in table 1.

Table 1: Personal, socio-economic characteristics of brinjal growers

Categories	No. (n - 150)	Percent
Age		
Young (Up to 35 yrs)	28	18.67
Middle (36-50 yrs)	92	61.33
Old (Above 51 yrs)	30	20.00
Education		
Illiterate	02	01.33
Primary school (1st to 4th std.)	34	22.67
Middle school (5st to 7th std.)	59	39.33
High school (8st to 10th std.)	33	22.00
College (11th and above)	22	14.67
Family size		
Small (below 4)	40	26.66
Medium (5 to 8)	97	64.67
Large (9 and above)	13	08.67
Land Holding		
Marginal (Upto 1.00 ha.)	11	07.33

Small (1.02 – 2.00 ha.)	21	14.00
Semi-medium (2.01 – 4.00 ha.)	38	25.33
Medium (4.01 – 10.00 ha)	70	46.67
Large (Above 10.00 ha.)	10	06.67
Annual Income		
Up to Rs. 50,000/-	18	12.00
Rs. 50,001 to Rs. 1,00,000/-	41	27.33
Rs.1,00,001 to Rs. 1,50,000/-	52	34.67
Rs. 1,50,001 to Rs. 2,00,000/-	14	09.33
Above Rs. 2,00,000/-	25	16.67
Area under Brinjal cultivation		
Low (Up to 0.07ha)	26	17.33
Medium(0.08 to 0.28ha)	92	61.34
High(0.29 ha and above)	32	21.33
Experience in vegetable cultivation		
Low (Up to 6 yrs)	24	16.00
Medium (7to 14 yrs)	106	70.67
High (15 yrs and above)	20	13.33
Extension contact		
Low (Up to 10 score)	34	22.67
Medium (11 to 16 score)	89	59.33
High (17 score and above)	27	18.00
Sources of information		
Low (Below 13)	31	20.67
Medium (14 - 21)	94	62.66
High (Above 22)	25	16.67
Innovativeness		
Low (Below 10)	40	26.67
Medium (11 to 16)	85	56.67
High (17 and above)	25	16.66
Economic motivation		
Low (Up to 21score)	41	27.33
Medium (22 to 27score)	100	66.67
High (28score and above)	09	06.00
Attitude towards pesticide use		

Unfavourable (up to 24)	37	24.67
Favourable (25 to 32)	77	51.33
Highly Favourable (above 33)	36	24.00

It is apparent from the data presented in the Table 1 indicated that, the majority of the respondents (61.33%) belong to middle age group. Most of the respondents, i.e. (39.33%) had completed 'middle school' education, followed by 'primary school' education (22.67%). It is seen from the Table 1, that majority of the respondents (64.67 %) were having medium family size, followed by 26.66 per cent of the respondents had small family size. Majority of the (46.67%) respondents had medium (4.01–10.00ha.) land holding, followed by (25.33%) respondents possessed Semi-medium land in between (2.01-4.00 ha.) ha. It is revealed that over one third of the respondents 34.67 per cent were having annual income up to Rs.1,00,000 to Rs 1,50,000, followed by (27.33%) of the respondents were having annual income Rs. 50,0001 to Rs.1,00,000. Two third (61.34 %) of the respondents had 'medium' area under brinjal, while (21.33%) of the respondents had high area under Brinjal cultivation. Majority (70.67%) of the respondents had medium experience in vegetable cultivation. It is also observed that, maximum (59.33%) of the respondents had medium extension contact and 62.66 per cent belongs to medium category of use of information sources. Majority of the respondents (56.67%) were included in the category of medium innovativeness and 66.67 per cent had medium level of economic motivation. It is observed from the Table 1 that more than half of respondents (51.33 %) had favourable attitude towards pesticide use in Brinjal cultivation, followed by (24.67 %) and respondents had unfavourable attitude towards pesticide application in Brinjal cultivation. The above findings were in accordance with the findings of Chaudhari and Khan (1992), Lami A. Abraham and E. Ali (2013), Madhu (2013) and Pimpalkar (2015).

B. Perception of brinjal growers about use of pesticide

Based on the extent of perception of brinjal growers' about use of pesticide, the respondents were categorized into low, medium and high groups by an equal interval method and the data depicted in Table 2.

Table 2 Distribution of the respondent according to their Perception about use of pesticide

Sl. No.	Categories	Respondents(n=150)	
		Frequency	Percentage
1	Low (Upto33.33)	15	10.00
2	Medium (33.34 - 66.66)	50	33.33
3	High (Above 66.67)	85	56.67
	Total	**150**	**100.00**

Table 2, revealed that majority (56.67%) of respondent were high perceivers of pesticide use, while (33.33%) per cent medium level of perception and 10 per cent had low level of perception of pesticide use in brinjal crop. It could be inferred that majority of the respondents belonged to the medium level of perception of pesticide use in brinjal crop. Similar findings were reported by Rao and Dubey (2001) and Madu (2013).

C. Relationship of selected characteristic of respondents with their Perception

The correlation coefficients of perception between personal, socio economic, communicational and psychological characteristics of brinjal growers have been depicted in Table 3.

Table 3. Coefficient of correlation between selected characteristics of brinjal growers with their perception

Sl. No.	Variables	'r' vlaues
1	Age	0.264**
2	Education	0.314**
3	Family size	0.224*
4	Land holding	-0.212*
5	Annual Income	0.198*
6	Area under brinjal crop	-0.164NS
7	Experience in vegetable cultivation	0.08NS
8	Extension contact	0.216*
9	Source of information	0.206*
10	Innovativeness	0.202*
11	Economic motivation	0.208*
12	Attitude towards pesticides use	0.203*

* Significant at 0.05 % level of probability ** Significant at 0.01 % level of probability
NS - Non significant.

Data pertaining to Table 4 reveals that age and education of the respondents had positive and highly significant relationship with the perception, whereas, variables like family size, annual income, extension contact, sources of information, innovativeness, economic motivation and attitude towards pesticides use were found positive and significant relationship with the perception at 0.05 per cent level of probability. Further the land holding was found negative significant relation with the perception. Which shows that the there is increase in these variables ultimately increase in their perception level. Further it is also area under brinjal crop and experience in vegetable cultivation were found non significantly correlated with perception.

CONCLUSION

It can be concluded from the above findings that the majority of the respondents were had favourable attitude towards pesticide use in Brinjal cultivation and also high perceivers of pesticide use. Out of twelve independent variables, nine variables viz., age, education, family size, annual income, extension contact, source of information, innovativeness, economic motivation, attitude towards pesticide use were shown positively significant correlation with perception, further land holding shows negative correlation with perception.

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RESEARCH ARTICLE

Knowledge of Paddy Growers about SRI Cultivation Method in Bhandara District

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ABSTRACT

The study entitled "Knowledge of Paddy Growers about SRI Cultivation Method in Bhandara District was undertaken in Bhandara district of Nagpur division in Vidarbha region with the objective to study the personal, socio-economic and psychological characteristics of paddy growers, and to study the extent of knowledge of paddy growers about recommended cultivation practices of SRI method.

The findings of the present investigation indicate that, about fifty per cent (50.00%) of the paddy growers were in middle age group, about 42.00 per cent of the paddy growers educated up to high school level. In case of land holding, 35.00 per cent paddy growers possessed small category of land holding. Most of the paddy growers having agriculture plus allied occupation is their main occupation, 93.00 per cent having medium level of experience in paddy cultivation. Regarding area under paddy crop, 35.00 per cent farmer's having 1.01 to 2 ha area under paddy crop. In case of annual income of the paddy growers, most of them having an income up to Rs.1,00,000/-. Maximum paddy growers utilize medium (87.00%) level of sources of information. Most of the paddy growers found in medium level of innovativeness (54.00%) and risk preference (91.00%). More than three fourth (78.00%) paddy growers found medium economic motivation. Maximum percentage of paddy growers possessed medium level of knowledge about recommended SRI method of paddy cultivation technology. Majority of paddy growers had knowledge about land preparation, recommended varieties, bed preparation, seed soaking, levelling of field, use markers, knowledge about pest and diseases, transplanting, harvesting and threshing. However, higher percentage of the paddy growers had poor knowledge about scented varieties, hybrid varieties, seed required, transfer of soaked seed into a gunny bag, ideal ploughing method, leaving pathway, water management, weed management and management of pest.

Key words : Knowledge, paddy growers, SRI

INTRODUCTION

Ancient Indian scriptures, the 'Yajurveda', the 'Atharva Veda' and Smritis make mention about paddy as not just a cereal for consumption as food but also as sacred offering to the deities especially during religious and social functions.

Rice is one of the prominent cereal crops in India. It is an important staple food of 50 per cent of the world's population that resides in Asia, where 90 per cent of the world's rice is grown and consumed. In Asia, India has the largest area under rice (41.66 million ha) accounting for 29.4 per cent of the global rice area. When all developing countries are considered together, paddy (rice) provides 27 per cent of dietary energy supply and 20 per cent of dietary protein intake. Over 90 per cent of the world's paddy (rice) is produced and consumed in Asia with over 2 billion people obtaining 60 to 70 per cent of their energy intake from rice and rice products.

India ranked first in area under paddy (41.66 million ha) and second in terms of production (152.6 million metric ton) during 2012-13 and it stood next only to China in the world with respect to rice production. But, the yield levels in India were low per ha compared to other major rice producing countries *viz.,* Japan (6.52 t/ha), China (6.24 t/ha) and Indonesia (4.25 t/ha). About 67 per cent of the area under paddy in India is under High yielding varieties.

SRI, the system of rice intensification is a system of production of rice. SRI is considered to be an intangible technological breakthrough in paddy cultivation. SRI involves the application of certain management practices, which together provide better growing conditions for rice plants, particularly in the root zone, than those for plants grown under traditional practices. This system seems to be promising to overcome the shortage of water in irrigated rice.

Maharashtra had about 14.99 lakh hectares under paddy. In Vidarbha region paddy crop is grown mostly in considerable area of about 7.319 lakh hectares in Bhandara, Gondia, Chandrapur, Gadchiroli and some part of Nagpur District. During 2009-10 average yield per hectare in Maharashtra state was observed 32.37 lakh tones (source: www.rkmp.co.in). However, the yield was in Bhandara (2642 tonnes), Gondia (2550 tonnes), Chandrapur (2069 tonnes) and Gadchiroli (1757 tonnes) District of Vidarbha (source: www.rkmp.co.in).

Major area is lowland and midland where rice is cultivated in the

konkan region. Farmers are not ready to adopt SRI due to heavy rainfall and use of 10-12 days old seedlings for transplanting. However, from 5-6 years SRI trials were conducted on university farm on upland and midland situation in *kharif* and *rabi* season. However, on upland situation very few farmers were egar to adopt SRI under guidance of NGO, Agril. Dept., Agril. University and extension workers (KVK).

Therefore, it is felt that, there may exist large recommended practices and actual knowledge about the practices may be very less at farmer's level. It may be reduces by finding technological in adoption of recommended SRI method of rice cultivation technology by farmers. Keeping this view in mind,

Objectives

1. To study the personal, socio-economic and psychological characteristics of paddy growers.
2. To study the extent of knowledge to paddy grower about recommended cultivation practices of SRI method.

METHODOLOGY

The present study was to assess the knowledge of SRI method of paddy, therefore exploratory design of social research was used for the present investigation.

The study was conducted in Bhandara district. Bhandara is located in Vidarbha region. There are 7 tahsils in Bhandara district, The list of paddy growing villages of Lakhani tahsil and Sakoli tahsil selected having highest area under paddy cultivation the list 10 paddy growers from each villages were drawn randomly,

RESULTS AND DISCUSSION

The study of personal, socio-economical and psychological characteristics were made with reference to age, education, land holding, occupation, farming experience, area under paddy cultivation, annual income, source of information, innovativeness, risk preference, economic motivation and knowledge. The results have been presented under the following table 1.

Table 1. : Distribution of the respondents according to their the personal, socio-economic and psychological characteristics of Paddy growers.

Sl. No.	Characteristics	Category	Respondents (n=100)	
			Number	Percentage
1	**Age**	Young (up to 35)	11	11.00
		Middle (36 to 50)	50	50.00

		Old (Above 50)	39	39.00
2	**Education**	Illiterate	02	02.00
		Primary school	11	11.00
		Middle school	11	11.00
		High school	42	42.00
		Higher secondary school	15	15.00
		College	19	19.00
3	**Land holding**	Marginal (up to 1.00 ha)	31	31.00
		Small (1.01 to 2.00 ha)	35	35.00
		Semi-medium (2.01 to 4.00 ha)	23	23.00
		Medium (4.01 to 10.00 ha)	08	08.00
		Large (Above 10.00 ha)	03	03.00
4	**Occupation**	Agriculture + labour	18	18.00
		Agriculture (Farming)	23	23.00
		Agriculture + Allied Occupation	34	34.00
		Agriculture + Business	18	18.00
		Agriculture + Service	07	07.00
5	**Farming experience**	Low (up to 5 yr)	01	01.00
		Medium (6 to 10 yr)	06	06.00
		High (above 10 yr)	93	93.00
6	**Area under paddy cultivation**	Up to 1.00 ha	32	32.00
		1.01 to 2.00 ha	35	35.00
		2.01 to 4.00 ha	22	22.00
		4.01 to 10.00 ha	08	08.00
		Above 10.00 ha	03	03.00
7	**Annual income**	Up to 1,00,000/-	63	63.00
		1,00,001 to 2,00,000/-	17	17.00
		Above 2,00,001/-	20	20.00
8	**Sources of information**	Low (up to 13)	12	12.00
		Medium (13-26)	87	87.00
		High (above 26)	01	01.00
9	**Innovativeness**	Low (up to 6)	00	00.00
		Medium (6-12)	54	54.00
		High (above 12)	46	46.00

10	**Risk preference**	Low (up to 10)	00	00.00
		Medium (10-20)	91	91.00
		High (above 20)	09	09.00
11	**Economic motivation**	Low (up to 10)	00	00.00
		Medium (10-20)	73	73.00
		High (above 20)	27	27.00

The distributional analysis pertaining to age of the paddy growers in Table 1 indicates that half of the paddy growers (50.00%) were found in the middle age group of 36 to 50 years, It could be noticed that relatively higher percentage of paddy growers were educated up to high school level (42.00 %)

It was observed from the Table 1, that 35.00 per cent of the paddy growers possessed small size land holding, it is observed that the majority of the paddy growers 34.00 per cent had their main occupation agriculture plus allied occupation, it was apparent that 93.00 per cent of the paddy growers had experience of above 10 years in paddy cultivation. It is revealed from Table 1, that majority of the paddy growers (35.00%) had put the area under paddy crop ranged between 1.01 to 2 ha.

From the distribution of the paddy growers according to annual income, it is revealed that majority of the paddy growers (63.00%) had annual income of up to Rs.1,00,000/-. It is observed that majority of the paddy growers (87.00%) were having medium level sources of information, It is seen from the data presented in Table 14, that more than half (54.00%) of the paddy growers included in the category of medium innovativeness

It was observed that higher number of the paddy growers (91.00%) found to be in the medium level of risk preference

The distribution of the paddy growers as per economic motivation in Table 1 reported that, majority of the paddy growers (73.00%) had medium level of economic motivation

Distribution of paddy growers according to their practice wise knowledge about recommended SRI method of paddy cultivation practices

Adequate and relevant knowledge of SRI method of paddy cultivation practices by the paddy growers has relevance in obtaining maximum benefit through production. Looking to the importance of knowledge, paddy growers

knowledge was studied practice wise and the data in this regards has been presented in Table 2.

A critical look towards practice wise knowledge in the Table 2 revealed that 89.00 per cent of the paddy growers having knowledge about type of soil suitable for paddy crop.

With regards the knowledge about recommended varieties of paddy, it was found that higher percentage of paddy growers (84.00%) had knowledge about medium duration varieties, followed by 76.00 per cent had knowledge about long duration varieties, followed by 68.00 per cent had knowledge about short duration varieties, followed by 36.00 per cent had knowledge about scented varieties and only 04.00 per cent paddy growers had knowledge about hybrid varieties of paddy.

While, studying the knowledge about raising nursery, it was seen that nearly cent per cent of paddy growers 100.00 per cent had knowledge about time of seed sowing in raised bed, followed by 91.00 per cent of paddy growers had knowledge about uniform broadcasting, 84.00 per cent of paddy growers had knowledge about seed soaking, about 72.00 per cent of paddy growers had knowledge about bed preparation. With regards with the knowledge of seed treatment 41.00 per cent of paddy growers had knowledge about seed treatment. And only 04.00 per cent of paddy growers had knowledge about transfer the soaked seed into a gunny bag for 24 hour for seed germination.

As regards to the knowledge about puddling, it is seen that cent per cent of paddy growers 100.00 per cent had knowledge about use markers, vogue majority 93.00 per cent of paddy growers had good knowledge about levelling of field. It was followed by 69.00 per cent of paddy growers had knowledge about wide spacing, only 06.00 per cent of paddy growers had knowledge about ideal ploughing method and knowledge about leaving path for every 2 meter.

While, studying the knowledge about transplanting, it is seen that 89.00 per cent of the paddy growers had knowledge about seedling/hill. And 44.00 per cent of paddy growers had knowledge about age of seedling for transplant.

While, studying the knowledge about nutrient management, it was seen that 87.00 per cent of paddy growers had knowledge about recommended first dose of fertilizer, followed by 66.00 per cent of paddy growers had knowledge about third does of chemical fertilizer for paddy. It is

followed by 59.00 per cent of paddy growers had knowledge about recommended does of fertilizer before ploughing and 45.00 per cent of paddy growers had knowledge about second dose chemical fertilizer.

However, 16.00 per cent of paddy growers had awareness knowledge about water management. And 12.00 per cent of paddy growers had knowledge about weed management.

While, assessing the awareness knowledge about important pest and diseases, it was observed that majority of paddy growers (78.00%) had knowledge about pest of paddy. And 75.00 per cent of paddy growers had knowledge about diseases of paddy.

About 76.00 per cent of paddy growers had knowledge about use of pesticide, 37.00 per cent of paddy growers had knowledge about use of resistance varieties. 21.00 per cent of paddy growers had knowledge about use of *Trichogramma* spp., 13.00 per cent of paddy growers had knowledge about rope dragging, 11.00 per cent of paddy growers had knowledge about clip off the leaf tip before transplanting. And only 01.00 per cent of paddy growers had knowledge about clean cultivation. Further, in case of disease management 75.00 per cent of paddy growers had knowledge about seed treatment and 70.00 per cent of paddy growers had knowledge about use of chemicals.

It was surprising to note that 100.00 per cent of paddy growers had knowledge about time of harvesting and threshing of paddy.

Table 2. : Distribution of paddy growers according to their practice wise knowledge about recommended SRI method of paddy cultivation practices

Sl. No.	Recommended paddy cultivation practices	Respondents (n=100)	
		Frequency	Percentage
A)	**Land preparation**		
1.	Do you know which soil suitable for SRI method of paddy (Rich in organic matter)	89	89.00
B)	**Recommended varieties**		
1.	Do you know the short duration varieties of paddy (Sakoli- 6, Sindewahi-1)	68	68.00
2.	Do you know the medium duration varieties of paddy (PKV Ganesh, Sindewahi-4, PKV- HMT, Sindewahi-2001)	84	84.00

3.	Do you know the long duration varieties of paddy (Sindewahi -5, Sakoli-8)	76	76.00
4.	Do you know the scented varieties of paddy (Sakoli-7, PKV-Makarand, PKV- Khamang)	36	36.00
5.	Do you know the hybrid varieties of paddy (Sahyadri)	04	04..00
C)	**Raising Nursery**		
1.	Bed preparation		
a	Do you know the size of raised bed required/acre (length- as necessary, wide- 4 feet, hight- 5-6 inch, 400sq. ft/acre or 4 beds of 4×25 feet)	72	72.00
2.	Seed required		
a	Do you know the recommended seed rate for SRI method of paddy (2 kg /acre or 5 kg/ ha)	41	41.00
3.	Seed soaking, broadcasting		
a	Do you know required hours for seed soaking of paddy (12 hr)	84	84.00
b	Does it required transfer the soaked seed into a gunny cloth/bag or make a heap and cover it with gunny cloth for 24 hour for seed germination (Yes)	04	04.00
c	Uniform broadcasting is necessary (Yes)	91	91.00
4.	What is time of seed sowing in raised bed (onset of monsoon Jun-July)	100	100.00
D)	**Preparation of main field**		
1.	Puddling		
a	Do you know ideal ploughing method for SRI system (Dry plough, without tractor)	06	06.00
b	Do you know the leveling of field (Used levels)	93	93.00
2.	Wide spacing		
a	Do you know spacing required for SRI method (25×25 cm r to r and p to p, or 10×10 inches)	69	69.00
3.	Use markers		
a	What type of marker you used for making spacing (Rope, stick, marker made out of wood as well as iron)	100	100.00
4.	Leaving pathway		
a	Do you know to leave paths for every 2 meter (Yes)	06	06.00

E)	**Transplanting**		
a	What is the age of seedling for transplant (8-12 days)	44	44.00
b	How deep seedling are to be transplanted (1 seedling/ hill, depth 2-3 cm deep)	89	89.00
F)	**Nutrient management**		
1.	Do you know recommended dose of fertilizer before ploughing (FYM/compost 10-12 t/ha)	59	59.00
2.	What is recommended first dose of chemical fertilizer/ha? (50% of recommended fertilizer (NPK) i.e., 50:30:20 kg NPK in kharif and 60:30:20 kg in rabi)	87	87.00
3.	What is recommended second dose of chemical fertilizer/ ha (25% of N i.e., 25 kg/ha at the time of second weeding)	45	45.00
4.	What is recommended third dose of chemical fertilizer/ ha (25% of N i.e., 25 kg/ha)	66	66.00
G)	**Water management**		
1.	What is the water level recommended to keep in paddy field? (SRI method does not require continuous flooding irrigation is given to maintain soil moisture. After panicle initiation stage until maturity, one inch of water should be maintain in the field. The water can be removed after 70% of grains get hardened.	16	16.00
H)	**Weed management**		
1.	How to manage the weed in SRI system of paddy cultivation (By using weeder on 10^{th} and 20^{th} day after transplantation. Then after 10-15 days interval.	12	12.00
I)	**Pest and disease management**		
1.	Knowledge about pest of paddy crop		
a	Name of the major pest of paddy (Stem borer, Rice hispa, Rice gundhi bug, Browen plant hopper, Rice case worm, Green leaf hopper, Rice grass hopper, Rice gall midge, Rice thrips)	78	78.00
2.	Knowledge about diseases of paddy crop		
a	Name of major diseases (Blast, Bacterial leaf blight of rice, Brown leaf spot, Khaira disease, Tungro disease, Grassy stunt, Udbatta disease, False smut, Neck blast)	75	75.00

3.	How to manage pest		
a	Use resistance varieties	37	37.00
b	Rope dragging (Army worm)	21	21.00
c	Use *trichogramma* spp.	13	13.00
d	Use of pesticide	76	76.00
e	Clip off the leaf tip before transplanting (Rice hispa, Stem borer)	11	11.00
f	Clean cultivation (Rice gundhi bug)	01	01.00
4.	How to manage diseases		
a	Seed treatment	75	75.00
b	Use chemicals	70	70.00
J)	**Harvesting and Threshing**		
1.	Which period is suitable for harvesting of paddy? (When 90% grains are matured, harvest the paddy on 25-30 days after panicle initiation.)	100	100.00
2.	Which period is suitable for threshing of paddy? (After complete drying the crop threshing should be done.)	100	100.00

Distribution of paddy growers according to their knowledge levels was ascertained and presented in Table 18.

The knowledge possessed by the paddy growers indicated in Table 18, that majority of the paddy growers (64.00%) were having medium level of knowledge of SRI method of paddy cultivation. While, 25.00 per cent of the paddy growers were having high level of knowledge and 11.00 per cent of paddy growers was having low level of knowledge.

These findings were in conformity with the findings of Gedam (2007) and Dhenge (2013).

Table 3. Distribution of paddy growers according to their overall knowledge about recommended SRI method of paddy cultivation practices

Sl. No.	Knowledge level	Respondents (n=100)	
		Number	Percentage
1.	Low	11	11.00
2.	Medium	64	64.00
3.	High	25	25.00
	Total	**100**	**100.00**

CONCLUSION

The present study "Knowledge of Paddy Growers about SRI Cultivation Method in Bhandara District." was conducted in Lakhani and Sakoli Panchayat Samiti of Bhandara district. The study was planned to investigate the technological of recommended package of practices of SRI method of paddy. It was also thought to be worthwhile to ascertain the reasons of paddy grower in technological about recommended package of practices of SRI method of paddy.

As regards to practice wise knowledge, majority of respondents had knowledge about land preparation, recommended varieties, bed preparation, seed soaking, leveling of field, use markers, knowledge about pest and diseases, transplanting, harvesting and threshing.

While, higher percentage of the respondents had poor knowledge about scented varieties, hybrid varieties, seed required, transfer of soaked seed into a gunny bag, ideal ploughing method, leaving pathway, water management, weed management and management of pest.

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RESEARCH ARTICLE

Profile of Community Radio Listeners and its Relationship with Listening Behaviour

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ABSTRACT

Community radio is useful for farming community for addressing agriculture issues. CRS broadcasts content that is popular and relevant to a local specific audience. The effectiveness of these programmes is depends on the listening behaviour of listeners and listening behaviour is directly related to his profile characteristics. Therefore, the study entitled, 'Profile of Community Radio Listeners and its Relationship with Listening Behaviour' was conducted; to study the profile of community radio listeners and to ascertain the relationship between the profiles of community radio listeners with their listening behaviour. The study was conducted in Rahata, Rahuri and Shrirampur tahsils of Ahmednagar district of Maharashtra state by interviewing 120 respondent listeners. Collected data was processed and analyzed by suitable statistical tools.

From the study it was observedthat, majority of the respondents were in middle age group, educated up to pre-primary and primary education level, had an agriculture and dairy as their main occupation, belonged to small size of family and had small land holding. Most of the respondents had medium experience in farming; majority had medium income level and social participation. Majority of the respondents use source of information to medium level and time spent in farm activities by the majority was medium.The study revealed that majority of the listeners had medium listening behavior.Regarding the relationship it was found that; the education, land holding, source of information and experience in farming had positive and significant relationship with the listening behaviour of listeners. Whereas; the age, occupation, size of family and annual income had a positive but non-significant association with the listening behaviour. Social participation and time spent in farm activities were negatively non-significant with the listening behaviour. Therefore, from the study it is concluded that, the profile factors and listening behaviour was important and should be considered by the operator and staff of CRS while designing and scheduling the CRS programmes.

Keywards: Community Radio Station, Listening behaviour, CRS listeners, profile, Correlation.

INTRODUCTION

Community radio is useful for farming community for addressing agriculture issues. In India, where literacy remains a substantial barrier to development, radio especially community radio, can reach a large number of poor people. Community Stations serve geographic communities and communities of interest.CRS broadcasts content that is popular and relevant to a local specific audience but is often overlooked by commercial or mass media broadcasters. Community Radio Station (CRS) PIRENS is run by Krishi Vigyan Kendra, Babhaleshwar in Rahata tahsil of Ahmednagar district. KVK, PIRENS broadcasts different type of programmes with help of rural people. The effectiveness of these programmes is depends on the listening behaviour of listeners and listening behaviour is directly related to his profile characteristics. Therefore, the study entitled, 'Profile of Community Radio Listeners and its Relationship with Listening Behaviour' was conducted; to study the profile of community radio listeners and to ascertain the relationship between the profiles of community radio listeners with their listening behaviour.

METHODOLOGY

The study was conducted in the periphery of PIRENS Community Radio Station i.e. in Rahata, Rahuri and Shrirampur tahsils of Ahmednagar district of Maharashtra State in India. The data was collected with the help of well structured interview schedule by interviewing 120 respondent Community Radio Listener farmers. Collected data was processed and analyzed by using frequency, percentage, mean, standard deviation and coefficient of correlation.

Results and Discussion

1. Profile of Community Radio Listener Farmers

The respondents were distributed into different categories based on their selected profile characteristics and presented in Table1.

Table: 1 Profile of Community Radio Listener farmers

Sl. No.	Variables	Category	Respondents (n=120)	
			Frequency	Percentage
1.	Age	Young (Up to 33 years)	18	15.01
		Middle (34 to 54 years)	85	70.83
		Old (55 and above years)	17	14.16
2.	Education	Illiterate	18	15.00
		Pre-Primary and Primary education (1st to 7th standard)	36	30.00
		Secondary school (8th to 10th)	33	27.51
		Higher secondary school (11th to 12th)	22	18.33
		Graduate and above	11	9.16
3.	Size of Family	Small (Up to 5)	100	83.33
		Medium (6 to 9)	16	13.33
		Large (10 and above)	4	3.34
4.	Farming Experience	Low (Up to 14)	17	14.06
		Medium (15 to 32)	80	66.66
		High (33 and above)	23	19.28
5.	Time spent in farm activities	Low (up to 8 hrs.)	34	28.34
		Medium (9 to 11 hrs.)	68	56.66
		High (12 and above hrs.)	18	15.00
6.	Occupation	Agriculture	19	15.84
		Agriculture + dairy + sheep/goat	41	34.16
		Agriculture +dairy	60	50.00
7.	Size of Land holding	Marginal (Up to 1.00 ha)	32	26.60
		Small (1.01 to 2.00 ha)	56	46.66
		Semi-medium (2.01 to 4.00 ha)	27	22.50
		Medium (4.01 to 10.00 ha.)	4	3.35
		Large (10.01 ha and above)	1	0.89
8.	Annual Income	Low (up to Rs.1,18,352)	10	8.34
		Medium (Rs.1,18,353 to Rs.4,49,764)	96	80.00
		High (Rs.4,49,765 and above)	14	11.66
9.	Social Participation	Low (up to 5)	27	22.50
		Medium (6 to 11)	69	57.50
		High (12 and above)	24	20.00
10.	Source of Information	Low (up to 31)	32	26.66
		Medium (32 to 39)	65	54.16
		High (40 and above)	23	19.18

Age : From Table 1, it is found that majority (70.83 %) of the respondents were from the middle age group, while 15.01 per cent of the respondents belonged to young age group and 14.16 per cent belonged to old age group. The findings are in line with the findings of Patil S. D. 2015.

Education: It is observed from Table1 that 30.00 per cent of community radio listeners were educated up to pre-primary and primary education, followed by secondary school (27.51%), higher secondary school (18.33%), illiterate (15.00%) and graduate and above level education (9.16%).

Size of Family: The data projected in Table1 indicated that, large majority (83.33 %) of the respondents belonged to the category of small size of family (up to 5) and 13.33 per cent of listeners belonged to medium size of family (6 to 9) and remaining 3.34 per cent to the category of large size of family (10 and above).The findings of Talwar (2011) are in contrast with the findings.

Farming Experience: Table1 depicted that majority (66.66 %) of the community radio listeners were having medium (15 to 32 years) farming experience, followed by high farming experience (19.28%) and low farming experience (14.06 %). Therefore, it can be said that CRS prorammmes were listened by the experienced farmers. The findings are in line with the findings of K. Aruna (2010).

Time spent in farm activities: The data in Table1 revealed that 56.66 per cent of the community radio listeners were spent medium time in farming activities, followed by low (28.34 %) and high (15.00 %) time spent.

Occupation: From the Table-1, it was found that one half (50.00 %) of the community radio listeners had agriculture + dairy farming was their main occupation, whereas 34.16 per cent of the listeners had agriculture + dairy + goat/sheep farming and 15.84 per cent of the listeners had agriculture as an only occupation. The findings are in line with the findings of Jadhav (2015).

Size of Land holding: The findings in the Table-1 showed that a about on half (46.66 %) of the community radio listeners had small size of land holding, followed by marginal size of land holding (26.60 %), semi medium size of land holding (22.50%), medium size of land holding (3.35%) and big size of land holding (0.89%). The findings are in line with the findings of K. Aruna (2010).

Annual Income: From Table1it is observed that large majority of the community radio listeners (80.00 %) had medium annual income between

Rs.1,18,352 to Rs.4,49,764; while 11.66 per cent had high annual income of above Rs.4,49,765 and 8.34 per cent of the respondent had low annual income up to Rs.1,18,352.The research finding of Madhu (2010) are in support of these findings.

Social Participation: Table1 depicted that 57.50 per cent of respondents had medium level of social participation, while 22.50 per cent of respondents had low social participation and 20.00 per cent of them had high social participation. The finding of this study partially agreed with the findings and not in agreement with the findings of Chandra et al. (2008) and Madhu (2010)

Source of Information: The data pertaining to the source of information showed that about 54.16 per cent of the respondents were using sources of information to the medium extent, whereas 26.66 and 19.18 per cent of them had used at low and high extent, respectively. The research finding of Patil *et al.* (2015) and Patil *et al.* (2016) are in support of these findings.

2. Radio Listening Behaviour of Community Radio Listeners

Listening behaviour was operationalised as the place of listening, regularity of listening, attention paid and duration of listening to community radio programmes. The listening behaviour of respondents is presented in Table2.

Table 2.Distribution of respondents according to their listening behavior

Sl.No.	Listening behavior (score)	Respondents (n=120)	
		Frequency	Percentage
1	Low (up to 7)	15	12.50
2	Medium (8 to 11)	84	70.00
3	High (12 and above)	21	17.50
	Total	**120**	**100.00**

From Table2 it is observed that majority (70.00%) of the community radio listeners had medium listening behaviour, followed by high (17.50%) and low (12.50%) listening behaviour. The results are in line with the result of Krishnamurthy *et al.* (2008) and Pattanashetti (2010).

3. Relationship between profile and listening behaviour of CRS listeners

In order to study the nature of relationship between the selected independent variables and the listening behaviour of community radio listeners, correlation coefficients (r) were computed and the values are presented in Table 3 .

Table3. Relationship between profile and listening behaviour of CRS listeners

Sr.No.	Independent variable	Coefficient correlation (r)
1	Age	0.071
2	Education	0.242**
3	Size of family	0.077
4	Experience in farming	0.182*
5	Time spent in farm activity	-0.183*
6	Occupation	0.144
7	Land holding	0.222*
8	Annual income	0.137
9	Social participation	-0.028
10	Source of information	0.186*

(* Significance at 0.05 level of probability and * * Significance at 0.01 level of probability)

It is evident from Table 3 that,education, land holding, source of information and farming experience of CRS listeners had positive and significant association with the listening behaviour. These finding are in line with the finding of K. Aruna (2010) and Naik and Manjula (2016).

Theage, occupation, size of family and annual income of CRS listeners had positive but non-significant relationship with the listening behaviour. While, social participation and time spent in farm activities was negatively and non-significantly associated with the listening behaviour. These finding are in line with the finding of K. Aruna (2010).

Conclusions

Findings help to conclude thatmajority of the radio listeners were in middle age group, educated up to pre-primary and primary education level, having agriculture and dairy as their main occupation, belonged to small size of family and having small size of land holding. Most of the respondents had medium level of experience in farming; majority had medium level of annual income and social participation. Majority of the respondents used source of information to medium level, and time spent in farm activities by the majority of the respondents was medium.

Majority of the community radio listeners had medium listening behavior.It is concluded that education, land holding, source of information and farming experience of CRS listeners had positive and significant association with the listening behaviour. The age, occupation, size of family and annual income of CRS listeners had positive but non significant relationship with the listening behaviour. While, social participation and time spent

in farm activities was negatively and non-significantly associated with the listening behaviour. This indicates that the CRS listeners having education, land holding, source of information and farming experience are more eager and interest in listening the CRS programmes.

The study will be helpful to programme officers, operators and staff of Community Radio Stations, PIRENS and others CRSs to know about the listeners profile, it helps to understand listening behaviour of CRS listeners ad also helps to know the relationship of listeners profile and their listening behaviour so that if necessary they can make changes in programmes and format of presentation accordingly.

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RESEARCH ARTICLE

Constraints in Listening of Community Radio Programmes

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ABSTRACT

The aim of the Community Radio Station (CRS) is to deliver latest information as per needs and problems in the field of agriculture and allied. CRS provide a platform to the farmers, farm women to share their experiences, skill and art, problems and needs with other farmers and communities. While designing the programmes for CRS the need, interest and likings of farming and rural community is always kept at centre, still farmers may face constraints regarding the programmes of CRS, which may reduce the efficiency, fruitfulness and usefulness of the programmes. Therefore, this study was conducted with the objective; to identify the constraints of community radio listeners and ascertain the suggestions of community radio listeners in Rahata, Rahuri and Shrirampur tahsils of Ahmednagar district in Maharashtra state by interviewing 120 respondents. Collected data was processed and analyzed by using suitable statistical tools.

From the study it was observed that, the important constraints reported by majority of the respondents were regarding the problem of power cut, time of broadcast was not suitable, followed by information provided was more theoretical and bookish, duration of CRS programmes was inadequate, no time to listen, no live broadcast, somewhat technical words were used, lack of content in the programme and non availability of radio sets. The major suggestions made by the radio listener to overcome the constraints were to provide information on Govt. scheme and policies, more programmes on user friendly technology, change the timing of broadcasts. There should be increase in the coverage area and strength of signal, avoid bookish information, use of local language and reduce the technical words during the programme. Therefore, from the study it is concluded that, the constraints faced by the listeners should be addressed by the operator and staff of CRS to improve the programmes. Based on suggestions given by the CRS listener simple language should be used, programme should be broadcasts at convenient time and should be need based.

Keywords: Community Radio Station, Constraints, Suggestions, CRS listeners

INTRODUCTION

The aim of the Community Radio Station (CRS) is to deliver latest information as per needs and problems of the community in the field of agriculture and allied. CRS provides a platform to the farmers, farm women and communities to share their experiences, skill and art, problems and needs with others. The needs, interests and likings of farming and rural community are always kept at centre during the designing the programmes for CRS. Still farmers may face constraints regarding the programmes of CRS, which may reduce the efficiency, fruitfulness and usefulness of the programmes. Hence, it is necessary to find out the constraints faced by community radio listeners in listening CRS programmes. Therefore, this study was conducted with an objective to identify the constraints faced by community radio listeners in listening CRS programmes and ascertain their suggestions to overcome these constraints.

METHODOLOGY

The study was conducted in the periphery of PIRENS Community Radio Station i.e. in Rahata, Rahuri and Shrirampur tahsils of Ahmednagar district of Maharashtra State in India. The data was collected with the help of well structured interview schedule by interviewing 120 respondent Community Radio Listener farmers. Collected data was processed and analyzed by using frequency, percentage, and ranking method.

FINDINGS AND DISCUSSION

1. Constraintsfaced by listeners while listening the CRSprogrammes

The adoption of the particular technology is depends on the extent of effectiveness of information broadcasted through CRS. The transfer of information towards the end users and its effectiveness depends on the different factors. Listeners may face the constraints while listening the programmes. Therefore, the respondents CRS listeners in the study area were interviewed to elicit the problem faced by them in listening various programme aired by CRS.

The various constraints faced by the listeners during listening CRS programme presented in the Table 1.

Table 1: Distribution of respondents according to the constraints faced while listening the CRS programmes

Sr. No.	Constraints faced while listening the CRS programmes	Respondents (n=120)		Rank
		Frequency	Percentage	
1	Problem of power cut	40	33.33	I
2	Time of broadcast was not suitable	33	27.50	II
3	Signal problem	30	25.00	III
4	Information was more theoretical and bookish	28	23.33	IV
5	Duration of CR programme was inadequate	25	20.83	V
6	No time to listen	24	20.00	VI
7	No live broadcast	20	16.66	VII
8	Technical words were used to some extent	20	16.66	VII
9	Lack of content in the programme	18	15.00	VIII
10	Non availability of radio sets	15	12.50	IX

The Table 1 indicates that, amongst the various constraints faced by the CRS listeners the problem of power cut ranked first (33.33 %), followed by time of broadcast was not suitable ranked second (27.50 %), problem of lowsignal ranked third (25.00 %), theoretical and bookish information ranked fourth (23.33 %) and constraints regarding the inadequate duration of CRS programmes was ranked fifth (20.83 %). Similar findings were reported by Geeta (2007) and Madhu (2010).

While,the constraints of no time to listen ranked sixth (20.00 %), no live broadcast and somewhat technical words were used ranked seventh (16.66 %), lack of content in the programme ranked eighth (15.00 %) and non-availability of radio sets ranked ninth (12.50 %) were the other constraints expressed by the CRS listeners.Similar findings were reported by Singh and Upadhyay (2006) and Bhosle *et al.* (2008).

2. Suggestions for improvement of CRS programmes

The suggestion encountered by the listeners farmers while listening the CRS programmes were collected and presented in Table 2.

Table2: Distribution of respondents according to suggestions to overcome the constraints of CRS programmes.

Sr. No.	Suggestions to overcome the constraints in CRS programmes	Respondents (n=120)		Rank
		Frequency	Percentage	
1	Frequent information on Govt. scheme and policies should be provided	76	63.33	I
2	Intensity of user friendly programmes should be increased	65	54.16	II
3	Change the broadcast timing	40	33.33	III
4	Strengths of signal and coverage area should be increase	30	25.00	IV
5	Bookish information should be avoid	28	23.33	V
6	Use of local language should be increase	20	16.66	VI
7	Reduce the frequency of technical words	20	16.66	VI

Regarding the suggestion of CRS listeners Table 2 indicates that, majority of the respondents (63.33%) suggests toprovidethe information on Govt. scheme and policies frequently, 54.16 per cent of the respondents suggested that intensity of user friendly programmes should be increased, 33.33 per cent suggested to change in broadcast timing, 25.00 per cent respondents said that there should be increase in the strength of signal and coverage area, 23.33 per cent respondents suggest to avoid bookish information and 16.66 per cent said that use of local language should be increased and reduce the frequency of technical words.Similar findings were reported by Nirmal (2003), Geeta (2007), Parab *etal.* (2009) and Madhu (2010).

CONCLUSION

From the study it is concluded that, the important constraints reported by the respondents were problem of power cut, unsuitable time of broadcast, somewhat theoretical and bookish information, inadequate duration, no time to listen, no live broadcast, somewhat technical words used, lack of content in the programme and non-availability of radio sets.Therefore, to increase the effectiveness of the CRS programmes and to overcome the constraints CRS listeners suggests that, frequent information on Govt. scheme and policies should be provided, programmes should be on user friendly technology, broadcast timing should be change, strength of signal and

coverage area should be increase, avoid bookish information, use local language and reduce technical words.The study will be helpful to programme officers, operators and staff of CRS, PIRENS and others CRSs to understand the constraints face by the listeners and also the probable to overcome the constraints so that if necessary they can make changes in programmes and format of presentation accordingly to increase the effectiveness of the CRS programmes.

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RESEARCH ARTICLE

Constraint and Suggestions of the Farmers in Farming Sector from Peri-Urban Area of Kolhapur

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ABSTRACT

The present study on "Effect of urbanization on agriculture in peri-urban area of Kolhapur" was conducted in Kolhapur district of Maharashtra state. The descriptive and diagnostic design of social research was used. In all, 150 respondents were selected by simple random sampling method. The data were collected by personally interviewing the respondents with the help of structured interview schedule. The data collected were carefully examined, classified, quantified and tabulated. Frequencies, Mean, Standard of deviation and were employed for interpreting the results.

All the respondents (100.00 per cent) faced the constraints like labour scarcity, unavailability of labours on time, increased wages and livestock management had become difficult. Local farmer's produce not fetching good prices was a major constraints faced by three fifth (58.00 per cent) of the respondents.Majority (94.00 per cent) of the respondents suggested thatconstruction on agricultural land should be prohibited and residential zone should not be developed on agricultural land. Followed by 92.00 per cent respondents suggested that to establish industries on barren land and don't use the fertile land for the same. Also suggestions like, to encourage the youths for farming 83.33 per cent, there should be some restriction on industrial construction and industrial waste 82.67 per cent and to do tree plantation on large area 81.33 per cent. While 78.67 per cent and 70.67 per cent respondents suggested recycling the waste water from urban area and use it in urban area and to aware the farmers about effect of urbanization on agriculture respectively.

Keywords : Urbanization, Peri-urban area, Constraints, Suggestion.

INTRODUCTION

In simple words urbanization refers to the expansion of a city in response to the movement of people from rural areas to that city. The term may also be used to describe the process of altering land uses to create and further develop urban centers. It's a process which involves the shifting of population from rural to urban settings and a subsequent development
and expansion of an urban area. Generally, urbanization may be accompanied by an increase in goods and services, greater employment, higher literacy rates, improved health and greater contribution to economic growth. Urbanization is the process whereby land and inhabitants become urban. Urbanization means that an increasing proportion of the human society becomes townsfolk and as this happens towns grow in population, spread in area and make an ever increasing impact upon the countryside both on its appearance and upon the life of its inhabitants. More and more of the land becomes townscape and people come to live in an environment that is both physically and socially urban (Smailes 1975).

As a specific and non-neutral space, a peri-urban area refers to a transition or interaction zone, where urban and rural activities are juxtaposed, and landscape features are subject to rapid modifications, inducing by human activities (Douglas 2006). A peri-urban area is not only a zone of direct impact experiencing the immediate impacts of land demands from urban growth and pollution, but is also a wider market-related zone of influence that is recognizable in terms of the handling of agricultural and natural resource products (Simon *et al*. 2006)

METHODOLOGY

The present investigation was conducted to ascertain the effect of urbanization on agriculture in peri-urban area of Kolhapur. Therefore, a descriptive and diagnostic design of social research was used for present investigation. Karveer and Hatkanangale tahsils were selected purposively. The villages near the boundary of Kolhapur Municipal Corporation were belonged to this tahsils and same were said to be peri-urban area in this study as these are adjacent to Kolhapur.

The 10 villages i.e. 5 from each tahsil (Karveer and Hatkanangale) were selected for this study which is located at the boundary of Kolhapur Municipal Corporation (KMC). Out of that 6 villages proposed under the expansion of KMC. A list of farmer who

owned and cultivating at least 20 R land from selected villages of peri urban area was obtained from Extension Personnel of Department of Agriculture and Agricultural University. From the list 15 respondents were selected randomly. The sample size of the study is 150.

RESULT AND DISCUSSION

Constraints Faced by the Respondents in Peri-urban Area

The information related to the constraints faced by the respondents due to urbanization was obtained and are presented in the Table 1.

Table 1 : Constraints Faced by the Farmers in Peri-urban Area

Sr. No.	Aspects	Yes	No
1	Labour scarcity	150 (100.00)	-
2	Unavailability of labour on time	150 (100.00)	-
3	Wages will increase	150 (100.00)	-
4	Livestock management become difficult	150 (100.00)	-
5	Local farmer's produce will not fetches good prices	87 (58.00)	63 (42.00)

(Figures in parentheses indicates percentage)

Table 1. revealed that all the respondents (100.00 per cent) stated that due to urbanization constraints like labour scarcity, unavailability of labours on time, increased wages, livestock management had become difficult are faced by them, local farmer's produce not fetching good prices was constraint faced by majority (58.00 per cent) of the respondents.

As it is proved that due to urbanization more work/employment is available to the people in the nearby industries, also they are provided better salary than the agricultural labour. The work of agriculture is very hard and tedious and to do work as labour in the farm is not prestigious, so the people prefer to do jobs in the industries than the farm. The findings were supported by Karwande (2009), Jadhav (2015) and Yadav (2016).

Suggestions for Minimizing Effect of Urbanization on Agriculture

The information pertaining to the suggestion for minimizing the effect of urbanization on agriculture by the respondents were obtained and presented in Table 2.

Table 2: Suggestion for Minimizing the Effect of Urbanization on Agriculture

Sr. No.	Suggestions	No. of respondents	Percentage
1	To encourage the youths for farming.	125	83.33
2	To do tree plantation on large area.	122	81.33
3	To recycle the waste water from urban area and use it in agriculture.	118	78.67
4	To aware the farmers about effect of urbanization on agriculture.	106	70.67
5	Construction on agricultural land should be prohibited.	141	94.00
6	There should be some restriction on industrial construction and industrial waste.	124	82.67
7	Construct the industries on barren land and don't use the fertile land for the same.	138	92.00
8	Residential zone should not be developed on agricultural land.	141	94.00

From the Table 2. it is revealed that majority (94.00 per cent) of the respondents suggested thatconstruction on agricultural land should be prohibited and residential zone should not be developed on agricultural land. Followed by 92.00 per cent respondents suggested that to construct the industries on barren land and don't use the fertile land for the same. Also suggestions like, to encourage the youths for farming 83.33 per cent, there should be some restriction on industrial construction and industrial waste 82.67 per cent and to do tree plantation on large area 81.33 per cent. While 78.67 per cent and 70.67 per cent respondents suggested to recycle the waste water from urban area and use it in agriculture and to aware the farmers about effect of urbanization on agriculture respectively.

These findings are in line with the findings of Malik and Ali (2015).

CONCLUSION

All the respondents faced the constraints like labour scarcity, unavailability of labours on time, increased wages and difficult livestock management. Local farmer's produce not fetching good prices was the constraint constraints faced by more than half of the Respondents.

Majority of the respondents suggested thatconstruction on agricultural land should be prohibited and residential

zone should not be developed on agricultural land, to construct the industries on barren land and don't use the fertile land for the same, to encourage the youths for farming, there should be some restriction on industrial construction and industrial waste , to do tree plantation on large area, to recycle the waste water from urban area and use it in agriculture and to aware the farmers about effect of urbanization on agriculture respectively.

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RESEARCH ARTICLE

Socio-Economic Profile and Source of Information Used By Sugarcane Growers

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ABSTRACT

The present study was conducted purposively in three tehsils of Kolhapur district of Western Maharashtra. From selected tehsil 120 sugarcane growers were selected on the basis of stratified proportionate random sampling method. The study revealed that, the majority of the sugarcane grower respondents were middle aged, educated up to secondary level, having small size of landholding, having low annual income, majority of them having tube well as source of irrigation, mostly having medium level of social participation. The majority of respondents had moderate level of source of information followed by medium and high level of source of information respectively.

Key words : Socio-economic profile, source of information, improved farm implement, sugarcane.

INTRODUCTION

India ranks 1st in area and IInd in production of sugarcane in the world. The area under sugarcane crop in India is 5.04 million ha and production 340.56 million tones with productivity of 67.5 tonnes (2007-08).The area under sugarcane in Kolhapur district is 94,500 ha with production 72,29,300 ton in the year 2005-06. Total cultivable area in Kolhapur district is 4,76,000ha and under sugarcane is 1,03,000 ha in the year 2008-09.Agricultural machinery and implements are rightly known as 'input of inputs' as without these inputs benefit from other inputs cannot be realized to fullest extent. Realizing the importance of Agricultural machinery and implements, efforts are being made by the State Agricultural Universities and other 2 agencies to invent and reinvent farm machineries, implements and such other mechanical devices. To ensure time and speed in farm operations, the machinery and improved farm implements are of crucial importance. Improved farm implements performs field operations speedily, efficiently, uniformly and relieving the farmers from drudgery of the physical work. The present study was undertaken with the following objectives:

1) To know the socio-economic profile of the sugarcane grower respondents and 2) To know source of information they used for utilization of improved farm implements.

MATERIAL AND METHODS

The present study was conducted in purposively three tehsils of Kolhapur district of Western Maharashtra. From selected three tehsil, 2 villages from each tehsils were selected. Then, among those 6 villages, total 120 sugarcane growers were selected on the basis of stratified proportionate random sampling method. A pre-tested structured interview schedule was used to collect the information through personal interview method. The data of qualitative form were converted into quantitative form by using score method.

FINDINGS AND DISCUSION

Table.1 Distribution of sugarcane grower respondents according to their characteristics

Sr. No.	Category	Number of respondents N=120	
		Frequency	Percentage
1.	**Age**		
i)	Young (Up to 35 years)	21	17.50
ii)	Middle (36 to 55 years)	78	65.00
iii)	Old (56 and above years)	21	17.50
	Total	**120**	**100.00**
2.	**Education**		
i)	Illiterate	1	0.83
ii)	Primary (Up to IV standard)	27	22.50
iii)	Secondary (V to X standard)	66	55.00
iv)	Higher secondary (XI and XII, diploma)	17	14.16
v)	Higher education (Graduation and Post-graduation)	9	7.50
	Total	**120**	**100.00**
3.	**Size of Land holding**		
i)	Marginal (Up to 1.00 ha)	25	20.83
ii)	Small (1.01 to 2.00 ha)	55	45.83
iii)	Medium (2.01 to 4.00 ha)	36	30.00
iv)	Large (4.01 ha and above)	4	3.33
	Total	**120**	**100.00**
4.	**Occupation**		
i)	Agriculture	3	2.50

ii)	Agriculture+Dairy	65	54.16
iii)	Agriculture+Dairy+service/business	35	29.16
iv)	Agriculture+Dairy+sheep/goat rearing	13	10.83
v)	Agriculture+Dairy+poultry	4	3.33
	Total	**120**	**100.00**
5.	**Annual income**		
i)	Low (Up to Rs. 6,86,666)	96	80.00
ii)	Medium (Rs. 6,86,666 to Rs. 12,13,332)	20	16.66
iii)	High (Rs. 12,13,333 and above)	4	3.34
	Total	**120**	**100.00**
6.	**Social participation**		
i)	Low (Up to 12)	29	24.16
ii)	Medium (Between 13 to 17)	79	65.84
iii)	Moderate (Between 18 to 21)	9	7.50
iv)	High (22 and above)	3	2.50
	Total	**120**	**100.00**
7.	**Source of Irrigation**		
i)	Tube well	36	30.00
ii)	Bore well	16	13.33
iii)	Lift irrigation	12	10.00
iv)	Co-operative irrigation society	28	23.33
v)	Tube well + Lift irrigation	16	13.33
vi)	Tube well + Co-operative irrigation	12	10.00
	Total	**120**	**100.00**

Selected characteristics of socio-economic profile of sugarcane grower respondents-

The selected characteristics of socio-economic profile of sugarcane grower respondents were studied viz., age, education, size of land holding, occupation, annual income, social participation and source of irrigation. The information and data pertaining to the characteristics are presented in table 1.

Age

Age wise categorization of the respondents showed that, about two-third (65.00 per cent) of the respondents belonged to middle age group followed by same percentage (17.50 per cent) of the respondents was from young and old age group. The finding is similar to the findings of Salunke (1994).

Education

More than one half (55.00 per cent) of the respondent had secondary

education followed by 22.50 per cent of respondents had primary education, 14.16 per cent of the respondents completed education up to higher secondary level,7.50 per cent of the respondents had higher education. Only a merge (0.83 per cent) of the respondents were illiterate.

Size of land holding

With regards to land holding 45.83 per cent of the respondents had small size of land holding while 30.00 per cent of the respondents had medium size of land holding and 20.83per cent of the respondents had marginal size of land holding. Very few (3.33 per cent) respondents had large size of landholding.

Occupation

Agriculture combined with the dairy was the main occupation of 54.16 per cent of the respondents. It was followed by 29.16 per cent had agriculture, dairy combined with business/service. 10.83 per cent of the respondents had agriculture, dairy combined with sheep/goat rearing as their main occupation. Only 3.33 per cent, 2.50 per cent of the respondent had agriculture, dairy combined with poultry and agriculture as their main occupation, respectively.

Annual income

74 Majority (80.00 per cent) of the respondents had annual income up to 6,86,666 Rs. while 16.66 per cent respondents had annual income in between 6,86,667 to12,13,332 Rs. i.e. medium level of annual income. Only few respondents (3.34 per cent) had high level of annual income i.e. Rs. 12,13,333 and above.

Source of irrigation

Tube well was the main source of irrigation of the 30.00 per cent of the respondents followed by 23.33 per cent of the respondents had co-operative irrigation society as a source of irrigation, 13.33 per cent of the respondents had bore well as source of irrigation 10.00 per cent of the respondents had lift irrigation as source of irrigation 13.33 per cent of the respondents also utilized both tube well and lift irrigation and10.00 per cent of the respondents utilized both tube well and cooperative irrigation society as a source of irrigation on their field.

Social participation

Out of the total respondents, two-third (64.84 percent) of the respondents had medium level of social participation while 24.16 per cent of the respondents had low level of social participation, 7.50 per cent of the respondents had moderate75level of social participation. Only 2.50 per cent of the respondents had high level of social participation.

Source of information used by sugarcane grower respondents regarding utilization of improved farm implement

Source of information refers to the frequency of the respondents regarding their contact with extension personnel of Government viz., Gramsevak, Agril. Assistant, Agril. Extension officer, Tehsil Agricultural officer, Scientist from Agril. universities, progressive farmers, Agril. Scientist forum, etc. and non-government agencies. Local sources, audio-visual sources like news paper, Akashwani, Doordarshan, etc. to gain latest information related to agriculture and allied field crops. Every year new crop varieties, recommendation, new improved farm implements new technologies related to agriculture and allied fields are generated by the various agencies. Adequate use of source of information helps the respondents to be in touch with innovations. The distribution of the respondents according to their extent of use of source of information is given in Table 2.

Table 2. Source of information used by sugarcane grower respondents for utilization of improved farm implements:

Sr. No.	Source of information (score)	Number of respondent N=120	
		Frequency	Percentage
i)	Low (Up to 13)	9	7.50
ii)	Medium (Between 14 to 18)	36	30.00
iii)	Moderate (Between 19 to 24)	62	51.66
iv)	High (25 and above)	13	10.83
	Total	**120**	**100.00**

More than half (51.66 per cent) of the respondents had moderate level of source of information about utilization of improved farm implements followed by 30.00 per cent of the respondents had medium level of source of information and only10.83 per cent of the respondents had high level of source of information. Only 7.50 per cent of the respondents had low level of source of information.

CONCLUSION

Majority of the sugarcane grower respondents were middle aged (65 per cent),educated up to secondary level (55 per cent), having small size of land holding, having low annual income, majority of them having tube well as source of irrigation, mostly having medium level of social participation. The

majority of respondents had moderate level of source of information (51.66 per cent) followed by medium and high level of source of information respectively.

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RESEARCH ARTICLE

Correlates of adoption of Recommended Cultivation Practices of Banana

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ABSTRACT

The present study on was undertaken in 10 villages of Telhara and Jalgaon Jamod Panchayat Samiti of Akola and Buldana district, respectively in Maharashtra State with objective to the extent of adoption of recommended cultivation practices of Banana by the growers. An exploratory design of social research was used for this study. From ten villages, 100 Banana growers were selected as respondents for the present study. The findings revealed that majority of the banana growers had medium level of adoption of recommended banana cultivation practices. As regards the relational analysis, independent variables namely age, land holding, area under banana, annual income, source of irrigation, extension contact, innovativeness and scientific orientation found to be positively significant with adoption. Whereas, occupation and experience in banana cultivation found to be negatively significant with adoption. Most of banana growers reported the inconvenient storage conditions, shortage of FYM/compost, high cost of fertilizers and high labour charges.

INTRODUCTION

Globally, banana (Musa paradisiaca) is fourth most important commodity after rice, wheat and corn. It is also known as 'Poor man fruit' due to its availability throughout the year, higher nutritive value and low market price. There are many uses of banana fruits. Immature fruits are used as vegetable. The end of the inflorescence, technically known as 'pendant' is cooked as a vegetable in Bengal. It is very good for the purification of urinary bladder and the removal of the urinary block. Ripe fruits are delicious and are used for table purpose. The core of the stem is used as curry (dish) after removing the fibrous part. It is considered to be good for stomach troubles. Banana leaves, in our place, are being used for variety purposes. The first and foremost use of these leaves is as plates for serving food on all special occasions. This is the traditional way of serving food, and we started using these

as disposable ones, much long before the modern culture of disposables. In connection with this, the leaves are in high demand in vegetable markets. This is also very nice food for live-stocks in our houses. Banana leaves are also used for packing food, especially for the packing of rice. The pieces of banana leaves are also used to bake a variety of food items in steam. Many products are made from banana viz. banana fig, banana chips, soft drinks, flour, jam etc.

Banana contributes 37.00 per cent to total fruit production in India. In respect of area it ranks second and first in production. In Maharashtra, banana is grown in 82,000 ha, with an annual production of 43,15,000 MT and productivity 52.6 MT/ha which is third highest in country. Maharashtra occupies 14% area of the country under banana cultivation, contributing 28% in production.

The study was undertaken with objective to study the extent of adoption of recommended cultivation practices of Banana by the growers and to find out relationship between the selected characteristics of banana growers with adoption about recommended cultivation practices of Banana.

MATERIAL AND METHODS

An exploratory design of social research was used for present study; it aims to find out the extent of adoption of recommended cultivation practices of banana growers. The study was purposively conducted in Telhara and Jalgaon (Jamod) Panchayat Samiti because of having higher area under banana cultivation. Ten farmers who having the area under banana cultivation were identified randomly from 10 selected villages of two districts. Thus, in all 100 respondents comprise the sample respondents for the study. The data were collected with the help of pre designed interview schedule by contacting the sample banana growers personally.

RESULTS AND DISCUSSION

I. Distribution of Banana growers according to their practice-wise adoption of recommended cultivation practices of Banana

The data pertaining to practice wise adoption of recommended cultivation practices of banana by the respondents is depicted in Table 1.

Table 1. Practice wise adoption of recommended cultivation practices of Banana by the respondents

Sl. No	Banana cultivation practices	Full adoption		Partial		No adoption	
		Freq.	%	Freq.	%	Freq.	%
1	Soil type	90	90	--	--	10	10
2	Varieties (Basrai/ Ardhapuri / G-9/ Shrimanti/ Robusta)	63	63	3	3	34	34
3	Size of suckers or rhizomes should be 500 to 750 gm	61	61	13	13	26	26
4	Quantity of suckers (4444 suckers/ha)	53	53	19	19	28	28
5	Selection of tissue culture (age 1/2/3 yrs)	25	25	01	01	74	74
6	Quantity of tissue culture (3630 plants /ha)	24	24	01	01	75	75
7	Time of planting	15	15	68	68	17	17
8	Method of planting (Ridge and Furrow/pit/ Trench)	60	60	25	25	15	15
9	a) Spacing (1.5×1.5 m)	70	70	22	22	8	8
	b) High density planting	--	--	--	--	100	100
10	Organic sources (50-60 t/ha) compost/ poultry/ vermicompost.	44	44	48	48	8	8
11	a) Recommended fertilizer doses	18	18	49	49	33	33
	b) Fertigation	27	27	51	51	22	22
12	Irrigation requirement (kharif-15/ Winter – 9 to10/summer 4days)	50	50	37	37	13	13
13	Method of irrigation (Flooding/Double ring/Drip)	50	50	29	29	21	21
14	Intercultural operations :						
a	Mulching grass/polythene/banana)	09	09	45	45	46	46
b	Weeding (hand/chemical/hoeing)	66	66	22	22	12	12
c	Earthing up	77	77	16	16	07	07
d	Propping	--	--	5	5	95	95
e	Trashing	02	02	60	60	38	38
f	Wrapping	--	--	28	28	72	72
g	Mattocking	01	01	32	32	67	67
h	Desuckring	34	34	46	46	20	20
15	Control measure for pest	40	40	36	36	24	24
16	Control measure for diseases	33	33	47	47	20	20
17	Wind break	14	14	64	64	22	22

18	Harvesting	62	62	36	36	2	2
19	Production of banana	07	07	40	40	53	53

It is depicted from Table 1 that 90.00 per cent banana growers had grown banana in recommended soil type whereas 77.00 per cent banana growers had fully adopted earthing up. Majority of banana growers (70.00%) had fully adopted recommended spacing between two rows should be 1.5 × 1.5 m. About 63.00 per cent of banana growers had fully adopted recommended variety. About 61.00 per cent of banana growers had fully adopted suckers/ rhizomes with 500 to 750 gm of weight. It is clear from Table 1 that, 53.00 per cent of banana growers had fully adopted the plants per hectare which should be 4444.Fifty per cent of banana growers had fully adopted irrigation requirement as per schedule. Table 1 indicates that 40.00 per cent of banana growers had fully adopted control measure of pest.It is observed that 64.00 per cent of banana growers had partially adopted wind break. Further it is indicated that about 51.00 per cent of banana growers had partially adopted fertigation in banana cultivation. It is clear from Table 1 that 49.00 per cent of the banana growers had partially adopted the practice of application of recommended dose of chemical fertilizer at the time of planting per ha NPK 100:200:100/plant. It is noticed that 46.00 per cent of banana growers had partially adopted de-suckering practice in banana cultivation.

II. Relational analysis :

Relationship between selected characteristics of the banana growers with their adoption about recommended cultivation practices in banana

The correlation coefficient of adoption with personal and socio economic, situational, psychological and communication variables of the banana growers has been depicted in Table 2.

Table 2. Relationship between selected characteristics of banana growers with their adoption about recommended cultivation practices in banana

Sl. No.	Independent variables	'r' value of adoption
1	Age	0.308**
2	Education	0.110
3	Land holding	0.291**
4	Area under banana	0.403**
5	Occupation	-0.213*

6	Annual Income	0.368**
7	Source of irrigation	0.196*
8	Extension contact	0.310**
9	Experience in banana cultivation	-0.195*
10	Innovativeness	0.207*
11	Scientific orientation	0.205*
12	Social participation	-0.117

** Significant at 0.01 level of probability * Significant at 0.05 per cent level of probability

As per data in Table 2 indicated that the results of correlation coefficient (r) showed that the independent variables namely age, land holding, area under banana, annual income and extension contact of banana growers were positively and significantly correlated with adoption at 0.01 level of probability whereas, sources of irrigation, innovativeness and scientific orientation significantly correlated with adoption at 0.05 level of probability occupation and experience in banana cultivation were found negative but significantly correlated with adoption while age and social participation could not established any relationship with the level of adoption of recommended cultivation practices in banana.

Similar findings were reported by Jambhale (2007), Nemade (2007) Atar (2012) that age, land holding, area under banana, annual income, extension contact and scientific orientation, significantly related with adoption. Anonymous (2006) reported that source of irrigation significantly correlated with adoption. Chandurkar (2015) reported that education non significantly correlated with adoption.

CONCLUSION

The findings revealed that majority of banana growers belonged to middle age group were educated up to secondary school level, possessed semi-medium size land holding. Majority of them had high school and college level education, agriculture is the main occupation of banana growers (72.00 %) and majority of banana growers annual income found above Rs. 3,00,000/- per year. They used tube well as a source of irrigation. Majority of the banana growers were having medium level of experience i.e. 6 -10 years, having medium extension contact, innovativeness, scientific orientation and social participation. It was observed that the majority of the banana growers had medium level of adoption of recommended banana cultivation practices.

As regards the relational analysis, independent variables namely age, land holding, area under banana, annual income and extension contact of banana growers were positively and significantly correlated with adoption at 0.01 level of probability whereas, sources of irrigation, innovativeness and scientific orientation significantly correlated with adoption at 0.05 level of probability occupation, and experience in banana cultivation were found negative but significantly correlated with adoption while age and social participation could not established any relationship with the level of adoption of recommended cultivation practices in banana.

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RESEARCH ARTICLE

Technological Gap in Maize Cultivation in Buldana District

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ABSTRACT

The study entitled "Technological gap in Maize Cultivation in Buldana district." was purposively conducted in Buldana district of Vidarbha Region. Data from the maize growers were collected by personally interviewing with the help of pretested and well structured interview schedule and data was subjected to appropriate statistical analysis.

Majority of maize growers observed in medium level of technological gap in maize cultivation. The partial technological gap was observed in case of practices seed rate and seed treatment (46.67%), inter cultivation (51.67%), water management (50.83%) and fertilizer application (47.50%) high technological gap found in the practices recommended varieties (55.83%), plant protection (69.17%). Low technological gap was noticed in land preparation, harvesting and threshing.

Key words: Technological, gap, maize

INTRODUCTION

In India, the majority of the population depends on vegetarian diet. The maize crop has a great importance in many state of India. Maize offers a good source of energy. Over 85 per cent of the maize produced in the country is consumed as human food that is in the form of roti, roasted ears, pop corn etc. It is important constituent of animal feed, particularly poultry feed. Maize is used as food crop by rural people in the form of bread and gruel. Maize grains contain about 72 per cent starch, 10 per cent protein, 4.8 per cent oil, 5.8 per cent fiber, 3.0 per cent sugar, and 17 per cent ash. It is a source of raw material for industry, where it is being extensively used for the preparation of corn starch, corn oil dextrose, corn syrup, corn flakes, cosmetics, wax, alcohol and tanning material for leather industry. Maharashtra is one of the important cereal crops growing state in India. In Maharashtra maize was grown on an average area of 0.84 million ha having the production of 1.82 million tones and yield 2167 kg/ha respectively.

Maize is one of the most versatile crops in nature, which can be grown over a wide range of climatic conditions and has acquired a dominant role in the farming sector. Maize is warm weather loving crop and it can be successfully grown in the area receiving an annual rainfall of 60 cm with well distributed throughout its growing period. In Maharashtra, the maize cultivation is getting importance as it is being considered a crop for replacing the cereal like *kharif* sorghum, pearl millet and ragi. Similarly there is an increased demand from industries for processing maize, as a result, farmers are getting increased price than the previous years.

In Vidarbha out of 11 districts the larger area under maize cultivation is observed in Buldana district, there is 74400 hectare area under maize crop (Anonymous, 2013). In the year 2013-14 (kharif) the State Government started a "Maize Development Programme" in 12 districts of the State, in which Buldana district is included out of 11th districts of Vidarbha (Agro-one, 2013).

Objectives

1. To study the personal, socio-economic, psychological characteristics of maize growers.
2. To study the extent of technological gap between recommended and actual adopted maize cultivation practices by the maize growers.

METHODOLOGY

This study was conducted in purposively selected Buldana district in Vidarbha Region of Maharashtra State, being maximum area under maize crop cultivation (74400 hectares) among the eleven districts of Vidarbha region. An exploratory research design of social research was used for the present investigation

From the selected twelve villages, 10 maize growers from each village were selected with the help of equal random sampling method. In total 120 respondents were selected for the present study.

RESULTS AND DISCUSSION

The age wise distribution of the respondents presented in Table 1 shows that higher proportion of maize growers (41.67%) were appeared in the middle age group of 36 to 50 years. It is evident from Table 1 that, 40.83 per cent of the respondents were educated up to high school level. Land holding structure when critically seen in Table 1, It is observed that higher proportion of the respondents (41.67%) belonged to small category of land holding having land in between 1.01 to 2.00 ha. It is

seen from Table 1, that majority of the respondents (52.50%) belonged to category agriculture (farming) as main occupation. The family size wise distribution of the respondents presented in table 1, Shows that the 76.67 per cent of the respondents belonged to medium size of family having 4 to 6 members in their family,

Table 1. Personal, socio-economic, situational and psychological characteristics of the beneficiary and non-beneficiary maize growers

Sl. No	Characteristics	Category	Respondents (n=120)	
			Number	Percentage
1	**Age**	Young	39	32.50
		Middle	50	41.67
		Old	31	25.83
2	**Education**	Illiterate (Can't read and write)	00	00.00
		Primary school (1 to 4th std.)	06	05.00
		Middle school (5 to 7th std.)	09	07.50
		High school (8 to 10th std.)	49	40.83
		Higher secondary school (11 to 12th std.)	26	21.67
		College	30	25.00
3	**Land holding**	Marginal (up to 1.00)	11	09.17
		Small (1.01 to 2.00)	50	41.67
		Semi-medium (2.01 to 4.00)	36	30.00
		Medium (4.01 to 10.00)	23	19.16
		Large (Above 10.00 ha.)	00	00.00
4	**Occupation**	Agriculture + Labour	18	15.00
		Agriculture(farming)	63	52.50
		Agriculture + allied occupation (goatfaring/poultry/apiculture/sericulture)	17	14.17
		Agriculture + business	10	08.33
		Agriculture + service	12	10.00
5	**Family size**	Small	03	02.50
		Medium	92	76.67
		Large	25	20.83

6	**Area under maize cultivation**	Small (up to 1.00)	41	34.17
		Medium (1.01 to 2.00)	68	56.66
		High (above 2.00)	11	09.17
7	**Experience in maize cultivation**	Low	40	33.33
		Medium	76	63.34
		High	04	03.33
8	**Sources of irrigation**	No Source	00	00.00
		River	27	22.50
		Well/Tube well	89	74.17
		Canal	03	02.50
		Farm Ponds	01	00.83
9	**Annual income**	Up to Rs. 1,00,000/-	88	73.33
		Rs.1,00,001 to 2,00,000/-	03	02.50
		Above 2,00,000/-	29	24.17
10	**Sources of information**	Low (up to 13)	77	64.16
		Medium (13-26)	32	26.67
		High (above 26)	11	09.17
11	**Economic motivation**	Low (up to 10)	00	00.00
		Medium (11-20)	15	12.50
		High (above 20)	105	87.50
12	**Innovativeness**	Low (up to 6)	01	00.83
		Medium (7-12)	80	66.67
		High (above 12)	39	32.50
13	**Knowledge**	Low	10	08.33
		Medium	56	46.67
		High	54	45.00

It is revealed from Table 1, that majority of the respondents (56.66%) had put the area under maize crop ranged between 1.01 to 2.00 ha. From Table 1, it was apparent that most of the respondents (63.34%) had experience of 11 to 20 years in maize cultivation. It could be noticed from the Table 1, that higher per cent of the respondent

farmers (74.17%) had well/tube well as a source of irrigation,

From the distribution of the respondents according to annual income in Table 1, it may be noted that great majority of the respondents (73.33 %) had annual income up to Rs.100000/-,.It is seen from the data presented in Table 1, that more than half (66.67%) of the maize growers included in the category of medium innovativeness

The knowledge possessed by the maize growers indicated in Table 1, that, majority of the respondents 46.67 per cent were having medium level of knowledge of maize cultivation,

Practice wise extent of technological gap in recommended maize cultivation practices

The technological gap of various practices connected maize growing by maize growers was further ascertained practice wise and the same have been reported in Table 2.

In case of recommended practices of maize, It was observed that considerable higher percentage of maize growers 75.83 per cent were observed in low technological gap category in land preparation practice and only 24.17 per cent maize growers were observed in medium technological gap about land preparation and none of the maize growers were observed in category of high technological gap. With regards to recommended varieties of maize, it was found that majority of the maize growers 55.83 per cent were observed in high technological gap where as 47.17 per cent of the maize growers were observed in low technological gap and none of maize growers observed in category of medium technological gap.

Table 2. Distribution of maize growers according to practice wise extent of technological gap in recommended maize cultivation practices

Sl. No.	Recommended practices of maize	Technological gap (n=120))					
		Low		Medium		High	
		Freq.	%	Freq.	%	Freq.	%
1	Land preparation	91	75.83	29	24.17	00	00.00
2	Recommended varieties	53	44.17	00	00.00	67	55.83
3	Seed rate and seed treatment	13	10.83	56	46.67	51	42.50
4	Sowing	54	45.00	37	30.83	29	24.17
5	Intercultural practices	28	23.33	62	51.67	30	25.00
6	Water management	20	16.67	61	50.83	39	32.50

7	Intercropping	09	07.50	50	91.67	61	50.83
8	Fertilizer application	14	11.67	57	47.50	49	40.83
9	Plant protection	11	09.16	26	21.67	83	69.17
10	Harvesting and threshing	87	72.50	09	07.50	24	20.00

In case of seed rate and seed treatment it was found that 46.67 per cent of respondents were observed in medium technological gap category and 42.50 per cent of the respondents were found in high technological gap category and only 10.83 per cent of the respondent was observed in low technological gap category. In the practice of sowing, it was found that majority of the maize growers 45.00 were observed in low technological gap category, 30.83 per cent of the respondents observed in medium level technological gap category and 24.17 per cent were observed in high technological gap category.

In case of intercultural practices, 51.67 per cent of the respondents were observed in medium level technological gap in intercultural practices, it was followed by 25.00 per cent respondents who observed in high level technological gap category and 23.33 per cent respondents were observed in low technological gap category.

As regards technological gap about water management for maize 50.83 per cent of the respondents were observed in medium level technological gap category, 32.50 per cent respondents were observed in high level technological gap category and 16.67 per cent respondents were observed in low level technological gap category.

In case of intercropping, 50.83 per cent of the respondents were observed in high level technological gap category, it was followed by 41.67 per cent respondents were observed in medium level technological gap category and 07.50 per cent respondents were observed in low level technological gap category. The technological gap in fertilizer application, 47.50 per cent respondents were observed in medium level of technological gap, 40.83 per cent respondents were observed in high level of technological gap category and 11.67 per cent respondents were observed in low level technological gap category.

With regards to technological gap about plant protection, it was observed that about 69.17 per cent of respondents were observed in high technological gap, 21.67 per cent of the maize growers were observed in medium level

technological gap category, and 09.16 per cent maize growers were observed in low level technological gap category.

It is surprising to note that, in case of harvesting 72.50 per cent of the maize growers observed in low technological gap category, 20.00 per cent of the maize growers were found ins high category of technological gap and 07.50 per cent respondents were observed in medium level technological gap category. It has quite logical that due to cultivation of maize from generation to generation, farmers had well experience in identifying the maturity stage of maize leads to harvesting and threshing at proper time.

The present findings, wide gap in plant protection measures, and low gap in harvesting and threshing did get support from the observations of Raut (2014).

Extent of technological gap index

The effort have been made to find out distribution of the maize growers based on their level of existing technological gap between recommended and actual adoption of improved cultivation practices by the maize growers and presented as below-

Table 3 Distribution of maize growers according to technological gap index

Sl. No.	Technological gap level	Respondents (n=120)	
		Number	Percentage
1.	Low	12	10.00
2.	Medium	85	70.83
3.	High	23	19.17
	Total	**120**	**100.00**

It is evident of data in Table 3 that, 70.83 per cent of maize growers were observed under medium level category of technological gap in adoption of recommended maize cultivation practices, followed by 19.17 per cent of maize growers were observed in high level of technological gap and 10.00 per cent of maize growers were found in low level category of technological gap. Similar result was reported by Badodia *et al.* (2002) and Nirwan (2014).

CONCLUSION

In overall low, technological gap was found in land preparation, sowing, harvesting and threshing of maize. Furthermore high technological gap found in the practices recommended varieties (55.83%), plant protection (69.17%). While medium technological

gap found in the practices seed rate and seed treatment (46.67%), intercultural practices (51.67%), water management (50.83%) and fertilizer application (47.50%).

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RESEARCH ARTICLE

Comparative Study of Users and Non-Users of Drip Irrigation System by Banana Growers

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ABSTRACT

The drip irrigation technology is proved to be superior to traditional methods of irrigation due to its precise application of water to the root zone of the crop in a controlled manner. The present study was conducted in Raver and Chopda tahsil of Jalgaon district. Out of the banana growing villages, 6 villages (3 from each tahsil) were selected on the basis of prominent area under drip irrigation. A majority of the users of drip irrigation system were from young age group, educated, having medium size of family, high level of annual income, moderate level of experience in banana cultivation, moderate level of experience of drip irrigation, medium level of social participation, medium level of risk orientation, medium sources of information, medium sized area under drip and area under orchard. There are many advantages of drip irrigation technology over other methods. It helps in minimizing the water losses due to percolation and evaporation. It is also possible to save labour charges. Moreover, the efficiency of water and fertilizer can be increased. Due to this system, the land leveling is not essential and at the same time cultural operations could be carried out easily. The major suggestions endorsed by users were electricity supply should be regular, cost of drip irrigation system should be minimize, loan should be available in time and suggestions by users were government should increase subsidy on drip irrigation system and practicals should be arranged from distributors and co-operative societies.

INTRODUCTION

The irrigated farming is not feasible in major parts of the states due to inadequate irrigation facilities. Hence, efficient utilization of irrigation water by precise method such as drip and sprinkler methods need to be applied. Drip irrigation system is defined as the application of small and precisely predetermined amount of water near the root zone of the plant at frequent intervals through emitting devices. The last decade registered the momentum in the growth of

the drip irrigation in India. The technology of drip irrigation is becoming increasingly popular in regions of the water scarcity where the available water is not sufficient to irrigate command area by irrigation. The banana cultivators from Jalgaon district are generally considered to have changed for the better in respect of their agricultural business, which they have developed to a surprisingly high level by adopting new agricultural technology of banana cultivation. Banana crop comes with the use of sophisticated irrigation technology among which drip irrigation is very popular. Since water is deciding factor for crop yield selected blocks of tahsils comes under scarcity area of water, water saving technologies like drip irrigation plays crucial role therein. Though most of the banana cultivators of these blocks use drip irrigation system, some factors induce temporary or continued rejection of use of drip irrigation system. This may divide banana cultivators in two categories, one using drip irrigation system on continued basis (users) and those who have adopted but now discontinued its use temporarily or permanently (non-users) for one or some other problems/reasons. This **'non-user'** factor is the theme of proposed study. The findings of the study will be useful for continuing the use of drip system for banana crop, especially to the farmers who discontinued due to several problems.

METHODOLOGY

Raver and Chopda tahsils of Jalgaon districts were selected for the study purpose. These tahsils situated in Jalgaon district of Maharashtra state Raver and Chopda tahsils are famous for banana production. Thus in all total 120 banana growers were selected randomly from Raver and Chopda tahsils of Jalgaon district. The structured interview schedule serve as a tool for collection of data. The researcher personally interviewed the respondents included in the sample. The information collected through interview was processed into primary table and then into the secondary tables. The qualitative data were quantified and later the quantified data were converted into frequency, percentages, wherever necessary the scoring was also done. Further the coefficient of correlation was worked out and inferences were drawn.

RESULT AND DISCUSSION

Table. 1 : Comparison between users and non-users of drip irrigation system by banana orchard using student t-test

Sr. No.	Variables	Users	Non-users	t statistics
1.	Age	39.933	41.343	1.003NS
2.	Education	10.567	8.433	2.386*
3.	Experience of banana cultivation	17.067	14.217	1.653NS
4.	Drip irrigation experience	8.333	6.583	2.014*
5.	Area under orchard	1.868	1.033	3.682**
6.	Area under drip	1.635	0.628	5.424**
7.	Risk orientation	10.767	8.25	4.315**
8.	Information sources	26.783	21.967	3.662**
9.	Family size	5.233	6.467	4.157**
10.	Annual Income	280906.8	184636.7	6.496**
11.	Income from banana orchard.	246335	184636.7	3.896**
12.	Social participation	14.767	12.333	2.39*
13.	Knowledge	26.367	21.517	4.606**

*** Significant at 5 per cent level** **** Significant at 1 per cent level**

It could be seen from table 1 that among twelve variables selected for the study 11 variables were observed to be significant during the comparison between users and non-users of drip irrigation system at one percent level. Those were; education, experience in drip irrigation, family size, annual income, income from banana orchard, risk orientation, social participation, sources of information, area under drip and area under orchard with knowledge.

Table. 2 : Suggestions made by the respondents to overcome their problems in the use drip irrigation system by banana orchard

Sr. No.	Suggestions	Respondents	
		Number	Percent
B. Users (N=60)			
1	Loan should be available in time.	52	86.66
2	Cost of drip irrigation system should be minimum	53	88.33
3	Electricity supply should be regular.	56	93.33
B. Non-users (N=60)			
1	Distributor or seller should give regular guidance and	32	53.33

	services after selling of the product.		
2	Accessories of drip irrigation system should be easily available to farmers.	33	55.00
3	Government should increase subsidy for drip irrigation system.	54	90.00
4	Training is necessary for increasing technological knowledge and skill for using drip irrigation system.	42	70.00
5	Practical's should be arranged from distributors and co-operative societies.	47	78.33
6	Water availability should be sufficient.	44	73.33

The data from table 2 depicts that, a majority of the users of drip irrigation system endorsed suggestions like; electricity supply should be regular (93.33 per cent) and drip irrigation system should be available at minimum rate (88.33 per cent). Loan should be available in time (86.66 per cent) was the third suggestion.

CONCLUSION

A majority of the users of drip irrigation system were from young age group, educated, having medium size of family, high level of annual income, moderate level of experience in banana cultivation, moderate level of experience of drip irrigation, medium level of social participation, medium level of risk orientation, medium sources of information, medium size area under drip and area under orchard. On the other hand; a majority of the non-users of the drip irrigation system were from middle age group, educated, having medium size of family, medium level of annual income, medium level of income from banana orchard, moderate experience in banana cultivation, moderate experience in drip irrigation, medium level of social participation, low level of risk orientation, medium sources of information, low size area under drip and very small area under orchard. A large number of users had medium level knowledge, while a large number of non-users had low level of knowledge.

Comparison between users and non-users using student t-test

It can be concluded that users of drip irrigation system are superior in case of education, experience in drip irrigation, family size, annual income, income from banana orchard, risk orientation, social participation, sources of information, area under drip and area under orchard and knowledge than the non-users. Age of the non-users is higher than users.

RECOMMENDATION

It is suggested that, problems in drip for banana crop need to be taken care of by extension workers on intensive basis, particularly, through trainings, demonstrations and providing relative information to improve their knowledge. Majority of the non-user farmers suggested that government should increase the subsidy for drip irrigation system, so it is suggested that, there is need to increase the subsidy for drip irrigation system. Majority of the respondents are facing the problem of time consuming loan procedure. It is implicated that, loan procedure should be simplified.

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RESEARCH ARTICLE

Dairy Farmer's Attitude towards the E-Agriservice: A Methodological Approach

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ABSTRACT

Information and Communication Technology (ICT) is being playing significant role in extension delivery system. Here, attempt has been made to study ICT based e-Agriservice i.e. aAQUA (Almost All Questions Answered). It caters the agriculture & allied sectors needs of the farmers at their doorstep by bridging information and service gap of rural India. Attitude plays an important role in evaluation of these innovations. Therefore, the paper presents methodological approach to develop the attitude scale to measure the farmer's attitude towards aAQUA e-Agriservice based on Likert's technique and standardized the same. A list of 54 statements indicating the attitude was prepared and sent to the 60 judges for rating on three point's continuum. The 't' values for each statements was find out and 22 statements (12 positive and 10 negative) were retained in the final scale. The reliability ($\alpha = 0.91$) and validity of the scale indicates its precision and consistency of the results. The study would be useful for researchers and academician to develop and use the attitude scale for evaluation of other ICT projects.

Key words: ICT; aAQUA e-Agriservice; Attitude scale; Likert scaling technique.

INTRODUCTION

Agricultural extension has been recognized as an essential mechanism for delivering knowledge (information) and advices to the farming community. Present day agriculture and Indian farming community is facing a multitude of problems to maximize crop and livestock productivity. Despite different approaches and successful technological application, the majority of farmers are not getting basic services due to several reasons. One of them is the lack of getting timely information (Saravanan, 2010). For this, extension agency plays a major role in bridging this gap, to make available the latest technologies at the door step of the farmers. With advent of modern

communication tools such as ICTs, are being acts as catalyzing agent to bridge this gap (Sulaiman, 2012). Presently various forces are at work to change scenario of agricultural extension research system from the traditional approaches to process of technology transfer via modern approaches for facilitating a wide range of demand driven, pluralistic and decentralized extension. Therefore, it is vital to harness ICTs potential to improve farming community. There was no scale available to measure farmers' attitude towards ICTs based e-Agriservice. Therefore, the present study was contemplated to develop and standardize a scale for measuring the dairy farmers' attitude towards the ICT based e-Agriservice, which can contribute to inform scientific and policy discussions on ICT based extension delivery system. This was the part of doctoral research on "Impact assessment and sustainability of the e-Agriservice for dairy farmers of Maharashtra" conducted during 2013-14 academic year.

METHODOLOGY

Attitude is an organized predisposition to think, feel, perceive and behave towards a cognitive object. *A*ttitude is the degree of positive or negative effect associated with some psychological object. Attitude in this study was operationalized as the degree of positive or negative feeling of farmers towards the aAQUA e-Agriservice. Understanding the processes of human attitude is crucial to understanding behaviour. The method of summated rating suggested by *Likert (1932)* and *Edwards (1969)* was followed in the development of scale. Saha & Bahal (2012) and Paul *et al.,* (2013) also used the summated rating scale to develop the success in livelihood diversification and quality orientation of agricultural scientist respectively.

Collection of Statements: The first step in the construction of attitude scale is to collect statements related to the farmers feeling towards the ICT based e-Agriservices. The list of 60 statements was prepared based on informal discussion with the extension workers, ICT experts, and also reviewed secondary sources. It could be a negative or a positive statement towards that issue.

Editing of Statements: The prepared statements were edited as per 14 informal criteria suggested by *Edwards (1969)* and as a result six statements were eliminated. Finally, 54 positive and negative (63:37 %) statements were retained and considered for judge's rating.

Response to Raw Statements: The Performa containing 54 raw statements on three point continuums i.e. Agree, Uncertain and Disagree were sent by post, through e-mail and also handed over personally to the total 50 judges. These judges were experts in the field of extension education, economics, computer application, field extension workers and progressive farmers. The judges were requested to indicate their response by tick mark in suitable continuum in front of each statement. Also the judges were requested to make necessary modifications and additions or deletions, if they desired so. Out of 50 judges 40 judges had returned the same set of statements after duly recording their judgements in a stipulated span of 2 months. These responses were considered for the item analysis.

Item Analysis: It is an important step while constructing valid and reliable scale. The judges were asked to indicate their degree of agreement or disagreement on each statement with three point continuums 'Agree', 'Uncertain' and 'Disagree' with scoring 3, 2, and 1, respectively for positive statements and vice-versa for negative statements. The total individual score of judges was calculated by summing up the response score of each statement given by individual judge.

Calculation of't' values: Based upon the total individual scores, the judges were arranged in descending order. The top 25 per cent of judges with their total individual scores were considered as high group and the bottom 25 per cent as the low group so that these two groups provided criterion groups in terms of which to evaluate the individual statements. Thus, out of 40 judges to whom the statements were administered for the item analysis, 10 judges from each with highest and lowest scores were used to evaluate the individual statement. The critical ratio, that is the't' value which is a measure of the extent to which a given statement differentiates between the high and low groups of the respondents for each statement was calculated by using the formula given by *Edwards (1957)*.

$$t = \frac{\bar{X}_H - \bar{X}_L}{\sqrt{\frac{\sum(X_H - \bar{X}_H)^2 + \sum(X_L - \bar{X}_L)^2}{n(n-1)}}}$$

$$\sum (X_H - \bar{X}_H)^2 = \sum X_H^2 - \frac{(\sum X_H)^2}{n}$$

$$\sum (X_L - \bar{X}_L)^2 = \sum X_L^2 - \frac{(\sum X_L)^2}{n}$$

Where,

$\bar{X}_H$ = The mean score on a given statement for the high group

$\bar{X}_L$ = The mean score on a given statement for the low group

$\sum X_H^2$ = Sum of squares of the individual score on a given statement for high group

$\sum X_L^2$ = Sum of squares of the individual score on a given statement for low group

$\sum X_H$ = Summation of scores on given statement for high group

$\sum X_L$ = Summation of scores on given statement for low group

n = Number of judges in low and high groups

t = The extent to which a given statement differentiate between the high and low groups

An example to calculate mean score of each statement for measuring the extent to which a given statement differentiates between the high and low groups of the respondents by using Likert Technique is given below.

Table. 1: The example to find out 't' value

Statement	Response Category	Highest				Lowest			
		X	*f*	*fX*	fX^2	*X*	*f*	*fX*	fX^2
The e-Agriservice provides answers to the farmers' queries within time	Agree	3	8	24	72	3	3	9	27
	Uncertain	2	2	4	8	2	7	14	28
	Disagree	1	0	0	0	1	0	0	0
			10	28	80		10	23	55
			nH	$\sum XH$	$\sum XH^2$		*nL*	$\sum XL$	$\sum XL^2$

$$\bar{X}_L = \frac{\sum X_L}{n_L} = \frac{23}{10} = 2.3 \qquad \bar{X}_H = \frac{\sum X_H}{n_H} = \frac{28}{10} = 2.8$$

$$\sum (X_L - \bar{X}_L)^2 = \sum X_L^2 - \frac{(\sum X_L)^2}{n} = 55 - \frac{(23)^2}{10} = 2.1$$

$$\sum (X_H - \bar{X}_H)^2 = \sum X_H^2 - \frac{(\sum X_H)^2}{n} = 80 - \frac{(28)^2}{10} = 1.6$$

$$t = \frac{\bar{X}_H - \bar{X}_L}{\sqrt{\frac{\Sigma(X_H - \bar{X}_H)^2 + \Sigma(X_L - \bar{X}_L)^2}{n(n-1)}}} = \frac{2.8 - 2.3}{\sqrt{\frac{1.6 + 2.1}{10(10-1)}}} = \frac{0.50}{0.20} = 2.5$$

In same manner the mean score of other statements were worked out for the high and low. If the two mean scores of a statement are close to each other, it implies that the statement is not able to discriminate well between persons holding different attitudes, and you can safely reject those statements. Retain only those statements where the mean score for the high group and that for the low group are distinct from each other. Reject the other statements.

A rule of thumb is to reject items with critical ratio less than 1.75. Higher the 't' value, better the statement in terms of its showing the attitude of the people. From Table 2 the statements having 't' value more than 1.75 were retained. Thus selected 22 (12 positive and 10 negative) statements were included in the final scale as shown in Table 2.

Table 2: A list o f selected statements with their respective 't' values.

Sl. No.	Statements	t value
1	The e-Agriservice empowers me to have control over works.	3.59
2	The e-Agriservice improves efficiency of experts and extension workers in reaching a large number of farmers with less effort.	3.21
3	It enhances users effectiveness about dairy farming	2.69
4*	The services provided by the e-Agriservice are not realistic and worthwhile.	2.59
5*	The e-Agriservice is more of propaganda & less usage for dairy farmers.	2.30
6*	I could have contacted other source for dairy related queries.	2.30
7	The aAQUA e-Agriservice is alternative to the present dairy extension system.	1.80
8*	The e-Agriservice does not improve the knowledge regarding different aspects of dairy farming.	1.76
9	It is not just the agro-advisory service but also develop my capability in dairy farming.	3.64
10*	The e-Agriservice cannot meet location specific needs of the farmers	3.25
11	It provides answers to the farmers' queries within time.	2.47
12*	Availing the e-Agriservice facility is a time consuming activity.	2.40
13	The service provider helps to retain and attract new users with the efficient mobilization of its activities.	2.40

14*	The internet unavailability obstructs the access and utilization of the e-Agriservice by the farmers.	2.09
15*	The techno savvy people can benefit more from the aAQUA e-Agriservice.	4.43
16	It helps to generate employment opportunities among farming community.	3.28
17	The e-Agriservice helps to develop self-reliance among farming community.	3.17
18*	The aAQUA e-Agriservice should be stopped.	3.15
19	It aids to increase income which leads to enhance standard of living	2.68
20*	The aAQUA e-Agriservice alone would solve the problems of farmers.	2.09
21	It is the best means to collect information on market prices of agricultural and non-agricultural products.	1.90
22	The weather services provided by the e-Agriservice are satisfactory.	1.76

* Negative Statement

Standardisation of the Scale:

The validity and reliability was ascertained for standardisation of the scale. The reliability and validity was measured by split half method and content validity, respectively.

Reliability of the Scale:

A scale is reliable when it gives consistently the same results when applied to the same sample. In present study, Cronbach's alpha coefficient of reliability test was measured. Thus, final set of the 22 statements was administered on five point continuum to a group of 40 users of the aAQUA e-Agriservice from non-sample area and which was not included in the actual sample size of study. The total individual score of each user was calculated by summing up the responses given to all the statements and total item variance was calculated by summing up of all users responses to the particular item. The Cronbach's alpha coefficient of reliability was measured with following formula:

$$\alpha = \frac{K}{K-1}\left(1 - \frac{\sum_{i=1}^{K} \sigma^2 y_i}{\sigma^2 x}\right)$$

Where,

α = Cronbach alpha reliability coefficient

K = Number of items

$\sigma^2 y_i$ = The variance of item *i* for the current sample of persons

$\sigma^2 y_i$ = The variance of the observed total test scores

The statistics of respondents were calculated, which includes the mean of users score (45.80), variance of score ($\sigma^2 x$) 92.27 and sum of item variance ($\sigma^2 y_i$) 12.15. The Cronbach's alpha was found to be excellent 0.910, which is very high and indicates strong internal consistency among the 22 items.

Validity of the Scale*:*

It is the property that ensures the obtained test score as valid, if it measure what it is supposed to measure. The content validity of the scale was tested by experts' judgement. The content validity is the representative or sampling adequacy of the content, the substance, the matter and the topics of a measuring instrument. This method was used in the present scale to determine the content validity of the scale. The content of the attitude scale was thoroughly covered through literature scan and experts opinion. The statements had at least 80 per cent judges' agreement were retained. This indicated validity of the scale content. As the scale value difference for almost all the statements included had discriminating values, it seemed reasonable to accept the scale as valid measure of the desired dimension.

RESULTS AND DISCUSSION

The final scale consisting of 22 (Table 3) statements can be administered to the aAQUA users on a five continuums viz., Strongly Agree (SA), Agree (A), Uncertain (UC) and Disagree (DA), Strongly Disagree (SDA) with a score of 5, 4, 3, 2 and 1, respectively for positive statements and reverse scoring system for negative statements. The overall possible minimum to maximum score ranges from 22 to 110. The high score will indicate that respondent have positive and significant attitude towards the aAQUA e-Agriservice.

Table 3: Standardized scale to measure the dairy farmer's attitude towards the e-Agri service.

Sl. No.	Statements	SA	A	UC	DA	SDA
1	The e-Agriservice empowers me to have control over works.					
2	The e-Agriservice improves efficiency of experts and extension workers in reaching a large number of farmers with less effort.					
3	It enhances users' effectiveness about dairy farming.					

4*	The services provided by the e-Agriservice are not realistic and worthwhile.					
5*	The e-Agriservice is more of propaganda & less usage for dairy farmers.					
6*	I could have contacted other source for dairy related queries.					
7	The aAQUA e-Agriservice is alternative to the present dairy extension system.					
8*	The e-Agriservice does not improve the knowledge regarding different aspects of dairy farming.					
9	It is not just the agro-advisory service but also develop my capability in dairy farming.					
10*	The e-Agriservice cannot meet location specific needs of the farmers					
11	It provides answers to the farmers' queries within time.					
12*	Availing the e-Agriservice facility is a time consuming activity.					
13	The service provider helps to retain and attract new users with the efficient mobilization of its activities.					
14*	The internet unavailability obstructs the access and utilization of the e-Agriservice by the farmers.					
15*	The techno savvy people can benefit more from the aAQUA e-Agriservice.					
16	It helps to generate employment opportunities among farming community.					
17	The e-Agriservice helps to develop self-reliance among farming community.					
18*	The aAQUA e-Agriservice should be stopped.					
19	It aids to increase income which leads to enhance standard of living.					
20*	The aAQUA e-Agriservice alone would solve the problems of farmers.					
21	It is the best means to collect information on market prices of agricultural and non-agricultural products.					
22	The weather services provided by the e-Agriservice are satisfactory.					

* Negative Statement

SA- Strongly Agree, A- Agree, UC- Uncertain, DA- Disagree, SDA- Strongly Disagree.

CONCLUSION

The ICT is one of the effective media approach for agricultural development especially for agricultural extension. As it is playing significant role in supporting and facilitating demand-driven extension. To ensure the efficiency and explore the fullest potential of the

ICT, it is vital to know the attitude and preferences of the farming community. Therefore, the present developed scale can be used to measure the farmer's attitude towards other ICT based e-Agriservice with suitable modifications.

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RESEARCH ARTICLE

Adoption of Improved Cultivation Practices Followed by Watermelon Growers

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ABSTRACT

Watermelon is an important vegetable crop having good prospects in state as well as country. Watermelon is an important vegetable crop grown in Solapur distr ict of Maharashtra. The present study was conducted purposively in Malshiras tahsil of Solapur district on the basis of highest area under watermelon. In all 120 respondents from ten villages of this tahsil were randomly selected. it was found that majority of the respondents (65.00 %) had medium level of adoption followed by 19.17 per cent and 15.83 per cent with high and low levels of adoption of watermelon recommendations. The study has brought to light the inadequate availability of good quality seed and seedlings for watermelon cultivation. Genuine seed and seedlings have a vital role in improved cultivation practices of watermelon.

Key words : Adoption, improved, watermelon

INTRODUCTION

Watermelon (*Citrullus lanatus L.*) is grown in tropical and subtropical regions of the world. The total area under cultivation of watermelon in India is 92.00 thousand ha. and production 2292.00 thousand MT. In Maharashtra, it is grown on an area of 5.66 (000 ha.) with production of 149.253 (000 MT) and productivity of 26.36 MT/ha. (Source: Ministry of Agriculture, Govt. of India). India grows approximately 25 commercial varieties, a few of which have delightfully interesting names: “New Hampshire midget,” “Madhuri 64,” “Black magic,” and “Sugar baby,” to name a few. Watermelon comes into season during the summer months, usually from April to June. However, unusual weather patterns during planting sometimes introduce the fruit to cities in early March.

Watermelon is an important vegetable crop grown in Solapur district of Maharashtra. The traditional system of cultivation has often posed problems in attaining desired levels of productivity.

Also it is difficult for practices which are generally followed in watermelon like polythene mulching, sowing (seed/ seedling), irrigation, dose of fertilizers, weeding, labour requirement, spraying, harvesting etc. Hence, there is a need to improve the existing production system besides increasing its productivity. Currently there is a worldwide trend in cultivation of watermelon like use of polythene mulching material, seedling material, pheromone trap, drip and sprinkler irrigation, desired architecture for better light interception and ease in operations such as water management, weed control, pest control and harvesting. It also gives more income than traditional method due to increased number of plant per hectare. Watermelon varieties like Sugar Baby, Sugar Queen give high yield, quality and have wide market acceptability all over India. Also, these varieties give good response to cultivation practices of watermelon. So, it is economically more favorable fruit crop in India and Maharashtra. Thus, the present research study was undertaken with the prime objective to assess the adoption of improved cultivation practices of watermelon followed by the respondents.

METHODOLOGY

The present study was conducted purposively in Malshiras tahsil of Solapur district on the basis of highest area under watermelon. In this tahsil the area under watermelon is 101.71 ha. In all 120 respondents from ten villages of this tahsil were randomly selected for the study. The Ex-post-facto research design of social research was used for the present study. A schedule was developed for knowing the adoption of improved cultivation practices of watermelon. Keeping in view the objective of the study, an interview schedule was prepared and data were collected. Appropriate statistical methods were used for analysis of data and interpretation of the results.

RESULTS AND DISCUSSION

The data on overall adoption of watermelon technology are presented in Table 1.

Table 1 Distribution of the respondents according to their adoption level of improved cultivation practices of watermelon

Sr. No.	Adoption category	Frequency (N=120)	Per cent
1.	Low (Upto 63 score)	19	15.83
2.	Medium (64 to 75 score)	78	65.00
3.	High (76 score and above)	23	19.17

	Total	**120**	**100.00**
		Mean=69.78	**S.D=5.85**

The data presented in Table 1 indicated that majority of the respondents (65.00 %) had medium level of adoption followed by 19.17 per cent and 15.83 per cent with high and low levels of adoption of watermelon recommendations, respectively. The findings are in line with the findings of Mate (2006) and Andhari (2009).

The data on adoption of recommended practices of watermelon cultivation are presented in Table 2.

Table 2 Distribution of the respondents according to their adoption of improved cultivation practices of watermelon

Sr. No	Recommended practices	Adoption					
		Complete		Partial		No	
		Frequency	Per cent	Frequency	Per cent	Frequency	Per cent
1.	Preparatory tillage : A) Land preparation						
	1.Ploughing	120	100.00	00	00.00	00	00.00
	2.Harrowing 2-3 times and leveling	68	56.66	41	34.17	11	09.17
	3.Rotavator	63	52.50	38	31.67	19	15.83
	B) Time of Sowing						
	1.Summer-15 Dec-15 Feb (Temp-17^{0}c to 18^{0}c)	120	100.00	00	00.00	00	00.00
	2.Kharif (June-July)	67	55.83	39	32.50	14	11.67
	C) Planting distance: 2 x 0.5 m	72	60.00	16	13.33	32	26.67
2.	Seed and Sowing :						
	2.0-3 kg / ha.	94	78.33	20	16.67	06	5.00
3.	Selection of variety						
	a] Sugar Queen	120	100.00	00	00.00	00	00.00
	b] Madhubala	98	81.67	15	12.50	07	05.83
	c] Sugarbaby	89	74.17	22	18.33	09	07.50
	d] Madhu	82	68.33	26	21.67	12	10.00
	e] Arkamanik	78	65.00	23	19.17	19	15.83
	f] Arkajyoti	72	60.00	21	17.50	27	22.50
	g] Milan	66	55.00	46	38.33	8	06.67
	h] Badshah	65	54.17	31	25.83	24	20.00
	i] Super king	60	50.00	43	35.83	17	14.17
	j] Other varieties	56	46.67	43	35.83	21	17.50

4.	Mulching								
	a] Spread 25-30 micron thick mulching paper (polythene) with 4 feet width on broad bed cover edges with soil. Be aware that paper should be spread parallel to bed and should not loose easily. Generally required 8-10 kg paper / ha			101	84.17	13	10.83	06	05.00
	b] Day before transplanting make holes at distance 15 cm to both sides of laterals. Distance between two holes should be 2 m in line. After making holes wet broad bed with drip irrigation.			104	86.67	12	10.00	04	03.33
	c] Then transplanting should be done with 12 day old plants. (Requires 10000-12000 seedlings / ha.)			108	90.00	08	6.67	04	3.33
5.	Recommended dose of fertilizers								
	Application of fertilizers A] Major Nutrients								
	1] Basal dose (full dose of P, K and 50 % N per ha.)								
	N	P	K						
	50 kg.	50 kg	50 kg	67	55.83	41	34.17	12	10.00
	2] Top dressing (Remaining 50% N per ha.)								
	50 kg.	-	-	69	57.50	44	36.67	07	05.83
	Application of manure								
	15-20 ton / ha			78	65.00	27	22.50	15	12.50
6.	Method used for application of fertilizers								
	A] Broadcasting by hand			89	74.17	24	20.00	7	05.83
	B] Fertigation (through drip irrigation) according to recommended dose			93	77.50	16	13.33	11	09.17

7.	Micronutrients deficiency in watermelon	13	10.83	25	20.83	82	68.34
8.	Methods of integrated weed management						
	a] Cultural method x Hand weeding x Ploughing x Harrowing	112	93.33	03	02.50	05	4.17
	b]Chemical method	77	64.17	30	25.00	13	10.83
	c] Biological method	00	00.00	15	12.50	105	87.50
9.	Irrigation management						
	Method of irrigation						
	a] Flood method	38	31.67	32	26.67	50	41.66
	b] Drip method	82	68.33	26	21.67	12	10.00
10.	Proper stage of harvesting						
	1] Mature Stage-Heavy Dull Sound	120	100.0	00	00.00	00	00.00
	2] Drying of Tendril	120	100.0	00	00.00	00	00.00
11.	Major pest of watermelon						
	Methods of controlling pest						
	1] Chemical method a) Leaf minor & b) Red pumpkin beetle :Dimethoate 0.05% in 10 lit of water c) Fruit fly: 20 ml Malathion /10litre water + 100 g Jaggery d] Aphid & e) Jasid :0.1% Malathion or Dimethoate @ 1.5 ml / litre water	81	67.50	33	27.50	06	05.00
	2] Mechanical method a) Leaf minor:Yellow sticky trap, Pheromone trap, Light trap b) Fruit fly:Rakshak trap (Dr. BSKKV, Dapoli)	71	59.17	31	25.83	18	15.00
	3] Biological method a) Leaf minor & b) Jasid : NSKE 4% or Trizophos 20 ml/ 10 lit.	04	3.34	06	5.00	110	91.66
12.	Major diseases of watermelon						
	Method of controlling diseases						
	Chemical method	71	59.17	22	18.33	27	22.50

	a) Blast : Spraying Mancozeb or Copper oxychoride 25g/10 lit. water b) Powdery mildew : Spraying Carbendazim @ 10 g / 10 lit. water c) Wilt : Seed treatment with Thirum 3g.						
13.	Marketing channels available in your locality						
	a) Self marketing	111	92.50	5	4.17	04	3.33
	b) By auction	42	35.00	26	21.67	52	43.33
	c)Agril.Produce Market Committee	94	78.33	20	16.67	06	5.00
	d)Other	20	16.67	22	18.33	78	65.00

Practicewise adoption of watermelon cultivation

The adoption of the respondents regarding the recommended improved cultivation practices of watermelon presented in Table 2 is discussed below.

1. Preparatory tillage

A. Land preparation

It was observed that cent per cent of the watermelon growers had complete adoption of land preparation tillage practices like ploughing, while, 56.66 per cent of respondents had completely adopted harrowing and 52.50 per cent respondents had completely adopted rotavator for watermelon cultivation.

B. Time of sowing

It was found that cent per cent respondents were adopting sowing of watermelon during summer season in the month of Dec-Feb and 55.83 per cent during kharif season in the month of June-July.

C. Planting distance

It was observed that that majority (60.00 %) of the watermelon growers had adopted normal recommended planting distance of 2 x 0.5 m.

2. Seed and sowing

The majority (78.33 %) of watermelon growers had completely adopted the recommended seed rate for sowing of watermelon.

3. Selection of variety

In respect of recommended watermelon varieties, it was observed that cent percent of respondents had completely adopted the Sugar Queen variety, while, 81.67 per

cent of the respondents had complete adoption of Madhubala variety. It was observed that nearly three-fourth (74.17 %) of the respondents had complete adoption of Sugar baby variety of watermelon growers.

4. Mulching

It was observed that a large majority of the respondents had complete adoption of mulching practices of watermelon.

5. Recommended dose of fertilizers

Regarding fertilizer management, it was revealed that 55.83 per cent of the respondents had complete adoption of recommended basal dose of fertilizers as per MPKV, Rahuri, while, 57.50 per cent of the respondents had complete adoption of recommended top dressing dose of N fertilizer of watermelon and 65.00 per cent had completely adopted the manure application in watermelon.

6. Methods used for application of fertilizer

It was observed that majority (74.17 %) of the respondents had completely adopted the application of fertilizer for broadcasting by hand and 77.50 per cent of the respondents about fertigation (through drip irrigation) according to recommended dose.

7. Micronutrient deficiency in watermelon

A substantial proportion (68.34 %) of the respondents had not adopted the application of micronutrients.

8. Methods for integrated weed management

It was observed that majority (93.33 %) of the respondents had completely adopted the cultural methods for weed management, while, 64.17 per cent of the respondents about chemical methods for weed management. The biological method was not adopted by large majority (87.50 %) respondents.

9. Irrigation management

The data in Table 2 revealed that more than one third (68.33 %) of the respondents had completely adopted the drip method of irrigation for watermelon, while, only 31.67 per cent respondents had adopted the flood method of irrigation.

10. Proper stage of harvesting

The recommended stage of harvesting of watermelon when drying of tendril with mature stage-heavy dull sound was completely adopted by all the respondents.

11. Methods for controlling the pests of watermelon

It was observed that 67.50 per cent of the respondents had completely adopted chemical methods of pest control, while, 59.17 per cent respondents adopted the mechanical methods and a large majority (91.66 %) were observed to non-adopt the biological methods.

12. Disease management

It was observed that more than half (59.17 %) of the respondents had complete adoption of disease management in watermelon.

13. Marketing channels in locality

It was found that a large majority (92.50 %) watermelon growers preferred self-marketing channel for marketing of watermelon, whereas, 78.33 per cent of the respondents sold watermelon through Agriculture Produce Market Committee and 35.00 per cent of the respondents sold their produce by auction.

Similar findings were recorded by Hinge (1997), Bhosale (2003), Kulhal (2004) and Jadhav (2009).

Implications

The research findings indicated that the majority of the watermelon growers had partial adoption regarding use of new variety, seed treatment and application of organic manure, plant protection measures and improved cultivation practices developed by the State Agricultural Universities. So the extension agencies and the personnel of the different development departments may organize training programmes to educate farmers regarding recommended practices of watermelon cultivation. The study has brought to light the inadequate availability of good quality seed and seedlings for watermelon cultivation. Genuine seed and seedlings have a vital role in improved cultivation practices of watermelon. Thus, the Government nurseries and State Agricultural University nurseries need to make concerted efforts for satisfying the farmers demand of quality watermelon seed and seedlings.

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RESEARCH ARTICLE

Impact of demonstration of Area Specific Mineral Mixture in Cross Breed cows of Dairy farmers of Baramati area in Pune district of Maharashtra

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ABSTRACT

The present study was conducted at Baramati tahshil of Pune district. This area was selected mainly because majority of farmers have a cross breed cows in this area and most of demonstration on use of mineral mixtures in cross breed animals was conducted by KVK Pune in five villages in 2013-14, 2014-15 and 2015-16 in this area. 100 farmers were selected randomly who have a cross breed cows and have visited mineral mixture demonstrations and was present while demonstration. It can concluded that majority of farmers were up to 40 years age group, studied up to middle school, having land holding 2 to 4 ha., annual income above 1 lakh & having low social participation. By using mineral mixture majority of farmers got 1.92 lit more milk yield & fat % increase by 38 %. There is less attack of disease and repeat breeding & shining of skin coat of animals was improved due to feeding of area specific mineral mixture.

Key words-Baramati, cross breed, mineral mixture, demonstration, impact

INTRODUCTION

Indian agriculture, plays an important role in the nation's economy. Over 58 per cent of the rural households depend on agriculture as their principal means of livelihood. Agriculture, along with fisheries and forestry, is one of the largest contributors to the Gross Domestic Product (GDP). For sustained growth in agriculture, there is need to improve productivity by improving efficiency. Thereforean urgent need to provide package for transfer of technology, improving input use efficiency and promoting investments in agriculture both in private and in public sectors.

The projected growth in annual income, urbanization and of the human population in developing countries there is demand for milk and meat in these countries will increase substantially. By 2050 the global demand for dairy and meat is projected to increase by 74% and 58% respectively, and a large part of this demand will originate from developing countries.

The average daily milk production data at 6.52 kg for crossbreds, 2.10 kg for indigenous cattle and 4.44 kg for buffaloes (NSSO, 2007) suggests that the productivity of these animals is far below than their genetic potential.Low productivity of animals with higher genetic potential can be primarily attributed to the imbalanced and inadequate feeding.Imbalanced feeding leads to excess feeding of some nutrients whilst others remain deficient. This not only reduces milk production and increases costs per kg milk, but also affects various physiological functions including long term animal health, fertility and productivity. A balanced ration should provide protein, energy, minerals and vitamins from dry fodders, green fodders, concentrates, mineral supplements etc., in appropriate quantities to enable the animal to perform optimally and remain healthy.

Imbalanced feeding results in:

• Low milk production, poor growth and reproduction
• Milk production of animals lower than their genetic potential
• Shorter lactation length and longer calving intervals
• Animals more prone to metabolic disorders such as milk fever and ketosis
• Slow growth in young animals and delayed age at first calving
• Shorter productive life
• Excessive amounts of pollutants released into the environment
• Lower profit to farmers

Area Specific Mineral Mixture: -Minerals are required by dairy animals for their metabolic functions, growth, milk production, reproduction and health. Animal cannot synthesize minerals inside its body and usually feeds and fodders fed to the dairy animals do not provide all the minerals in the required quantity. Therefore, animal should be supplemented with adequate amount of good quality mineral mixture in their ration.

Level of minerals in feeds and fodder varies from region to region, thus mineral availability to the animal also varies. So, it is necessary to produce region specific mineral mixture accordingly.

For that, NDDB has completed mineral mapping for various states/ region and accordingly area specific mineral mixture formulations have been developed. ASMM has to be fed @ 100-200 g daily, depending upon level of milk production in lactating animals, 50 g daily for growing and non-producing animals and 25 g daily for calves.

Benefits of feeding ASMM:

1. Improves growth rate of calves, hence early puberty
2. Improves reproduction efficiency in male and female animals
3. Reduce inter-calving period leading to more productive life of animals
4. Improves efficiency of feed utilization
5. Improves milk production and SNF content of the milk
6. Better immune response; hence better resistance against diseases

Minerals that are not sufficient from the feed and fodder ingested by the animlas only need to be supplemented through mineral mixture should supply only those minerals that are deficient in the ration. NDDB initiated mineral mapingprogramme in different states, by testing feed and fodder samples in different agro- climatic zones, so as to develop area specific mineral mixtures. The programme has so for been completed in the states of gujrath, Rajasthan, Kerala, Maharashtra and Andhra pradesh, Mg, K, Fe, Mn, & Se are more than sufficient in the most of the area , whereas , deficiency levels of Ca, P, S, Na, Cu, Zn, & Co vary greatly within the state and their levels have been adjusted accordingly in the formulations.

Dairy enterprise is a major income generating activity in the rain fed and irrigated area of Baramati Taluka (Block), Maize and sorghum is a major fodder crops grown by the dairy farmers. Out of total population of cattle in the Pune District 50% population is crossbred animals, for maximum milk production. These crossbred animals require green fodder throughout the year. Area under fodder crops is 5% of total area of the District. Green fodder is not available throughout the year. Sugarcane tops are also available from Nov. to March in the area due to Sugar factories. There is shortage of green fodder in Nov to June for animals.Livestock farming is secondary source of income for medium, small and marginal farmers.

Rainfed area with light soil and medium soil. Soil is light and medium with depth of the soil is 30-45 cm to 90cm respectively, low in Nitrogen .phosphorus, potash, organic carbon etc. Annual rainfall is 523.5 mm. Bajara Maize, Rabi sorghum, Onion, Soybean are major crop and Hybrid Napier ,Maize ,sugarcane tops fodder sorghum are

fodder crops fed to crossbred cows. There is shortage of leguminous fodder crops in the area and Dairy farmers are feeding only cereals green fodder and dry fodder to crossbred HF cows,in summer season there is shortage of leguminous green fodder, hence there is severe shortage of calcium and Phosphorus leading to retention of placenta, Metritis ,repeat breeding and low milk production and increase in intercooling period of cows. Hence KVK, Baramati has demonstrated use of Area specific Mineral Mixture to crossbred animals for three years and impact of this technology was scientifically studied with following objectives.

Objectives:-

1. To study socio economics characteristic of dairy farmers.
2. To study knowledge and adoption of use of mineral mixture in cross breed cows by dairy farmers.
3. To study before and after demonstration milk yield.
4. To identify the difficulties ranked by farmers in adoption of mineral mixture.

METHODOLOGY

1. Location of study

The present study was conducted at Baramati tahshil of pune district. This area selected mainly because majority of farmers have a cross breed cows in this area and most of demonstration on use of mineral mixtures in cross breed animals was conducted by KVK Pune in five villages in 2013-14, 2014-15 and 2015-16 in this area.

2. Method of sampling

For present study 100 farmers will be selected randomly who have a cross breed cows and have visited mineral mixture demonstrations and was present while demonstration.

3. Tools for collection of data :- Interview schedule was prepared for collection of data.

4. Measurement of variable.

Independent variable

Sr. no.	Variable	Measurement
1	Age	Chronological age of respondent

2	Education	Actual No. years of schooling.
3	Land holding	No. of hectors of agril. Land owned by respondent.
4	Animal holding	No. Of animals owned by respondents.
5	Annual income	Annual earnings of farmer family in thousand rs
6	Social participation	Membership of respondent in organization.
7	Knowledge	Questioner developed

Dependant Variable

S.No.	Variable	Measurement
1	Impact of mineral mixture A)Feed management B)Yield of Milk	Schedule was developed.

Statistical test:-Percentage, Mean, standard deviation was statically calculated and reported in this study .

RESULT AND DISCUSSION

In this study personal & socio economic characteristics of dairy farmers were studied as follows

1.Age :- Respondent was Distributed according to their age as up to 30 years one group ,31 to 40years second Group , 41 to 50 years in third group and 51 and above in fourth group and shown in Table 1.

Table No.1 – Distribution of respondents according to age.

Sr.no.	Age range	Frequency	%
1	Up to 30	30	40
2	31 to 40	25	33
3	41 to 50	11	15
4	51 & above	9	12
Total-		75	100

It is found that from table 1 that (40percent) respondents were from up to 30 year age & (33percent) respondents were from 31 to 40 year age &(15percent) respondents were 41 to 50 year age While (12 percent) respondent are of 51 and above age group .

2. Education: -Education is a major variable impacting the adoption of technology hence actual year of schooling was considered during this study. Respondent are distributed according to their Education and shown in the table: - 2 as follows.

Table No.-2- Distribution of respondents according to education

Sr.no.	Category	Frequency	%
1	Illiterate	0	0
2	Primary	1	1
3	Middle school	36	49
4	High school	16	21
5	College & above	22	29
Total -			100

It is observed from above table 2 that (49.00 percent) Dairy farmers were educated up to middle school while (29 percent) and (21 percent) farmers were educated up to college and above &high school respectively.

3. Land holding: -Land holding is also important personal and socioeconomic characteristics hence the respondent were distributed according to land holding andshown in the table: - 3

Table No. 3- Distribution of respondents according to land holding

Sr. no.	Category	Frequency	%
1	Marginal farmer below 1 Ha.	8	10
2	Small farmer 1-2 Ha.	18	24
3	Sami medium farmer 2-4 Ha.	26	35
4	Medium farmer 4-10 ha.	14	19
5	Large farmer 10 ha & a bow	9	12
Total-		75	100

It is indicated from table 3 that majority of (35percent) respondents have semi medium land holding & (24percent) respondents have small land holding while (19percent& 12 percent) respondent were from medium & large land holding respectively.

4. Number of animals:-Dairy farmers having 10 dairy animals are selected for this study.

5. Annual income: -

Respondentaccording to their total family income was distributed and grouped and shown in the table: - 4 and frequency was studied

Table No.-4 - Distribution of respondents according to annual income

Sr. no.	Category	Frequency	%
1	Up to 50000	4	5
2	50001 to 100000	19	25
3	100001 & above	53	70
	Total-	**76**	**100**

From the present study it was observed that the majority of (70percent) farmers were from the Income of Rs.1,00,000/-and above category while (25 percent) farmers were of Rs. 50001 to 100000/- Income and 5 percent farmers were from annual income of less thanRs. 50,000/-

6. Social participation –Social participation of the respondent in the different activities like member of SHG, Member of farmers club and member of gram panchayatetc.was considered and accordingly score was given to the respondent

Table No. – 5 - Distribution of respondents according to social participation

Sr. no.	Category	Frequency	%
1	Low (up to 3)	38	50.66
2	Medium (3.1 to 4.99)	16	21.33
3	High (5 & above)	21	28
	Total-	**75**	**100**

Mini : 1 , max: 4 , Diff : 4

It was observed from table 5 that majority of (50.66percent) farmers were grouped in low social participation category while (28.00 and 21.33percent) farmers were categorized in high& medium social participation category respectively.

7. Knowledge – Knowledge plays a vital role in the process of adoption of technology and it was studied by asking them the questions related to the technology of use of area specific mineral mixture for cross bred animals. Respondents are group according to their knowledge as low, medium and high Category.

Table No. – 6 - Distribution of respondents according to knowledge

Sr. no.	Category	Frequency	%
1	Low (up to 62 %)	1	1.33
2	Medium (63 to 81 %)	10	13.33
3	High (82 & above)	64	85.33
Total-		75	100

Max : 100 , Mini.: 44

It is observed from Table 6 that majority of (85.33 percent) farmers were grouped in knowledge category while (13.33 and 1.33 percent) farmers were categorized in medium & low knowledge category respectively.

8. Adoption:-

Table No. –7 -Distribution of respondents according to Adoption

Sr. no.	Category	Frequency	%
1	Low (up to 55 %)	2	2.66
2	Medium (56 to 77 %)	19	25.33
3	High (78 & above)	54	72
Total-		**75**	**100**

Max: 100 Min. :33

It is observed from table 7 that majority of (72 percent) farmers were grouped in high adoption category while (25.33 and 2.66 percent) farmers were categorized in medium & low adoption category respectively.

Table No. -8 Distribution of respondents according to advantages of using mineral mixture.

Sr.No.	Particular	Before use of mineral mixture –average	After use of mineral mixture –average
1	Milk yield per cow per day. -	15.13/cow/day	1.93 lt. Increased/cow/day
2	Fat %-	3.37	3.75
3	% of repeat breeding -	50.29	72.53 % reduced
4	Effect on cow health -	a.Low milk & fat-68% b. Frequently sickness-60% c. Repeat breeding problem-75% d. Rough skin coat -61%	a.Increased in milk & fat-79 % b. disease incidence Reduce 69% c. repeat breeding problem reduce 73% d. Shining skin coat -77%

It is observed from Table 8 that majority of (72.53 percent) respondents repeated that breeding problem of animals reduced &average fat % increased from 3.37 to 3.75 %.while 1.93 litters average milk yield increased. While (79 percent& 69 percent) farmers reported that, there cow milk yield, fat increased& disease incidence reduced respectively while (77 percent& 73 percent) farmers express that improvement in skin shining of cows& reduced repeat breeding problem respectively.

Suggestion from beneficiary farmers.:- Respondent are distributed according to their suggestion in the table no.9 and show below

Table No. – 9– Distribution of respondents according to Suggestions from farmers-

Sr. No.	Particular	No. Of farmers	Percentage
1	Cattles cannot eat it easily- 3 farmers	3	4
2	% of mineral was not mentioned on bags of mineral mixture.	3	4
3	Not available for sale at village level	5	7
4	No adequate supply	2	3
5	High cost	1	1
6	Mineral mixture is not tasty	1	1

CONCLUSION

From above study it can concluded that majority of farmers were from up to 40 years age group, studied up to middle school, having land holding 2 to 4 ha., annual income above 1 lakh& having low social participation.

By using mineral mixture majority of farmers got 1.92 lit.More milk yield& fat % increase by,38 %. There is less attack of disease and repeat breeding & shining of skin coatof animals was improved due to feeding of area Specific mineral mixture.

Expenditure of farmers was Rs. 180/- per month, on use of mineral mixture & received extra more income of Rs.1094.4/- per month/cow due to increase in milk yield and fat content of Milk of crossbred HF cows .This indicates feeding of area specific mineral mixture to crossbred animals is economically feasible for dairy Farmers.

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RESEARCH ARTICLE

Impact of soil testing on fertilizer management & yield of sugarcane

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ABSTRACT

This paper reviews the adoption of rate of farmers in various parts of Pune district on soil test based fertilizer use in sugarcane for achieving the targeted yield of crop. Soil testing has been accepted as a unique tool for rational fertilizer use in sugarcane. It helps to assess the soil fertility status and recommend suitable and economic nutrient dose through chemical fertilizer and organic manure for sugarcane and cropping system. The selection of proper rate of plant nutrient addition is influenced by knowledge of nutrient supplying power of the soil and efficiency of fertilizers. Fertilizer recommendation based on soil test has been evolved for many crops and cropping system using post-harvest soil test value.

Key words : Impact, soil testing, fertilizer management, sugarcane

INTRODUCTION

Soil testing as a tool for judicious fertilizer use is a well-recognized practice all over the world which takes care of too little, too much or disproportionate applications of nutrients. The soil testing and fertility management programmes have been given adequate importance for sustaining crop production and balanced fertilization in Indian agriculture. Fertilizer has been and will continue to be the key input for achieving the estimated food grain production goals of the country. But, the escalating cost coupled with increasing demand for chemical fertilizers and depleting soil health necessitates the safe and efficient method of nutrient application. The soil test based fertilizer recommendation is therefore the actual connecting link between research and its practical application to the farmer's fields. A farmer who follows only the soil test based fertilizer recommendations is assured of a good crop. Soil testing is essential and is the first step in obtaining high yields and maximum returns from the money invested in fertilizers. Dumping of fertilizers by the farmers in the fields

without information on soil fertility status and nutrient requirement by crop causes adverse effects on soil and crop regarding both nutrient toxicity and deficiency either by overuse or inadequate use (Ray *et al*., 2000). Managing the location specific variability in nutrient supply is a key strategy to overcome the current mismatch of fertilizer rates and crop nutrient demand in irrigated rice environments (Dobermann and Cassman, 2002). To enhance farm profitability under different soil-climate conditions, it is necessary to have information on optimum doses for crops. Traditionally, to determine the optimum fertilizer doses of most appropriate method is to apply fertilizer on the basis of soil test and crop response studies. Improved crop management needs to be envisaged with adequate emphasis on balanced plant nutrition for stability in production, appropriate soil nutrient resilience. With the advent of fertilizer responsive improved varieties, indiscriminate application of fertilizer nutrients becomes an obvious problem in the quest for ever higher crop yields (Ingram, 1995). Prior estimation of the actual nutrient requirement of a particular crop, native soil fertility status, has been ignored. Soil test based fertilizer use is must for sustainable agriculture (Rao and Srivastava, 2000). Thus, need based estimation of N, P and K requirements may call for soil test crop response (STCR) based nutrient management, which can be represented in a linear relationship. The fertilizer application by the farmers in the field without knowledge of soil fertility status and nutrient requirement of different crops usually leads to adverse effect on soil as well as crops by way of nutrient deficiency or toxicity due to over use or inadequate use of fertilizers. In this regard, targeted yield approach has been found to be beneficial which recommends balanced fertilization considering available nutrient status in the soil and the crop needs. Targeted yield approach was first developed by Troug (1960) Ramamoorthy *et al*. (1967) established theoretical basis and experimental technique to suit it to Indian conditions. This target yield equation (TYE) is considered as a soil-and fertilizer-based precision farming strategy to meet nutrient demands for a specified yield (Balasubramanian *et al*., 1999). Location specific fertilizer recommendations are possible for soils of varying fertility, resource conditions of farmers and levels of targeted yield for similar soil classes and environment (Ahmed *et al*., 2002). Field specific balanced amounts of N, P

and K were prescribed based on crop based estimates of the indigenous supply of N, P and K and by modelling the expected yield response as a function of nutrient interaction was done by many workers (Dobermann and White 1998 and Witt *et al*., 1999). Fertilizer recommendation for preset yield target is refined technique particularly applicable under conditions of fertilizer resource constraint for most efficient use of fertilizer and soil nutrients (Ramamoorthy and Velayutham. 1971). In this technique, the fertilizers are recommended separately for different fields separately on the basis of soil test and are preset uniform yield targets depending upon the availability of fertilizer input.

The fertilizer recommendations vary from state to state depending upon the soil fertility status and yield levels. Fertilizer recommendations for sugarcane in major Indian (SBI Coimbatore).Is there any methodology or technique, which is simple and can be easily used for calculating the amount of the fertilizers to be used for sugarcane crop after soil testing (with special reference to Maharashtra)

Objectives –

1. To study personal & social characteristic of sugarcane growers.
2. To study impact of soil test on fertilizer management and yield in sugarcane.
3. To study constraints faced by sugarcane growers for fertilizer management.
4. To study suggestion made by farmer to overcome constraints faced by them.

METHODOLOGY

1. Location of study-

The present study was conducted at Baramati & Indapur tehsil of Pune district. This area selected mainly because on an average more than 6000 farmers in this area tested their soil sample from KVK, Baramati each year out of that 45 % sample are tested for sugarcane crop.

2. Method of sampling

For present study 50 farmers who grow Adsali Co- 86032 variety & test their soil sample before sugarcane planting from KVK Pune and 50 farmers who does not follow soil testing before cultivation of Adsali Co-86032 variety likewise total number of respondent will be 100.

3. Tools for collection of data.

Interview schedule will be prepared for collection of data.

4. Measurement of variable.

Independent variable

Sr. No.	Variable	Measurement
1	Age	Chronological age of respondent
2	Education	Actual No. years of schooling.
3	Land holding	No. of hectors of Agril. Land owned by respondent.
4	Annual income	Annual earnings of farmer family in thousand RS.
5	Social participation	Membership of respondent in organization.

Dependent Variable

Sr. No.	Variable	Measurement
1	Impact of soil test Fertilizer management Yield of sugarcane	Schedule will be developed.

Statistical test

1. Percentage
2. Mean
3. Standard deviation
4. Frequency

General information

1. From where you have goat information about soil testing?

Sr. No.	Particular	No. Of farmer	Percentage (%)
A	Village person	2	2
B	KVK Scientist	93	93
C	Magazines, News paper	1	1
D	Other	4	4

2. Why you have tested your soil from KVK?

Sr. No.	Particular	No. of farmer	Percentage (%)
A	Near from village	11	11
B	Quality testing	74	74
C	Guide as per the recommendation	15	15

3. When you have given soil sample for testing?

Sr. No.	Particular	No. Of farmer	Percentage (%)
A	Before sowing	96	96
B	After crop sprouting	1	1
C	After crop harvesting	3	3

4. When you have got a soil testing report?

Sr. No.	Particular	No. Of farmer	Percentage (%)
A	Before sowing	89	89
B	After crop sprouting	10	10
C	After crop harvesting	1	1

5. Do you apply fertilizer doses as per the soil test recommendation?

Sr. No.	Particular	No. Of farmer	Percentage (%)
A	Yes	97	97
B	No	3	3

Regarding sending soil sample for testing & gating report of soil test it was found that 96 % farmers have given their soil sample for testing before sowing & 97 % farmer have applied fertilizer dose as per soil test recommendation.

Fertilizer management

Changes in fertilizer management in sugarcane due to soil testing.

Chemical fertilizers

Sr.No.	Urea		S.S.P.		M.O.P.		10:26:26		Ammonium Sulphate		FeSo4		ZnSo4		MgSo4		Borax		Sulphur	
	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
Total	33544	26965	23100	20130	15320	12520	11050	10200	1250	2680	267	1733	166	1132	261	1294	117	726	111	810
Average	335.44	269.65	26.86	228.75	176.09	142.27	128.48	159.37	30	107.2	16.68	17.33	11.85	13.97	16.31	14.21	7.8	8.34	8.53	9.20

After soil testing it was found that there is average increased in use of chemical fertilizers like S.S.P., 10:26:26, ammonium sulphate, FESO4, ZNSO4, Borax andsulphur. While decries in use of urea, MOP & MGSO4. Also increase in number of farmers using micronutrients ranging from 5 to 15 kg.

Frequency

Sr. No.	Particular	Before No. of farmers	After No. of farmer
1	M.O.P.	87	88
2	Ammonium Sulphate	10	25
3	FESO4	16	93
4	ZNSO4	14	81
5	MGSO4	17	90
6	Borax	15	87
7	Sulphur	12	88

Fertilizer management

Changes in fertilizer management in sugarcane due to soil testing.

Organic & Bio-fertilizer

Sr.No.	Cow dung-in tones		PSB. In Kg.		Azatobactor Kg.		Acetobactor Kg.		Multimicronutrient in litres.		Expenditure Rs./ acre		Yield/acre in tones	
	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
Total	181	460	15	322	10	247	7	179	19	324	1242435	1473107	4920	6722
Average	1.81 t	4.60 t	0.15	3.22	0.10	2.47	0.70	1.79	0.19	3.24	12424.35	14731.07	49.2	67.22

After soil testing it was found that there is average increased in use of FYM & bio fertilizers like cow dong, PSB, Azatobactor, Acetobactor, also increase in number of farmers using multinutrients ranging from 0.19 lit. to 3.24lit.

Frequency

Sr. No.	Particular	Before No. of farmers	After No. Of farmer
1	Cow dung	27	92
2	PSB	8	84
3	Azatobactor	5	83
4	Acetobactor	4	77
5	Multi micro-nutrient	5	77

RESULT AND DISCUSSION

1.Study of personal & socio economic characteristics of Sugarcane farmers.

1. Age-

Table No.1 – Distribution of respondents according to age.

Sr. No.	Age range	Frequency	Percentage (%)
1	Up to 30	18	18
2	31 to 40	24	24
3	41 to 50	35	35
4	51 & above	23	23
Total-		**100**	**100**

It is indicated from table 1 that majority of respondents (35 percent) were from 41 to 50 year age old & 24 percent respondents were from 31 to 40 year age & 23 percent respondents were from 51 and above year age While 18 percent respondent have been grouped below 30 years age group.

2. Education-

Table No. 2 -Distribution of respondents according to education

Sr. No.	Category	Frequency	Percentage (%)
1	Illiterate	0	0
2	primary	3	3
3	Middle school	5	5
4	High school	33	33
5	College & above	59	59
Total -		**100**	**100**

It is observed from table 2 that (59.00 percent) sugarcane growers were educated up to college and above while (33 percent) and (5 percent) farmers were educated up high school and & middle school, respectively.

3. Land holding

Table No. 3- Distribution of respondents according to land holding

Sr. No.	Category	Frequency	Percentage (%)
1	Marginal farmer below 1 Ha	7	7
2	Small farmer 1-2 Ha	27	27

3	Sami medium farmer 2-4 Ha	36	36
4	Medium farmer 4-10 ha	23	23
5	Large farmer 10 ha& a bow	7	7
Total-		**100**	**100**

It is indicated from table 3 that majority of (36 percent) respondents have semi medium land holding & (27 percent) respondents have small land holding while (23 percent & 7 percent) respondent have been grouped in medium& large land holding respectively.

4. Area of sugarcane.

Sr. No.	Category	Frequency	Percentage (%)
1	Up to 1 ha	34	34
2	1.1 to 2 ha	47	47
3	2.1 to 3 ha	8	8
4	3.1 to 4 ha	9	9
5	4.1 to 5 ha	5	5
6	Above 5 ha	7	7
Total		**100**	**100**

It is indicated from table 4 a. that majority of (47 percent) respondents cultivate 1.1 to 2 ha Sugarcane & 34 percent respondents have up to 1 ha Sugarcane plantationwhile (9 percent & 7 percent) respondent have been grouped in 3.1 to 4 ha& above 5 ha sugarcane plantation.

b) Irrigation system.

Sr. No.	Irrigation system	No of farmers(%)
1	Flood irrigation	75 farmers (75 %)
2	Drip irrigation	25 farmers (25%)
Total		**100**

It is indicated from table 4 b. that majority of (75 percent) respondents have flood irrigation system & 25 percent respondents have drip irrigation system for Sugarcane.

5. Annual income

Table No.-4 - Distribution of respondents according to annual income

Sr.No.	Category	Frequency	Percentage (%)
1	Up to 50000	2	2
2	50001 to 100000	11	11
3	100001 & above	87	87
Total-		**100**	**100**

It is observed from table 5 that majority of (87 percent) farmers were grouped in 1lac and above annual income category while (11 and 2 percent) farmers were categorized in 50 thousand one to 1lac and up to 50 thousand annual income group respectively

6. Social participation –

Table No. – 5 - Distribution of respondents according to social participation

Sr. No.	Category	Frequency	Percentage (%)
1	Low (up to 3)	58	58
2	Medium (3.1 to 4.99)	26	26
3	High (5 & above)	16	16
Total-		**100**	**100**

Mini. 1 max-5, diff- 4

It is observed from table 5 that majority of (58 percent) farmers were grouped in low category of social participation category while (26.00 and 16 percent) farmers were categorized in medium & high category of social participation respectively.

Table No. – 6- Impact of soil testing before and after use

Sr.No.	Particular	Before soil testing %	After soil testing %
1	Sugarcane plantation method	a. Space plantation- 32 b. paired row- 2 b. Ridge & Furrow- 66	a. Space plantation- 83 b. paired row- 3 b. Ridge & Furrow- 14
2	Sugarcane plantation method	a. Single eye Bud- 7 b. Doable eye Bud- 51 c. Three eye Bud- 42	a. Single eye Bud- 13 b. Doable eye Bud- 84 c. Three eye Bud- 3
3	Sunhemp&Dhencha Insitu de-composting	Yes- 26 No- 74	Yes- 78 No- 22

4	Average Yield per acre- tones	49.20 Tones	67.22 Tones
5	Insitutrash decomposing	Yes- 23 No- 77	Yes- 92 No- 8
6	If fertility is improved or not	Yes- 20 No- 80	Yes- 96 No- 4
7	Yield of sugarcane/acre tone	49.2 tone	67.22 tones

It is observed from table 6 that majority of (92 percent) respondenthave started to insitu trash de-composting,(83.00 percent) respondents reported that they have adopted space plantation method of sugarcane, while (84 percent)respondent reported that they have adopted doable eye bud method of sugarcane plantation . While the average yield of sugarcane has been increased from 49.2 tons to 67.22 tons per acre & it helps to improve fertility of soil.

Table No. – 7- Problems expressed by farmers

Sr. No.	Problem	No. of farmers
1	Poor information about soil sample collection	34
2	We do not received soil testing report within 8-10 days	4
3	Do not get proper recommendation	8
4	Soil testing cost is high	14
5	Distance of KVK is long from village	16
6	Difficult to apply 4 times fertilizers to sugarcane	27
7	Fertigation through drip is easy but initial cost is high	24
8	At the time of mixing all chemical fertilizers moisture	20
9	Water soluble fertilizers are costly	52
10	Difficult to apply Water soluble fertilizers	17
11	Chemical fertilizers are not available in market	21

It is observed from table 7 that majority of (52.00 percent) respondents repeated problem that water soluble fertilizers are costly. While (34 percent & 27 percent) respondents expressed that they have poor information about soil sample collection & Difficult to apply 4 times fertilizers to sugarcane respectively. While (24 percent & 20 percent) farmers expressed the problems of Fertigation

through drip is easy but initial cost is high & at the time of mixing all chemical fertilizers moisture respectively. While (17 percent & 16 percent) respondents express that difficult to apply water soluble fertilizers & Distance of KVK is long from village respectively.

Table No. – 8- Suggestions from beneficiary farmers

Sr. No.	Particular	No. of farmers	Percentage
1	We need information regarding fertigation through drip	9	9 %
2	Make available sugarcane seedlings	5	5 %
3	Make available information bulletin regarding sugarcane plantation	3	3%
4	Make available soil testing report on mobile	2	2 %
5	Make available mobile soil testing vane in village	4	4 %

CONCLUSION

From this study it was observed that majority of farmers having age of 41 to 50 years old, educated up to college level having land between 2to 4 ha Cultivate sugarcane on 1 to 2 ha Area, use flood irrigation system for irrigation of sugarcane have annual income above 1 lack &have low social participation.

Majority of farmers mentioned that they get information of soil testing from KVK scientist, quality testing from KVK, they take soil sample for analysis & get report from KVK before sowing of crop & they apply fertilizer dose as per soil test recommendation.

Regarding use of chemical fertilizers by farmer it was observed that after soil analysis farmers have decreases quantity of urea & increases quantity of S.S.P. Out of 100 farmers 70 to 80 farmers have started the use of micronutrients, FYM, & bio fertilizers as per soil analysis report. Also for sugarcane cultivation they have adopted space plantation method, double eye bud set, green manuring because of this fertility of soil is improved & average yield of sugarcane is increased from 49.2 tons per acre to 67.22 tons per acre.

Also 52 % farmers expressed problem about costly water soluble

fertilizers, 34 % farmers told about poor information of soil sample collection & 27 % farmers mentioned that it is difficult to apply fertilizers dose for four times.

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