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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 37th issue of Asian Journal of Extension Education for the year 2019. 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: December, 2019

P. K. Wakle
Chief Editor

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RESEARCH ARTICLE

Capacity Building of Rural women through Participatory Communication Approaches

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ABSTRACT

Women play an important role in development of Nation. They are the central figure of family life. According to Census 2011, India is the second populous country having crossed the population of one billion. The population of women in India is 496,514,346. The most glaring evidence of gender bias in India is low sex ratio. According to Census 2011, Sex ratio is 940 females per 1000 males and this ratio is 990 females per 1000 males worldwide. Women's status is the pure indicator of progress of any nation. Studies aptly indicate that women are suffering from various types of problems due to lack of education, information in various aspects. Thus, Capacity Building of women is necessary. Capacity Building is one of the key factors in determining success of development. Government has imitated various projects, programme and extension strategies for capacity building of rural women. Present paper aim is to discuss about the Capacity Building of Rural women through Participatory Extension Communication Strategies.

Key words: Capacity building, Extension Strategies, Women

INTRODUCTION

In India, Women play strong potential role in socio-economic development of our Nation. In hill areas where women are the sole earner in their family, they are known for their courage, perseverance and hard work due to their involvement with agriculture, forest protection and dairying especially in difficult hilly terrain. According to Pradeep (2009) hill women are found extending their working hours inordinately at home and outside to earn enough to meet the subsistence requirements of their households. They are deprived of exposure to knowledge and hardly participate in the farm activities as well as household activities. Government has initiated various programme and projects. Studies revealed that more than half per cent of women are

suffering various types of problems due to lack of knowledge, information and education on many aspects. In this case capacity building is necessary.

Need of Capacity Building

Singh (2013) describes that a capacity building approach to development involves identifying the constraints that women experience in realizing their basic rights and finding appropriate vehicles to overcome the causes of their exclusion and suffering. Sharma (2012) reported that right information given at the right time can empower the hill women and protect them from various problems. Various Information Communication Technologies as Radio, Television, Mobile phone and Internet are used for capacity building of hill women via Awareness, Education and Information on many aspects. According to Singh (2011) this is an ICT era but till today fifty per cent hill women are suffering from various types of problems due to the gap between ICTs and its use without need assessment and participation of hilly people. According to the Country Report of Government of India, "Capacity building means moving from a position of enforced powerlessness to one of power".Capacity building is a multi-faceted, multi-dimensional and multi-layered concept. Capacity building is a process in which women gain greater share of control over resources - material, human and intellectual like knowledge, information, ideas and financial resources like money and control over decision-making in the home, community, society and nation, and to gain `power'. According to Shively (2009) capacity building of women is a prerequisite for creating a good nation, when women are empowered, society with stability is assured. Capacity building of women is essential as their value systems lead to the development of a good family, good society and tgultimately good Nation.According to Sharma (2010) Capacity building is the One of the key factors in determining the success of development is the status and Position of women in the society. This means that the neglect of women in the development process of any country constitutes a human resource waste.

However, it can be concluded that Capacity building is the idea of power. The possibility of Capacity building depends on two things. First, Capacity building requires that power can change. If power cannot change, if it is inherent in positions or people, then Capacity building is not possible, nor is Capacity building conceivable in any meaningful way. In other words, if power can change, then Capacity building is possible. Second, the concept of Capacity building depends upon the idea that power can expand. This second point reflects our

common experiences of power rather than how we think about power.

Areas of Capacity building

The major types of empowerment can be summarized into four groups (Lennie, 2002). **[1]** *Community Capacity:* Access to new and useful knowledge and awareness, Developing new skills, abilities, confidence and competence, obtaining the friendship and support of other women, participating in various activities with other women.**[2]** *Organizational Capacity:* New knowledge and awareness about new benefits of technology for rural development through rural tourism development or development of agriculture cooperatives.**[3]** *Political Capacity:* Influencing other government policies and decisions that affect on rural communities, changing town-based people's beliefs, networking with people in government and industry and other women to discuss issues affecting rural women and rural communities.**[4]** *Psychological Capacity:* An increase in self-confidence and self-esteem, Greater motivation, inspiration, enthusiasm and interest to develop new skills and knowledge, to keep pushing for better services for rural people, feelings of belonging related to participation in the online groups in particular.

Importance of assessment of Information needs

For capacity building of rural women, Information communication extension strategies should be designed. For designing any strategy for women, need assessment is the first step. Need is a gap between what is and what ought to be. Need assessment of rural women is an urgent step. Without assessment of need we cannot deliver information among the rural people.Studies showed that women want information on various topics as child care, agriculture, nutrition etc.According toDwivedi and Purang (2007) women farmers in Uttar Pradesh region required information on credit availability (40 per cent), agriculture insurance (40 per cent), cooperative association (50 per cent) and risk management (43 per cent).Sharma and Singh (2016) revealed that rural home makers needed more knowledge in the areas of food and nutrition and child development.Sharma (2009) reported that the information needs of the respondents were balanced diet for pregnant women and nutrients in vegetables and fruits.Prabha (1988) reported that the areas of agriculture where of the respondents needed information included pesticides application (67.7 per cent), fertilizer application (64.6 per cent) and improved farm implement (50.8 per cent). Thus, we can say that need assessment is first and foremost step for designing any project and extension strategy.Rouda and Kusy (1996) suggested a four step model for conducting need assessment. Step 1- Performing a gap

analysis. It is done in order to check the actual performance of organization and people against existing standard or to set new standard. Step 2- Prioritizing the needs according to their importance from a large list of needs. Step 3- Identification of causes of problem and/ or opportunities. Step 4- Identification of possible solution and growth opportunities. Needs are determined by comparing performance on the tests with existing norms that is the performance of the population upon which the test to be standardized. Other purposes used to determine needs are desires or wants. Perceptions of what should be the status of performance and requirements. The first two are determined by public or professional opinion. Requirements are found in existing laws, policies and regulating procedures.

Thus, on the basis of needs of rural women an extension strategy should be designed. Thistype of strategy should fulfill the gap regarding information.

Participatory communication

Researches revealed that participatory mediaor participatory communication strategies can empower the rural women. The concept of participatory communication has been associated with the emerging field of "Development Communication" or communication for development and social change in which communication has been conceived as an integral part of the development process.

According to Harms (1976) communication is a "two-way, interactive and participatory process." He has managed to come up with a formulation of RTC which reflects a variety of its elements and visions including: (a) a right to assemble, a right to discuss, a right to participate and related association rights, (b) a right to inquire, a right to be informed, a right to inform, and related information rights, and (c) a right to culture, a right to choose, a right to privacy, and related human development rights. White (1981) defined participation as the involvement of local population in the decision making concerning development projects or in its implementation. The characteristics of participatory research may be described as follow: it rests on the assumption that human being have an innate ability to create knowledge and that this is not the prerogative of professional. It is an educational process for participation in the research programmes as well as for research. It involves the identification of community needs, awareness regarding constraints, an analysis of the causes of glitches and the designing and execution of solution.

Community Development programme was failed due to lack of participation of rural people in each and every step in the programme. Thus, participation of rural people is essential for

the successfully implementation of any programme.

Need of accessible, localized and friendly media for capacity building of women

Looking into the issues of capacity building of women, it seems imperative that more localized and participatory community media could be used to work with rural women according to their specific needs. Women of under-developed areas are less cosmopolite with lower exposure to communication and information sources as evident by plethora of researches. Capacity building of women studies indicate that participatory communication is increasingly recognized by many agencies as a development tool with the ever-evolving world of information technologies (i.e. Community radio, Internet, Mobile phones) being used to mobilize social change among hill women.

CONCLUSION

One project on **"**capacity development support to rural women on the socio-economic and gender aspects of sustainable rural development" financed by the Government of Turkey under the FAO-Turkey Partnership Programme was initiated in Turkey and Azerbaijan. They gave CoCoCoCo" approach ("co-diagnoses, co-design, co-act and co-

learn"). As per the project objectives firstly need assessment was done. On the basis of need extension strategies were designed. Elements include: the training of more than 60 extension and rural advisory staff members in designing and delivering gender-sensitive rural advisory services and the development of a participatory training of trainers manual that draws on experiences and feedback from pilot training participants.

Thus, we can say that capacity building of rural women is possible through the extension strategies designed on the basis of needs of rural people. Local media can also empower the rural people if they broadcast the programme on the basis of needs of rural people. Participation is another important aspect. To make the successful of any programme, participation of rural people is necessary.

REFERENCES

FAO 2016. Capacity development support to rural women on the socio-economic and gender aspects of sustainable rural development. A project financed by the Government of Turkey under the FAO-Turkey Partnership Programme http://www.fao.org/3/a-i6301e.pdf

Dwivedi, P. and Purang, P .2007. Training needs identification and evaluation: case study of Indian organizations. Indian Journal Training and Development. Vol. 37, No.1, pp:5-21.

Girard, M. 2003. Satellites over South Asia: Broadcasting, Culture and the Public Interest. New Delhi: Sage Publications, pp:47-68.

Govindaraju P., Kalavathy M. 2002. Case Study: Holy Cross Community Radio, Trichy, Tamil Nadu, India Serving communities: The Holy way. http://portal.unesco.org/ci/ev.php.

Harms, M. 1976. Radio: A post nine eleven strategy for reaching the world's poor. Lanham, MD:University Press of America.

Kumar, N., Singh, V., Vashis hta, P. and Saxena, R. R. 2004. A Study on Nutrition Status of Pregnant Women of Kanpur Nagar. Indian Research Journal of Extension Education. Vol-4, No.1& 2, pp: 29-33.

Prabha, S. 1988. Need assessment of farm Women for Selected Child Care & Nutritional Practices for Designing Audio Cassettes. Unpublished Thesis M. Sc. G.B.P.U.A. &T., Pantnagar.

Pradeep 2009. Educational Needs of the Rural Mothers of Children under five years of age in regard to nine aspects of Child Nutrition. Indian Journal of Home-Science. Vol.65, No.1, pp: 48-49.

Lennie, J. 2002. Rural women's empowerment in a communication technology project: some contradictory effects. Rural Society, *12*(3), 224-245.

Rouda, R. H. and Kusy, M. H. 1996. Four steps to conducting a need assessment.

Tappi J. Retrieved from. http://alumnus.caltech.edu/rouda/T2.

Singh, C. 2011. Community Radio Voices in Asia. Media Watch. Vol. 2, No. 1, pp:44- 46.

Sharma A. 2010. Community Radio for Rural Development. 2010-11 Budget *Yojana* (A Development Monthly). Vol.54, pp.60-63.

Sharma, A. 2012. Concept of Mobile Technology in Community Radio. Media Watch *a* research and news feature journal in Journalism and mass communication. Centre for Communication Studies, SCS College Road, Near Amala Club, Puri. Vol.2, No.1,Janurary-June2011, pp.20-27.

Shively, S. 2009. The Role of Community Radio in India. http://www.radioduniya .in/CommunityRadio/articledetails.asp? Article=Community-Radio-iIndia&fm=11&yy=2008&articleid=19 1&typ=Community%20Radio.

Singh R. 2013. Community radio: A tool for participatory Agricultural Development. Indian Journal of Adult Education. Vol. 70, No. 4.pp.83-91.

Sharma, A. and Singh A. K.. 2016. Information needs of Farm women for efficient farming in Uttarakhand. Journal of Agrisearch. Vol 3, No. 2, pp:122-126.

White, A. T. 1981. Community Participation in Water and Sanitation. Concept Strategies and method. Technical paper 17. The Hague. WHO 7-26.

RESEARCH ARTICLE

Constraints and Suggestions of the Oil Palm Growers in Dammapeta Mandal of Khammma District of Telangana State

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ABSTRACT

The study revealed that the important constraints were in resource management for oil palm cultivation was identified situational, technical and economical constraints. in case of situational constraints, (100%) regular price fluctuation in the market, (100%) non availability of suitable equipment for oil palm FFBs harvesting, (74.66%)high wages rates, (66%) non availability of skilled labours, (28%) problem of snakes and (24%) insufficient oil palm industry. In respect of technical constraints, it was found that majority of the respondents (70%) faced the problem about lack of knowledge to handling the drip system, lack of knowledge about use of growth regulator/hormones/micronutrients (50.66%). In case of economic constraints majority of the respondents (85%) reported that high cost of maintenance of orchard, lack of credits support on oil palm inputs (50%) to oil palm growers.

Key words: Oil palm, Constraints

INTRODUCTION

Oil palm also known as miracle oil, because it is used for both edible and non edible oil (give more oil per hectare than other oil crop). It has become the world's number one fruit crop because of its unparalleled productivity. This is the highest oil yielding plant among perennial oil yielding crops, producing palm oil and palm kernel oil. Globally, it occupies an area of 11 million hectare with a total production of 35 million tonnes of palm oil in 2007. Presently, South East Asia is the dominant region of production, with Malaysia and Indonesia accounting for around 86% of the world's palm oil production in 2007. India, China and the EU are the major global importers of palm oil.

Domestic consumption of edible oils has increased substantially over the years and has touched the level of more than 24.50 million tonnes in 2015-16. The per capita consumption which was 15.8 kg / person / annum in 2012-13 has increased to 19.57 kg / person / annum in

2015-16, it is likely to increase further with enhancement in income. The production of domestic edible oils (8.77 million tonnes in 2015-16.) has not been able to keep space with the growth in consumption and the gap between production and consumption is being met through imports which amounted to Rs. 68,000 crores (2015-16). Palm oil contributes 70% of total vegetable oil import and is one of the cheapest oil due to high productivity per hectare.

According to 2009 statistics 26.19% of vegetable oil requirement in the world is provided by oil palm. It has 40% share of the world's trade in edible oil. The total net area under cultivation worldwide is 11,000,000 hectares (42,000 sq. m) as per 2006 statistics. The worldwide area planted under oil palm has increased by more than 150% in the past few decades. Most of this increase has taken place in South-East Asia, particularly in Malaysia and Indonesia. in India is 2 million hectares up to 2012-2013.It is estimated that the demand for palm oil would be 68 million tonnes, out of 170 million tonnes of vegetable oils by 2015.

In Khammam district where the present study has been conducted, oil palm cultivation covers an area of 13,511 hectares with production of 62,652 million tonnes of FFBs per hectare and productivity 15-20 tonnes per hectare during 2016-17.

METHODOLOGY

The present research study was conducted in Dammapeta mandal of Khammam district of Telangana state. In Khammam district Dammapeta mandal were purposively selected for the research. Ten villages in Dammapeta mandal were purposively selected for research. These villages are considered on basis of high area under oil palm cultivation. From each village fifteen oil palm growers were selected comprising total 150 oil palm farmers were selected for the research work. An interview schedule was developed with the help of scientists of Dr. PDKV., Akola. Data was collected with the help of interview schedule. Personal interview method was used for data collection. For the analysis of collected data simple statistical techniques like frequency, percentage, standard deviation and coefficient of correlation were used. One shot case study research design with "Ex-Post-Facto"research approach was used present study. The findings were suitably interpreted and necessary conclusions and interfaces were drawn.

RESULTS AND DISCUSSION:

Table 1: Distribution of the respondents according to the constraints faced by the oil palm growers in managing the resources (N=150).

Sl.No.	Constraints	Number of Respondents(150)	Percentage
A	**Situational constraints**		
1	Regular price fluctuation in the market	150	100.00
2	Non availability of suitable equipment for oil palm FFBs harvesting	150	100.00
3	High wages rates	112	74.66
4	Non availability of skilled labours	99	66.00
5	Problem of snakes	42	28.00
6	Insufficient oil palm processing industry	36	24.00
B	**Technical constraints**		
7	Lack of knowledge to handling the drip system	105	70.00
8	Lack of knowledge about use of growth regulators/hormones/micronutrients	76	50.66
C	**Economic constraints**		
9	High cost of maintenance of orchard	85	56.66
10	Lack of credit support on oil palm inputs	75	50.00

Constraints encountered by the respondents in resource management for oil palm cultivation were identified and classified under three heads viz. situational, technical and economical constraints. The information in this regard furnished in Table1. Showed that, in case of situational constraints, (100.00%) regular price fluctuation in the market, (100.00%) non availability of suitable equipment for oil palm FFBs harvesting, (74.66%) high wages rates, (66%) non availability of skilled labours, (28%) problem of snakes and (24%) insufficient oil palm processing industry were major constrains expressed by oil palm growers.

In respect of technical constraints majority of the respondents (70%) faced the problem about lack of knowledge to handling the drip system, lack of knowledge about use of growth regulator/hormones/micronutrients (50.66%). In case of economic constraints majority of the respondents (85%) reported that high cost of maintenance of orchard, lack of credits support on oil palm inputs (50%) reported as economical constraints by respondents.

CONCLUSION

From above study it is concluded that regular price fluctuation in

the market, non availability of suitable equipment for oil palm FFBs harvesting, high cost of maintenance of orchard, high wages rates, lack of knowledge to handling the drip system, non availability of skilled labours, lack of knowledge about use of growth regulator / hormones/ micronutrients, lack of credits support on oil palm, problem of snakes, insufficient oil palm processing industry. These are the most frequently occurred and regularly faced constraints. Suggestions to overcome the constraints were minimum support prices should be fixed by the government, develop the suitable equipment to harvest FFBS, reduce the labour problem by providing mechanized agricultural Inputs and fixe the wages rates, provide well trained and high skilled labours to oil palm growers through oil palm society or Horticulture departments on price bases, provide on time credit support to oil palm growers by bankers, The government should gave emphasis on these constraints and organization of short training courses for on the improved oil palm cultivation practices, which will help to increase the knowledge level of the farmers. Government should establish oil palm refinery industry in Telangana state.

REFERENCES

Akangbe.J.A. G.B., Adesiji, S.B., Fakayode and Y.O, Aderibigbe, 2011.Towards palm oil self-sufficiency in Nigeria, constraints and training needs nexus of palm oil extractors.J Hum Ecol, 33(2): 139-145.

Ayinde, O.E., M. Muchie., A.H. Adenuga., M.O. Jesudun., F.I. Olagunju and M.O., Adewumi. 2012. Food security and emerging innovations in oil palm production in Osun state, Nigeria.www.pjbs.org/pjnonline/fin2469.pdf

Bernor, D., J.Q., Harrison and Baxter, 1997. Agricultural extension. The training and visit system. Washington, D.C. The World Bank.

Bhople, R.S., K.K., Thakur and A.H., Atrey, 1990. Source of information knowledge and adoption of dry land Horti. Technology by farmers. Paper presented in national level seminor on changing scenario of rain fed Horti. In rural areas. Marathwada (Agri.) University. Parbhani, oct.1990.

Chandrakar, Khushboo, Choudhary, V.K., and A.K., Koshta, 2015. Constraints in banana cultivation and supply chain management in Raipur district of Chhattisgarh. Internet Res. J. Agric. Eco. & Stat., 6 (2): 410-413.

Ibitoye, O.O., A.O., Akinsorotan, N.T., Melludu and B.O., Ibitoye, 2011. Factors affecting oil palm production in Ondo state of Nigeria. www.ajol.info/index.php/jasr/article/viewFile/73682/64360.

Kinkhedkar, A.K., 2001. Resourse management behavior of orange

grower. *M.Sc. (Agri.) Thesis* (Unpub.), Dr. PDKV, Akola.

Koshti, N.R., 2013. Farmer's perception and adaptations towards climate change and variability in distress prone districts of Vidarbha region *Ph.D.Thesis* (Unpub.), Dr.PDKV, Akola.

Mgbakor M.N., U. Jennifer Nkechi and F.Oghenemaro, 2013. Problems and prospects of oil palm production in Isoko south local government area of Delta state, Nigeria.

Narasimharao.v, 2013. Oil palm cultivation in Andhra Pradesh state – A study of the problems and prospects.

Raymond, N., L.F, Nkongho, and L., Patrice, 2014. Strengths and weaknesses of the small holder oil palm sector in Cameroon. 21(2) D208

https://www.cgiarfund.org/FundDonors.

Samanta, R.K., and G.L., Ray, 1981. Who shall repay agricultural loan. Biksanchittaranjan Avenue, Calcutta.

Thakare, U.G., 2004. Impact of centrally sponsored crop development programme on the beneficiaries. *Ph.D. Thesis* (Unpub.), Dr. PDKV, Akola.

Wankhede Y.N., 2016. Soil testing status of orange orchards in Amravati district, *M.Sc. (Agri.) Thesis*, (Unpub.), Dr. PDKV, Krishinagar, Akola. (MS.).

Yawalkar, P.B., .D.M., Nikhade and R.S., Bhople. 1991. Correlates of adoption of plant protection recommendation of kolshi by orange growers-a path analysis, *Maharashtra. j.Ext.Edc.x (2):216-217*.

RESEARCH ARTICLE

Constraints Faced by the Students in Use of Educational Technology for Learning

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ABSTRACT

The present study was conducted in two state agricultural universities i.e., one from north andone from south part of India. The universities were selected purposively based on the utilization of ET for creating better learning approaches among students.Postgraduate students of these two universities were randomly selected as a respondent from various departments. 60 respondents were selected from one university and 60 from other, thus the sample size of the study being 120. Data was collected through interview schedule and collected data were subjected to appropriate statistical analysis. The study indicated that the majority of the respondents faced lack of managerial skill in utilizing the available budget underfinancial constraints. In adequatenumber of practical classes for using ETunder administrative constraints, lack of training in use of educational technology under technological constraints, lack of knowledge and skill about use of educational technology (ET) toolsunder psychological constraints, and lack of maintenance of available devicesunder physical and material constraints. The study also revealed about suggestions of majority of the respondents viz., better management of available budget, provide more number of practical classes on ET by the department, proper maintenance of available ET devices at institutes, organizing more number of motivation classes regarding use of ET tools.

INTRODUCTION

Integration of the technology in learning process is more effective for the students and their learning outcomes. Hedberg (2006) stated that the educational technologies in university education are widely promoted for their potential to enrich, enhance and extend student learning experiences, they have not yet met with these expectations and yet these technologies continue to have an increasingly integral role in university learning practices. Brown (2006) defined that E-learning is the macro concept that includes online and mobile learning environments. M-learning is also an

important component of educational technology in higher education. Educational Technology plays a crucial role in learning process in the present educational system but integration of the advanced learning technology is sometimes creating problem in using by the students because of lack of awareness, knowledge and skills. Instructional personnel (teachers, instructional designers, etc.), mindful of the real-world needs of learners and constraints faced in the learning context, strive to apply sound learning theories and instructional design approaches to integrate new technologies as they arrive on the scene with increasing rapidity, abundance, and complexity (Brill and Park2008). ET includes medias like audio and video, computer, tablets and mobile devices, social networks, webcams, whiteboards, virtual classroom, learning management system, training management system, and learning objects. The present study deals with the constraints faced by the students and suggestions given by them to overcome constraints regarding use of educational technology in learning. A major significance of this study is the potential to apply findings to university student's education approaches to support future learning in any virtual or physical technologyenriched spaces.

Literature Review

Talebianet et al. (2014) stated that educational tools do not work for everyone or everywhere in the same way. Agricultural students from Iran country were faced many problems regarding ICT tools as an educational purpose due to lack of infrastructure facilities and nature of teaching and learning in agricultural field.

Wankhade et al. (2017) revealed that 100% of the students were faced problems of low power supply, 98.33% of the students expressed that there was no backup system for power supply like invertor or generator instead of power cut. 91.67% of the students faced problem of lack of maintenance of available computers, 83.33% of the respondents faced problem of insufficient computers in the collage. It was also reported that majority of the students faced problem of unavailability of computer facilities, lack of printing facilities, lack of sufficient books for issue and lack of knowledge about ICT in Learning.

Singh and Pal (2018) revealed that majority of the students (40%) expressed problems regarding accessing e-resource due to poor connectivity followed by 36% students had lack of knowledge about how to use computer. 32% students were said that lack of sufficient computers with poor internet facilities inhibit them to use,

and lack of information technology using skills by 30% of the students.

Suggestion also indicated that the increase data (bandwidth) and network with sufficient bit for better access, sufficient amount of computers at institute, providing conducive environment, and better electrical backup for better learning environment.

Objective

x To identify constraints faced by the students regarding use of educational technology in learning.

x To record and analyse the suggestions given by the students on the constraints in learning.

METHODOLOGY

The present study was used quasi-experimental research design where data were collected through open ended interview schedule. Students were randomly selected as a respondent from various departments. Sixty respondents from one agricultural university from South India and another 60 from North India.Thus, the sample size of the study was 120.Students were asked to put their comments on constraints faced by them and suitable suggestions for overcoming the constraints regarding use of educational technology in learning. Data was collected through interview schedule and collected data were subjected for content analysis and used appropriate statistical tools viz., frequency and percentage.

RESULTS

1. **Constraints faced by the students in adoption of educational technology in Learning.**

Multiple responses were taken to ascertain the constraints faced by the students in adoption of educational technology in learning and analysed by content analysis, frequency and percentage. Data regarding these constraints are presented in table 1. The data revealed regarding financial constraints that the majority of the students (82.5%) faced lack of money for purchase ET tools/devices, followed by lack of management of available money (95.8%). The administrative constraints faced by students are such as lack of practical classes for using ET (96.66%), lack of guidance by teachers to use ET (92.5%) and lack of curriculum management for learning (81.66%).

Table 1 also revealed about technological constraints that the majority of the students faced lack of training regarding use of educational technology (100%), followed by improper maintenance of available devices (92.66%) and lack of technical knowledge to access ET tools (85.83%).

The table 1 also revealed psychological constraints such as lack of knowledge and skill about use of

educational technology (ET) tools (96.66%), lack of awareness about ET tools (81.66%) and lack of motivation for learning with educational technology (85%). The physical constraints faced by the students arelack of maintenance of available devices (93.33%), lack of lab facilities in the department (83.33%), lack of smartboard in the department (80%) and non-availability of computers (74.16%). Similar constraints were indicated by the other researchers (Bhankole and Uludayo, 2012) that the slow internet connections increased the time spent on internet and invariably the cost of usage is increased. That the non-provision of free internet facilities for them in the University unlike their counterparts in some neighbourhood Universities that enjoy their intuitional internet free of charge is a very serious impediment limiting Internet use.

Table 1: Constraints faced by the students in using Educational Technology in learning

Sl. No.	Constraints and Suggestions	Frequency	Percentage
1.	**Financial Constraints**		
a.	Lack of money for purchase ET tools/devices	99	82.50
b.	Lack of management of available money	115	95.83
2.	**Administrative Constraints**		
a.	Lack of curriculum management for learning	98	81.66
b.	Lack of practical classes for using ET	116	96.66
c.	Lack of Guidance by the teachers for using ET	111	92.50
3.	**Technological Constraints**		
a.	Improper maintenance of available devices	110	91.66
b.	Lack of advanced training in use of ET in learning	109	90.83
c.	Lack of technical knowledge to access ET tools	120	100.00
4.	**Psychological Constraints**		
a.	Lack of motivation for learning with educational technology	98	81.66
b.	Lack of awareness about ET tools.	102	85.00
c.	Lack of knowledge and skill about use of ET tools	116	96.66
5.	**Physical/Material Constraints**		
a.	Non-availability of computers.	89	74.16
b.	Lack of smartboard in department	96	80.00
c.	Lack of lab facilities in department	106	88.33
d.	lack of maintenance of available devices	112	93.33

*Multiple responses obtained.

2. Suggestions given by the students to overcome constraints in adoption of educational technology in learning.

Multiple responses were taken to ascertain suggestions to overcome these constraints in adoption of educational technology in learning. The suggestions were analysed by content analysis, frequency and percentage is presented in Table 2.The suggestions provided by the students are to better management of available budget,provide financial support to students for purchase educational technology tools,providemore number of practical classes on ET by the department for students, followed by providing mass media exposure,to overcome finance and administrative constraints.

Students also given suggestion to overcome technological constraints that proper maintenance of available devices in institute, providing technical knowledge and provide training on use of ET for learning purpose. Table 2 concluded that the suggestions given by students to overcome psychological constraints are frequently conduct of motivation classes regarding use of ET tools, providing training on knowledge and skill development regarding ET develop to confidence, and conduct workshop for awareness of ET tools for students.Suggestions given by the students to overcome by physical / material constraints are proper maintenance of available devices, provide smartboard for every department, providing sufficient computer facilities and developing academic atmosphere for adopting ET tools.It would provide the rich environment and motivation for learning which seems to have a profound impact on the process of learning in education by offering new possibilities for learners. These possibilities can have an impact on student performance and achievement. Similarly, wider availability of best practices and best course material in education, which can be shared by means of ICT, can improve academic achievement of students. The overall literature suggests that successful ICT integration in educationis more important (Noor-Ul-Amin, 2013).

Table 2 Suggestions given by the students to overcome constraints in using Educational Technology in Learning.

Sl. No.	Constraints and Suggestions	Frequency	Percentage
1.	**Suggestions on financial constraints**		
a.	Financial support may be provided to purchase ET devices	112	93.33
b.	Should be better management of available money	120	100

2.	**Suggestions on administrative constraints**		
a.	Good mass media exposure may be provided	118	98.33
b.	More number of practical works may be provided for using ET tools	120	100
3.	**Suggestions on technological constraints**		
a.	Proper maintenance of available devices in institute	117	97.5
b.	Technical knowledge may be provided	107	89.16
c.	Provide training on use of ET for learning purpose	99	82.5
4.	**Suggestions on psychological constraints**		
a.	Frequently conduct motivation classes regarding use of ET	120	100
b.	Conduct workshop for awareness of ET tools for students.	114	95
c.	Training may be provided on Knowledge and skill development regarding ET	115	95.83
5.	**Suggestions on physical constraints**		
a.	Sufficient computer facilities may be provided.	97	80.83
b.	Proper maintenance of available devices	118	98.33
c.	Academic atmosphere may be developed and maintained.	79	65.83
d.	Provide smartboard for every department	110	91.66

*Multiple responses obtained.

CONCLUSION

The study indicated that the majority of the respondents faced lack of management of available money in order to address financial constraints, lack of practical classes for using ET under administrative constraint, lack of training regarding use of educational technology, lack of knowledge and skill about use of educational technology (ET) tools, and lack of maintenance of available devices under physical and material constraints respectively.

The suggestions provided by the majority of the respondents were better

management of available budget, provide more number of practical classes on ET by the department, proper maintenance of available devices in the institute, frequently conduct of motivation classes regarding use of ET tools and proper maintenance of available devices.

This research will contribute to the body of knowledge in extending the literature on ET. Similarly, it will provoke management to come up with various appropriate strategies on how to manage these challenges faced by students in using ET tools for learning purpose. The limitation of the study is that the findings cannot be generalized to the respondents

which were not part of the study. A comparative study is needed across two universities to validate the findings of this study and get anaggregate view on the adoption of ET tools by students and make specific conclusions.

REFERENCES

Bankole, O.M. and Oludayo, B.S., 2012. Internet Use among Undergraduate Students of OlabisiOnabanjo University, Ago Iwoye, zigeria. *Library Philosophy and Practice*, *812*.

Brill, J.M. and Park, Y., 2008. Facilitating engaged learning in the interaction age taking a pedagogically-disciplined approach to innovation with emergent technologies. *International Journal of Teaching and Learning in Higher Education*, *20*(1),70-78.

Brown, Tom H. 2006. M-Learning in Africa: Doing the Unthinkable and Reaching the Unreachable. *An international Handbook of information technology in primary and secondary education*, 861-871.

Hedberg, J. G. (2006). E-learning futures? Speculations for a time yet to come. *Studies in Continuing Education*, 28(2), 171-183.

Noor-Ul-Amin, S., 2013. An Effective Use of ICT for Education and Learning by Drawing on Worldwide Knowledge, Research, and Experience. *ICT as a Change Agent for Education. India: Department of Education, University of Kashmir*, 1-13.

Singh, D., and Pal, D., 2018. Awareness and Use of Electronic Resources by Post-Graduate Students in Technical: A Study. *Journal of Advanced Scientific Research and Management,* 3(7):208-211.

Talebian, S., Mohammadi, H. M. and Rezvanfar, A. 2014. Information and Communication Technology (ICT) in Higher Education: Advantages, Disadvantages, Conveniences and Limitations of Applying E-Learning to Agricultural Students in Iran. *Procedia - Social and Behavioral Sciences* 152: 300–305. https://doi.org/10.1016/j.sbspro. 2014.09.199.

Wankhade, P.P. et al. 2017. Use of Information Communication Technology in the Post Graduate Students. *Indian Research Journal of Extension Education*.14

Zayim, N., Yıldırım, S., and Saka, O. 2005. Instructional technology Adoption of Medical Faulty in Teaching. *Studies in Health Technology and Informatics*, 116: 255.

RESEARCH ARTICLE

Constraints Faced by Chilli growers in Adoption of Recommended Package of Practices

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ABSTRACT

The study was conducted in Agricultural Zone Sopore of district Baramulla of Jammu and Kashmir state. With the help of proportionate allocation method 100 growers were selected and data were collected by personal interview method by using pre tested interview schedule. The results revealed that Lack of Extension services (87.00 %), less knowledge regarding package of practices recommended by SKUAST-K (74.00 %), High cost of production (71.00 %), less income from chilli (67.00 %), lack of vigilance and inspection on pesticide dealers by government (64.00 %), lack of technical guidance in selection of appropriate chemicals (52.00 %) were the major constraints expressed by the chilli growers. The policy maker and developmental agencies should have to consider these constraints as chilli is the important vegetable crop of this region.

Key Words: Chilli growers, Constraints

INTRODUCTION:

Vegetables are the most important human diet for better health because they possess high nutritive value and are a rich source of carbohydrates, proteins, vitamins and minerals and thus play an important role in human nutrition in supplying adequate quantity of free radicals, anti-oxidants, micro-nutrients and essential amino acids, which are essential for normal functioning of human metabolic processes. Looking to the vegetable scenario in the world China is dominating as it produces 43.3 per cent of the world vegetable production followed by India with a total production of 1.75 lakh metric tonnes which contributes 9.7 per cent of world vegetable production (Anonymous, 2003). The daily requirement of vegetables in human diet in India is 300 g/day/person but we are able to produce only 245 g/day/person still short of 55 g/day/person. In India more than 40 different kinds of vegetables are grown. However, a planned development in the field of vegetable

production is very much essential to improve the nutritional security for masses (Singla *et al*, 2016).

Among vegetables Chilli *(Capsicum annum* L.) is one of the most important commercial vegetable cum spice crop grown almost in all the parts of temperate, tropical and subtropical regions of the world (Goudappa*et al.* 2012). Pungency in chillies is due to the active constituent "Capsaicin", an alkaloid, is extracted from chillies and is used to medicine. The fruit is actually called 'Chilli' and is used as a spice in a variety of cuisines all over the world in different forms as green chilli, dried red chilli (Jagtap*et al.*2012).

In India, chilli is grown over an area of 774.9 thousand ha with total production of 1492.10 thousand tonnes Andhra Pradesh is the largest producer of chillies in India with total production of 685.15 thousand tonnes followed by Karnataka (107 thousand tonnes), West Bengal (100 thousand tonnes), Madhya Pradesh (93.57 thousand tonnes), Orissa (70 thousand tonnes), Maharashtra (45.60 thousand tonnes) and Tamil Nadu (23.06 thousand tonnes). (Anonymous, 2015-16).

In Jammu and Kashmir, the total area under vegetable crops is about 62.63 thousand ha and production 1386.37 thousand tonnes. The area under chilli crop in Kashmir valley is about 3080 ha with production of 48072 metric tonnes (Anonymous, 2015).

Baramulla is the most important chilli growing district of Kashmir valley due to favourable climatic conditions and availability of proper marketing facilities as compared to other districts. In district Baramulla, Sopore Sub-Division has the highest area 85.55 ha under chilli and other vegetables (SDAO, Sopore).

METHODOLOGY:

The study was conducted in Agricultural Zone Sopore of district Baramulla of Jammu and Kashmir state as having the maximum area under chilli cultivation. Ex-post-facto research design was used in the present study. Five villages were selected having maximum number of growers. The villages were selected purposively as chillies are grown in only these five villages for commercial purposes, the villages selected for present study were- Arampora, Adipora, Chinkipora, Nowpora, and Tarzoo. A sample of 100 chilli growers was taken by proportionate allocation method of sampling from the selected villages.

Measurment of constraints

The oxford dictionary meaning of the word constraints is confinement, restriction of liberty or compulsion of circumstances or compulsion put upon the behaviour. Reading (1971) defined constraints as the use of force to influence or prevent an action or quality or state of

being compelled to do or not to do something.

In the context of our study the impediments/constraints for limiting the knowledge and adoption level of the recommended package of practices by chilli growers was taken into consideration. The responses were collected through unstructured schedule for constraints and frequency was calculated. Percentage of frequencies for each of the constraints was obtained and ranking was done on the basis of maximum percentage.

RESULTS AND DISCUSSION:

Table 1 Constraints faced by chilli growers in the adoption of recommended practices. (N=100)

Sl.No	Constraints	F	P	R
A.	**Social constraints:**			
1.	Producing chillies only for consumption purpose	11	11	XII
2.	Family members prefer jobs than farming	32	32	XI
B.	**Economic constraints:**			
3.	Less income from chilli sales	67	67	IV
4.	High cost of production in growing chillies	71	71	III
5.	Frequent fluctuation of prices	41	41	IX
C.	**Technical constraints:**			
6.	Lack of Extension services	87	87	I
7.	Lack of technical guidance in selection of appropriate chemicals	52	52	VI
8.	Lack of technical guidance for optimum pesticide dose	30	30	XII
D.	**Knowledge constraints:**			
9.	Less knowledge regarding package of practices recommended by SKUAST-K	74	74	II
10.	Unawareness about recommended chemicals and formulations for controlling various diseases	46	46	VIII
11.	Unawareness about time of application of fertilizers	40	40	X
E.	**Constraints related to inputs:**			
12.	Spurious chemicals available in the market	46	46	VIII
13.	Non-availability of chemicals on time	8	8	XIV
F.	**Marketing constraints:**			
14.	Lack of proper marketing channels	48	48	VII
15.	Lack of vigilance and inspection on pesticide dealers by government	64	64	V

F= Frequency, P= Percentage, R= Rank

The Table-1 indicated some constraints faced by the chilli growers while adopting the recommended package of practices areLack of Extension services (87.00 %), Less knowledge regarding package of practices recommended by SKUAST-K (74.00 %), High cost of production (71.00 %), Less income from chilli (67.00 %), Lack of vigilance and inspection on pesticide dealers by government (64.00 %), Lack of technical guidance in selection of appropriate chemicals (52.00 %), Lack of proper marketing channels (48.00 %), Unawareness about recommended chemicals and formulations for controlling various diseases (46.00 %), Spurious chemicals available in the market (46.00 %), Frequent fluctuation of prices (41.00 %), Unawareness about time of application of fertilizers (40.00 %), Family members prefer jobs than farming (32.00 %), Lack of technical guidance for optimum pesticide dose (30.00 %), Producing only for consumption purpose (11.00 %) and Non-availability of chemicals on time (8.00 %) .

Suggestions for promoting the adoption of the recommended package of practices by the Chilli growers:

Based on the findings of the study and discussion with the chilli growers, some of the suggestions might be helpful for promoting the adoption of the recommended package of practices among the chilli growers:

1. Conducting of awareness programmes regarding the use and subsequent benefits of treated seeds through the information provided by the extension personnel's of State Agriculture Production Department.

2. The growers need to be motivated to use the correct doses of fertilizers so as to get the higher returns and reduce the expenditure of over dosage of fertilizers used.

3. Provision should be made for adequate and timely supply of essential inputs. Such as improved seeds, varieties, fertilizers, insecticides and fungicides along with the timely finance and credit facilities for the chilli growers at low interest rates.

4. Method as well as result demonstrations should be conducted to provide the knowledge to the growers regarding proper seed rate and sowing time and further guiding and solving the problems of chilli growers should be done through observation and discussion.

5. The extension functionaries should take the initiatives at the gross root level in developing the contacts with the growers and they should be encouraged to take part in various extension activities like Farmers day,

Kissanmelas, Trainings, Kissangoshties, Method demonstrations etc.

6. The findings of the study have revealed that lack of technical knowledge has been the main constraint in the adoption of the recommended package of practice. So, awareness should be created among the chilli growers about the scientific cultivation of chilli crop through the use of mass media and by organizing short term training programs for them.

7. Government should come up with good marketing facilities which will help the growers in selling the chilli crop in distant markets to get higher returns. In addition to this government should check the exploitation of growers by various commission agents.

8. Government and the farmers should established agro-processing units and cold storage units on co-operative basis in order to reduce the distress sale of chillies and to avoid glut in the market in the peak period.

REFERENCES:

Anonymous, 2003. Indian Agriculture-2003, Indian Economic data research, New Delhi.

Anonymous, 2015. Jammu and Kashmir Department of Agriculture.

Anonymous, 2015-16. National Horticulture Board Database.

Goudappa, S. B., Biradar, G. S. and Bairathi, R. 2012.Technological gap in chilli cultivation perceived by farmers,*Research Journal of Extension Education***20**: 171-174.

Singla, R. and Singh, J. 2016. Constraints in adoption of vegetable production technologies by the farmers, *International Journal of Farm Sciences***6**(3): 246-253

Jagtap, P. P., Shingane, U. S. and Kulkarni, K. P. 2012. Economics of Chilli Production in India, *African Journal of Basic and Applied Sciences***4**(5):161-164.

Reading, H. F. 1971. Simple dictionary of social sciences. Ambika Publication, New Delhi.

RESEARCH ARTICLE

Farm Women Attitude towards Girls Education

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ABSTRACT

The present study was undertaken in villages of Akola and Akot Panchayat Samities of Akola district in Maharashtra state by interviewing 120 farm women from 10 villages. The Ex-post facto design of social research was used for the study. Findings of study revealed that majority of the educated girls of farm women are more helpful to their parents than the uneducated girls, agree with educated girls will turn in to ideal housewives,accepting the idea that education will help the girls to solve their day today problems,education of girls improved generation to come, education makes the girls self-sufficient,denied that education of girl is wastage of money, and there is no necessity of girl's education as they have to ultimately serve their spouses. The majority of respondents (84.17%) had overall favourable attitude towards girls education. The variables like age, education, land holding, annual income, caste, occupation, social participation, mass media exposure shows significant relationship with attitude towards girls education.

INTRODUCTION

Education of a girl is like educating a family while educating a boy is merely educating a person. The educational backwardness of rural people is due to their traditional attitude towards female education. Without the participation of women in national activities, the social, economic or political progress of a country will be stagnated. The social status of the women is the reliable indicator of the economic development of a society. Indian literacy rate grew to 74.04 per cent in 2011 Census from 12 per cent at the end of British rule in 1947. Out of 74.04 per cent, 82.14 per cent is male and 65.46 per cent is female (Anonymous, 2012).

According to Good (1959), attitude is the predisposition or tendency to react specifically towards an object, situation or value, usually accompanied by feelings and emotions. To provide the education to everyone, EFA (Education

for All) programme was launched in 2002 by the Government of India after its 86th Constitutional Amendment made education from age 6-14 the fundamental right of every Indian child. But position of girl's education is not improving according to determined parameter for women.

In most recent report on global level of children's participation in education by UNESCO (2005), finds that given its population, India has the largest number of girls who are not in school in the world. Women constitute almost half of the population of the world. Education for women is the best way to improve the health, nutrition and economic status of household that constitute a micro unit of a nation economy. In 21st century, women education has changed from independence of India to till date. Education is milestone of women empowerment because it enables them to respond to the challenges, to confront their traditional role and change their life. Hence, the study was carried out with specific objectives to study the personal, socio-economic and communicational characteristics of farm women, attitude of the farm women towards girl's education and delineate relationship between personal, socio-economic and communicational characteristics of farm women and attitude towards girls education

METHODOLOGY

The *ex-post facto* design of social research was used for the study. The study was carried out in Akola and Akottahsils of Akola district in Vidarbha region of Maharashtra State by taking into consideration that more number of women's population in this area. From these two tahsils, 10 villages were randomly selected from the list of villages. Out of 10 villages, 12 respondents from each village were randomly selected on the basis of those women having minimum one or two girls as their daughter in their family. Thus, in total from ten selected villages 120 respondents were selected by disproportionate random sampling method for present study.To measure the attitude scale developed by YashomatiKarande (2008) was used with slight modification.

FINDINGS

I] Attitude of Farm Women towards Girls Education

The standard attitude scale developed by YashomatiKarande (2008) was used to measureattitude of farm women towards girl'seducation. It was administered to the respondents and results are presented here below. The statements wise attitude of farm women was studied on three point continuum i.e. Agree, Undecided, Disagree and results have been presented in Table 1.

Table 1 Distribution of the respondents according to their attitude towards girl's education

Sl. No.	Statements	Agree(3)	Undecided(2)	Disagree(1)
1	Educated girls are more helpful to their parents than uneducated girls.	108 (90.00%)	12 (10.00%)	00 (00.00%)
2	Educated girls will turn into ideal housewives.	86 (71.66%)	33 (27.50%)	01 (0.83%)
3	Education will help the girls to solve their day to day problems.	98 (81.66%)	20 (16.66%)	02 (1.66%)
4	To educate the girls means to improve the generation to come.	97 (80.83%)	14 (11.66%)	09 (7.50%)
5	Education makes the girls self-sufficient.	119 (99.16%)	01 (0.83%)	00 (00.00%)
6	There is feeling of insecurity for keeping the girls outside for education.	70 (58.33%)	49 (40.83%)	01 (0.83%)
7	There is no necessity of girl's education as they have to ultimately serve their spouses.	04 (3.33%)	11 (9.16%)	105 (87.5%)
8	There is wastage of money for educating the girls.	05 (4.16%)	14 (11.66%)	101 (84.16%)
9	Girls become fashionable and lazy due to education.	21 (17.50%)	47 (39.16%)	52 (43.33%)
10	There is more difficulty in the marriage of highly educated girls.	33 (27.50%)	77 (64.16%)	10 (8.33%)

(Figures in parentheses indicate percentages)

It is crystal clear from Table 1 that most of the farm women i.e. 90 per cent appeared to have favourable attitude with the statement that educated girls are more helpful to their parents than the uneducated girls. It is also noticed that most of respondents 71.66 per cent have favourable attitude with the statement that educated girls will turn in to ideal housewives. It was further noticed that majority of respondents 81.66 per cent were seen to be accepting the idea that education will help the girls to solve their day today problems. Similarly significant percentage i.e. 80.83 per cent was also observed to be in agreement with the statement like education of girls improved generation to come.

It was remarkable finding to quote that majority of respondents 99.16 per cent seemed to have high regard for education of girls which was reflected in the statement like education makes the girls self-sufficient. It was also observed that more than half of respondents (58.33%) had favourable attitude with the statement that there is feeling of insecurity for keeping the girls outside for education. It was good finding to note that majority of respondents i.e. 84.16 per cent had denied that education of girl is wastage of money. It was also noticed that nearly half of the respondents 43.33 per cent have unfavourable attitude with the statement that due to education girls become fashionable and lazy. It is also noticed that above two third of respondents 64.16 per cent have neutral attitude with the statement that there is more difficulty in the marriage of highly educated girls. Another finding observed majority of respondents 87.5 per cent were seen to be refusing the statement that there is no necessity of girl's education as they have to ultimately serve their spouses.

On an average it can be seen that the farm women have positive attitude towards girl's education. To put this attitude into action the Government should remove presumptions and highlight the needs of literacy.

Similar findings were reported by Bhinade (1986), Thombre (1986), YashomatiKarande (2008) and Ashwini Shintre (2009).

II] Attitude level towards girl's education

The data in Table 2 represents the attitude level of farm women towards girls education, the findings of study revealed that most of the farm women (90.00%) have favourable attitude towards educated girls are more helpful to their parents than the uneducated girls, Majority of respondents (71.66%) agreed with educated girls will turn in to ideal housewives. Majority of respondents (81.66%) were accepting the idea that education will help the girls to solve their day to day problems. Similarly significant percentage i.e. 80.83 per cent was also with the statement like education of girls improved generation to come. Majority of respondents (99.16%) seemed to have high regard for education of girls which was reflected in the statement like education makes the girls self- sufficient, more than half of respondents (58.33%) agreed with the statement that there is feeling of insecurity for keeping the girls outside for education.

Majority of respondents i.e. 84.16 per cent had denied that education of girl is wastage of money. Nearly half of the respondents (43.33%) have unfavourable attitude with the statement that due to education girls become fashionable and lazy. Nearly two third of respondents (64.16%) have neutral attitude with the

statement that there is more difficulty in the marriage of highly educated girls. Majority of respondents (87.5%) were seen to be refusing the statement that there is no necessity of girl's education as they have to ultimately serve their spouses.

Table 2: Distribution of farm women according to their attitude level towards girl's education

Sl. No.	Attitude level	Respondents (n = 120)	
		Frequency	Percentage (%)
1	Unfavourable	00	00.00
2	Neutral	19	15.83
3	Favourable	101	84.17
	Total	**120**	**100.00**

According to data in Table 3 independent variables education, land holding, caste, social participation and mass media exposure were found positively and significantly correlated with the attitude of farm women towards girl's education at 0.01 per cent level of probability. The variable like age was found negatively and significantly correlated with the attitude of farm women towards girl's education at 0.01 per cent level of probability and family annual income and occupation were found positively and significantly correlated with the attitude of farm women towards girl's education at 0.05 per cent level of probability.

Table 3 Relationship between personal, socio-economic and communicational characteristics of farm women and attitude towards girl's education

Sl. No.	Independent variables	('r' value)
1	Age	-0.2571^{**}
2	Education	0.7520^{**}
3	Marital status	-0.0571^{NS}
4	Family size	0.1162^{NS}
5	Family type	0.1236^{NS}
6	Land holding	0.2703^{**}
7	Caste	0.3149^{**}
8	Family annual income	0.2035^{*}
9	Occupation	0.2157^{*}
10	Social participation	0.2645^{**}
11	Mass media exposure	0.5095^{**}

It may be seen from R^2 value (Table 4) that the selected 11 variables explained to the extent of 63.73 per cent, the variation in the attitude of farm women towards girl's education. This indicates that much of the attitude of farm women remained unexplained by the selected variables. Also the education and caste as a variables shows positive and significant relationship with attitude of farm women which indicate that when farm women's education increases by 1 per cent then their attitude towards girl's education increases by 0.57 per cent and when caste changes by 1 per cent then their attitude towards girl's education changes by 0.91 per cent.

Table 4: Multiple regression of respondents with their attitude towards girl's education

Sl. No.	Independent variables	Regression coefficient (b) value	Standard error	't' value
1	Age	-0.0134	0.0275	-0.4879
2	Education	0.5748	0.0659	8.7112[**]
3	Marital status	1.0075	0.8813	1.1430
4	Family size	0.2003	0.1899	1.0545
5	Family type	0.2404	0.8691	0.2766
6	Land holding	0.0408	0.1413	0.2889
7	Caste	0.9166	0.3142	2.9172[**]
8	Family annual income	3.8046	6.7898	0.0560
9	Occupation	0.2452	0.1802	1.3610
10	Social participation	0.1848	0.1964	0.9410
11	Mass media exposure	-0.0357	0.1340	-0.2665

$R^2 = 0.6373$, F value = 17.25**   [**] **Significant at 1% level of probability.**

CONCLUSION

In the light of above significant relationship between education, family educational status, social participation and socio-economic status with attitude of farm women towards girl's education,it could be suggested that for speedy propaganda of education among farm women, with more education, high social participation and better socio-economic status may be constantly contacted to spread the value of education among other women in the village ultimately contributing to enhanced educational percentage in the village. The economic condition and literacy go hand in hand therefore farm women apart from agriculture, allied occupation should supplement their economy.

Mass media and information technology revolution has helped in shaping the attitude of people across culture and socio-economic status of families. Encouraging girl child to attend school is again another positive sign. However, more improvement can be witnessed if schools could be successful in generating parental involvement as well as work upon their feedback on running applied courses and vocational training for students.

REFERENCES

Ekale, J.V. (1983) Study of home managerial practices in vogue in rural area of Marathwada, Parbhani, Thesis (M.Sc.) Unpub. M.A.U., Parbhani.

KavithaMaheswari K, J. Godwin Prem Singh, (2014). Rural girl student's attitude towards education.Journal of Business Management and Social Sciences Research. 3(10): 66-72

KomalKashid, (2008). Empowerment of rural women through SHGs. M.Sc. Thesis (Unpub.) Dr. PDKV, Akola.

LukngamYomgam (2014). "Aspiration of girl students of college of agriculture, Nagpur."Thesis (Unpub.) M.Sc. (Agri.) Dr. PDKV, Akola.

Wankhade, P.P., R. T. Katole, S.K. Godse and D.M. Mankar, (2011). "Socio-economic profile of women members in Self Help Group."Journal of Agriculture Research and Technology. 36(3): 443-446.

YashomatiKarande, (2008). Attitude of rural women towards girl's education. M.Sc. Thesis (Unpb.), MAU, Parbhani.

RESEARCH ARTICLE

Opinion of Farmers on Use of Sugarcane Harvesters

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ABSTRACT

The study was conducted in purposively selected Malshiras and Pandharpur parts of Solapur district. 120 sugarcane growers were selected from eight villages which constituted the sample of study. Analysis of data revealed that a large majority of sugar factory personnel had a opinion that the time required for sugarcane harvesting is less and gives maximum sugarcane as a raw material to the factory (86.66 per cent), gives maximum output (yield) from the field of sugarcane (83.33 per cent) and maximum sugar recovery is possible as compared to manual harvesting (80 per cent).

Key Words: Opinion, Harvester, Sugarcane

INTRODUCTION

Sugarcane (*Saccharum officinarum L.*) occupies a place of pride in commercial crops of the country. It is one of the most important cash crops. It is grown intensively along the riverside and canal where irrigation facilities are readilyavailable. India ranks first in area and second in production of sugarcane in the world. Maharashtra alone contributes about 12.50 per cent of national sugarcane production. In Maharashtra total sugar produced during the year 2017-2018 is about 107 lakh mt ton and total sugarcane crushed is about 951.33 lakh mt ton (Agriculture Department, Govt. of Maharashtra report). In Solapur district total sugar factories are 39 in number which is highest in all the districts of the Maharashtra with sugarcane area about 21600ha.

Before mechanical harvesting systems were introduced, sugarcane had been harvested manually using various types of hand knives. This conventional harvesting operation still continues in a large scale in developing and underdeveloped countries around the world. Manual sugarcane harvesting is a very labour intensive and laborious activity. The advent of mechanical harvesting systems frees harvest labourers

from the drudgery of field operations. To harvest one hectare of sugarcane, it requires 7-8 hours by mechanical harvesting, whereas, 60-70 man days per ha.by manual harvesting. Mechanical harvesting also makes green cane harvesting possible which reduces Green House Gas emissions from pre-harvest burning necessitated by manual harvesting. Generally, sugarcane harvesters can be categorized into whole stalk harvesters and chopper harvesters.

The primary benefit of sugarcane harvester is to reduce the cost of sugarcane harvesting that is required to maintain high crop yield. The studies indicate that 20-30 per cent cost can be reduced in ratoon crop. Labor expenses can be reduced as the sugarcane harvester reduces time and increase the yield of sugarcane. Sugarcane harvester can lead to about 50 per cent reduction in tillage expenses. No burn of trash removes the human health hazard associated with the exposure to airborne matter (fly shoot and biogenic amorphous silica) when the cane field is burnt. Harvester significantly increases the economic return of cane production when compared with conventional harvesting methods. Although net revenue decreases by 4 per cent in the plant crop, the net revenue increased by 28 per cent in the return crop. This is primarily due to increased yield and 10 per cent reduced cost of production per ton cane. Sugarcane harvester

decreases the overall energy input required per ton of cane produced. The study was undertaken particularly to study the opinion of farmers and sugarcane factory personnel about use of sugarcane harvester, the constraints faced and suggestions toovercome them.

METHODOLOGY

The study was conducted in purposively selected Malshiras and Pandharpur tahsils of south-western parts of Solapur district. Four villages from each tahsil were selected by simple random sampling method. Thus, eight villages were selected from these two tahsils. In order to get representation of small, medium and large farmers, 15 farmers from each village were selected by using stratified proportionate random sampling procedure from selected villages. Thus, 120 sugarcane growers were selected from eight villages which constituted the sample of study.The Ex-post-facto research design of social research was used for the present study.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 regarding opinion of sugarcane growers about use of sugarcane harvesters is presented in Table 1.

Table 1. Distribution of sugarcane growers regarding their opinion about useof sugarcane harvester

Sr. No.	Statement	Frequency (N=120)	Per cent
1.	Use of sugarcane harvester leads toreduction in cost of sugarcane cultivation as compared to manual harvesting	85	70.83
2.	Use of sugarcane harvester gives more net profit than manually harvesting of sugarcane	95	79.16
3.	Sugarcane harvester becomes available on time, whenever it is required	70	58.33
4.	Use of sugarcane harvester resultsinto increase in sugarcane yield/ha. as compared to manual harvesting of sugarcane	80	66.66
5.	Use of sugarcane harvester saves time of farmer as compared to manual harvesting	80	66.66
6.	Use of sugarcane harvester results into reduction in labour requirement	70	58.33
7.	Use of sugarcane harvester leads to better sugar recovery than manual harvesting	65	54.16
8.	Rent charged for use of sugarcane harvester is fair and appropriate than labor harvesting rent	80	66.66

The data revealed that majority of sugarcane growers were of the opinion that the use of sugarcane harvester gives more net profit than manually harvesting of sugarcane (79.16 per cent), use of sugarcane harvester leads to reduction in cost of sugarcane cultivation as compared to manual harvesting (70.83 per cent), while, an equal number (i.e. 66.66 per cent) opined that the use of sugarcane harvester results into increase in sugarcane yield/ha. as compared to manual harvesting of sugarcane, the use of sugarcane harvester saves time of farmer as compared to manual harvesting and the rent charged for use of sugarcane harvester is fair and appropriate than labor harvesting rent. Further, 58.33 per cent sugarcane growers expressed the opinion that sugarcane harvester becomes available on time, whenever it is required and use of sugarcane harvester results into reduction in labour requirement. More than half of the respondents (54.16 per cent) were of the opinion that the use of sugarcane harvester leads to better sugar recovery than manual harvesting.

Similar findings were reported by Yadav *et al* (2008), Aitawade (2012) and Karkee *et al* (2014).

The data on opinion of the sugar factory personnel about sugarcane harvester is presented in Table 2.

Table 2. Distribution of the sugar factory personnel according to their opinion about sugarcane harvester

Sr. No.	Statement	Frequency (N=30)	Per cent	Rank
1.	Time required for sugarcane harvesting is less and gives maximum sugarcane as a raw material to the factory	26	86.66	I
2.	Gives maximum output (yield) from the field of Sugarcane	25	83.33	II
3.	Maximum recovery is possible as compared to manual harvesting	24	80.00	III
4.	Increases overall sugarcane crushing capacity of factory within season	22	73.33	IV
5.	Less awareness among sugarcane growersabout sugarcane harvester	22	73.33	IV
6.	Unavailability of the spare parts of sugarcane harvester	19	63.33	V
7.	Problem of skilled person to operate sugarcane harvester	18	60.00	VI
8.	High maintenance cost required for sugarcane harvester	16	53.33	VII
9.	Initial high cost of sugarcane harvester	14	46.66	VIII
10.	Unavailability of capital for sugarcane factory to purchase harvester	11	36.66	IX

The data shown in Table 2 revealed that a large majority of sugar factory personnel had a opinion that the time required for sugarcane harvesting is less and gives maximum sugarcane as a raw material to the factory (86.66 per cent), gives maximum output (yield) from the field of sugarcane (83.33 per cent) and maximum sugar recovery is possible as compared to manual harvesting (80 per cent). Further, it was observed that an equal proportion i.e. 73.33 per cent sugar factory personnel opined that the use of sugarcane harvester increases overall sugarcane crushing capacity of factory within season and there is a less awareness among sugarcane growersabout sugarcane harvester. A majority of these respondents had a opinion that there is an unavailability of the spare parts of sugarcane harvester (63.33 per cent) and problem of skilled person to operate sugarcane harvester (60 per cent). Finally, 53.33 per cent sugar factory personnel were of the opinion regarding high maintenance cost required for sugarcane harvester, initial high cost of sugarcane harvester (46.66 per cent) and unavailability of capital for sugarcane

factory to purchase harvester (36.66 per cent).

This is in conformity with the findings of Aitawade (2012) and Karkee *et al* (2014).

Constraints faced by sugarcane growers in utilization of sugarcane harvester

The data on the constraints faced by sugarcane growers in utilization of sugarcane harvester is given in Table 3.

Table 3. Constraints faced by sugarcane growers in utilization of sugarcane harvester

Sr. No.	Constraints/problems	Respondents (N=120)	
		No.	Per cent
1	Lack of awareness about spacing of sugarcane required for sugarcane harvester	84	70.00
2	Unavailability of sugarcane harvester at proper time	35	29.16
3	Land holding is less	44	36.66
4	Problems related to trash management	28	23.33
5	Doubt about insect pest attack due to trash	34	28.33
6	Problem in ratoon management	65	54.16
7	Expenditure on removaland reinstallation of irrigationset after harvesting of the crop	42	35.00
8	Damage of irrigation set during harvesting of crop	48	40.00

The data from Table 3 revealed that majority (70 per cent) of sugarcane growers had faced the constraint like lack of awareness about spacing of sugarcane crop required for sugarcane harvester. Further, it was observed that more than half of the respondents (54.16 per cent) of sugarcane growers had a problem related to the ratoon management. About 40 per cent of the sugarcane growers faced the constraint of damage to irrigation set during harvesting of sugarcane. It was observed from the Table 3 that 35 per cent respondents faced the constraint about expenditure on removal and reinstallation of irrigation set after harvesting of the crop. Also 36.66 per cent respondents faced the constraint about less land holding, whereas, 29.16 per cent respondents had constraint about unavailability of sugarcane harvester at proper time.About28.33per centoftherespondentsfacedtheproblemofdoubtabout insect and pest attack due to trash and 23.33 per cent respondents regarding problems related to trash management.

The above constraints are in line with those of Kokate and Kharde (2006).

Suggestions of the rrespondents' to overcome the constraints

The respondents' suggestions regarding utilization of sugarcane harvester are presented in Table 4.

Table 4. Suggestions of the respondents to overcome the constraints

Sr. No	Suggestions	Respondent (N=120)	
		No.	Per cent
1	Small sugarcane harvesters should be made available to the small land holders	86	71.66
2	Extension agencies should motivate farmers for group farming	68	56.66
3	Spacing of 4 ft. x 4 ft. for sugarcane cultivation	42	35.00
4	Sugarcane harvester should be made available on time	35	29.16

Majority (71.66 per cent) of the respondents suggested providing small sugarcane harvester to the small land holders. More than half (56.66 per cent) of the respondents suggested that the Extension agencies should motivate farmers for group farming. Further, 35 per cent respondents suggested spacing of 4 ft. x 4 ft. for sugarcane cultivation and 29.16 per cent respondents suggested for availability of sugarcane harvester on time.

These findings are in line with those of Anonymous (1999), Gurav (2000) and Gaikwad (2013).

Implications

From the research findings it was observed that the use of sugarcane harvester leads to increase in the yield and saves time and labour on large scale of the farmers. It also results into high sugar recovery compared to manual harvesting and increases the sugarcane crushing capacity of the factory within season. Therefore, use of sugarcane harvester may be promoted by sugar factories and agriculture department of stategovernment. Similarly, awareness trainings and campaigns may be organized by agriculture officer of sugar factory before the start of sugarcane planting season. Furthermore, extension department of the state agriculture may organize large scale awareness programme on sugarcane spacing required for sugarcaneharvester.

REFERENCES

Aitawade, N.M. 2012. Constraints faced in utilization of improved farm implements by sugarcane growers. M.Sc. (Agri.) (Unpub.) thesis, MPKV. Rahuri (M.S.).

Anonymous, 1999. A study of utilization of Agricultural implements by the farmers from Kolhapur district. AGRESCO

Res. Review Comm. Report. MPKV, Rahuri.

Gaikwad, A.S. 2013 White grub management practices adopted by sugarcane growers, M.Sc. (Agri.) Thesis, (Unpub.) MPKV, Rahuri.

Gurav, B.S. 2000. Study of maintenance, knowledge and experiences of sugarcane growers about the drip irrigation system for sugarcane crop in Rahuri tahsil of Ahmednagar district M.Sc. (Agri.) Thesis (unpub.), MPKV, Rahuri.

Karkee. M., Scharf, P.A. and Zhang, Q. 2014.Sugarcane harvester technology : A critical overview. Ame. Soc. Agril. Bio. Engg. 30(5):727-739.

Kokate, K.D. and Kharde, P.B. 2006.Extension strategies for increasing sugarcane production. Asian J. of Extn. Edu. 25 (1) : 10-14.

Yadav, R.N.S, Sandeep Yadav and Raj Kumar Tejra. 2008. Labour saving and cost reduction machinery for sugarcane cultivation. J. Sug. 5:1-2.

RESEARCH ARTICLE

Adoption of Integrated Weed Management Practices by the Cotton Growers

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ABSTRACT

The present study conducted in Manora and Karanja panchayat samiti of Washim district in Vidarbha region of Maharashtra State. The exploratory research design was used for present study. The data were collected with the help of structured interview schedule & the findings emerged out after statistical analysis are, majority of respondents belonged to middle age group were educated up to college level, middle family size, belonged to semi-medium size land holding category and agriculture as main source of occupation, with annual income between of Rs. 1,00,001 to Rs. 2,00,000, had bi-seasonal cropping system, put up to 1.01 to 2.00 ha area under cotton crop had medium sources of information, had medium category of extension contact had medium level of economic motivation and adoption of integrated weed management practices. As regards correlation analysis, the characteristics viz. education, land holding, annual income, cropping pattern, area under cotton crop, sources of information, extension contact, and economic motivation were positively and significantly correlated with adoption at 0.01 level of probability.

Keywords: Adoption, Cotton Growers, Integrated Weed Management Practices

INTRODUCTION

Weed is a serious problem in crop production and responsible for making losses in crop field. They rob plant nutrient, water, fertilizer and solar energy which should be available to the main crop. They compete with the crop for space, harbor pest and diseases and allelopathic effect on crop. They reduce quality of produce increase crop of labour and crop production.Weed control is considered as an important operation in cultivation of crop. It has undergone change over years. During initial stages of crop growth, hand removal of weeds is common practice.

Animal power to draw implements like harrows and hand tools

for tilling the land destroying weeds was introduced during 600 BC. This was replaced with machine drawn implements like cultivators, rotary weeders etc. Herbicides or use of chemical became the principle tool of weed control in most developed nations from 1940 onwards and are spread slowly in developing countries like India after 1970

Weed is a serious problem in crop production and responsible for making losses in crop field. They rob plant nutrient, water, fertilizer and solar energy which should be available to the main crop. They compete with the crop for space, harbor pest and diseases and allelopathic effect on crop. They reduce quality of produce increase crop of labour and crop production. Integrated weed management (IWM) can be defined as the use of 'many little hammers', that on their own are not stand alone weed control measures but, if applied in a systematic way will control weeds. This technique utilizes all suitable methods in a compatible manner as possible. It involves the tactical use of multiple tools for weed management, including combinations of herbicides, crop rotation, mechanical and biological controls as well as other cultural practices designed to reduce damage by weeds. It is about putting components together and integrating them into existing crop production systems to produce a cropping system that resist weed invasion, tolerate weed presence and decrease population, survival and persistence of weeds.

In cotton, weeds cause several direct and/or indirect negative impacts, such as (a) reducing fiber quality, (b) reducing crop yield, (c) increasing production costs, (d) reducing irrigation efficiency, and (e) serving as hosts and habitats for insect pests, disease-causing pathogens, nematodes, and rodents. Weeds can directly hinder cotton growth by competing for available resources and, in some cases, by releasing allelopathic or growth-suppressing, chemicals. Certain weeds are more competitive with cotton than others mainly because of differences in their growth habit. For example, any weed species that grows taller than the cotton plants would limit light availability to the cotton, thus causing competition even at low weed densities. Therefore, for effective weed management in cotton, growers should concentrate their efforts on weed management in the early part of the growing season.

Losses caused by weeds

Presence of weeds in an around agricultural land causes enormous losses which may be borne by us. About one third of potential food production in India, is lost due to insect, weed, disease etc.(Mathur,1998) Among all pest in India weeds alone are responsible for about one third loss in crop production (Kulshreshta and Parmar, 1992).

It has been estimated that weeds alone caused 5% loss in agricultural production in most developing countries. It caused 10% loss in developing countries (Bhowmik, 1998). An analysis revealed that losses caused by weeds in India were to the tune of 9.28 million tons in cereals, 0.57 million tons in oilseeds, 0.78 million tons in pulses and 7.2 million tons in fiber and other commercial crops (Sahoo and Saraswat,1998)

In Maharashtra highest area under cotton in the Vidarbha region is in Yavatmal, Buldhana, Amravati, Akola districts and highest productivity in the Vidarbha region of Amravati districts. (543 kg/ha).The Washim district before separation was a part of Akola district and substantial area under cotton cultivation. Since the productivity of cotton in Washim district was low (264.00 kg/ha in 2012-13), it was thought imperative to take study related to integrated weed management practices followed by cotton growers in Washim district. The findings of present study would help to suggest remedies related to weed management for increase in cotton production per hectare in Washim district and the present study was therefore undertaken in Washim District.

METHODOLOGY

The present study was purposively conducted in Karanja and Manora Panchayat samiti in the Washim district having more area under cotton crop. Five villages from Karanja and five from Manora panchayat samiti were selected randomly for research study. The respondents were selected from village by random sampling technique. Fifteen respondents were selected from each village. Thus the total 150 respondents is the sample for this study. The exploratory research design was used for present study. Data were collected with the help of pre- tested and structured interview schedule by taking personal interview of the respondents.

RESULTS AND DISCUSSION

I. Adoption of Integrated weed management practices

Adoption in present study was defined adoption of recommended integrated weed management practices by the respondents in cotton crop against the knowledge possessed by them about IWM practices. The practice wise adoption level of IWM practices was studied against the knowledge possessed about recommended practices & based on adoption the distribution of respondents is given in Table-1.

Table-1:Distribution of respondents according to their practice wise adoption of IWM practices

Sr. No	Adoption of Integrated weed management practices	Respondents (n=150)		
		C.A*	P.A	N.A
A	**Adoption of cultural practices**			
1	Use proper sowing time	117 (78.00%)	33 (22.00%)	0 (00.00%)
2	Use of hand weeding	122 (81.13%)	19 (12.67%)	9 (06.00%)
3	**Number of hand weeding**			
3.1	One at 25 DAS	108 (72.00%)	33 (22.00%)	9 (06.00%)
3.2	One at 45 DAS	120 (80.00%)	21 (20.00%)	9 (06.00%)
3.3	One at 65 DAS	105 (70.00%)	36 (24.00%)	9 (06.00%)
4	Crop rotation	132 (88.00%)	18 (12.00%)	0 (00.00%)
5	Cover crops	55 (36.67%)	10 (6.66%)	85 (56.67%)
6	Use of smother crops (E.g. Cowpea, Green gram, Black gram, Sun hemp)	55 (36.67%)	10 (6.66%)	85 (56.67%)
7	Use of Hoeing	107 (71.33%)	30 (20.00%)	13 (8.67%)
8	**Time of hoeing**			
8.1	First at 20 DAS	101 (61.33%)	36 (24.00%)	13 (8.67%)
8.2	Second at 40 DAS	110 (73.33%)	27 (18.00%)	13 (8.67%)
8.3	Third at 60 DAS	103 (68.67%)	34 (22.67%)	13 (8.66%)
9	Hand chipping	0 (00.00%)	59 (39.33%)	91 (66.67%)
10	Irrigation management	100 (66.67%)	0 (00.00%)	50 (33.33%)
11	Farm hygiene	78 (52.00%)	72 (48.00%)	0 (00.00%)
12	Balance use of fertilizer (RDF)	56 (37.33%)	0 (00.00%)	94 (62.67%)
13	**Intercrops**			
13.1	Cotton + Green gram (1:1)	78 (52.00%)	52 (34.67%)	20 (13.33%)
13.2	Cotton + Blackgram (1:1)	52 (34.67%)	63 (42.00%)	35 (23.33%)

13.3	Cotton + Sun hemp (1:1)	0 (00.00%)	4 (2.67%)	146 (97.33%)
13.4	Cotton +Sorghum + Pigeonpea + Sorghum (6:1:2:1)	20 (13.33%)	8 (5.3%)	122 (81.33%)
14	Stale seed bed method	96 (64.00%)	35 23.33%)	19 (12.67%)
15	Broad bed furrow cultivation	10 (6.67%)	5 (3.33%)	135 (90.00%)
B	**Adoption of mechanical practices**			
1	Ploughing	140 (93.33%)	10 (6.66%)	0 (00.00%)
2	Harrowing	137 (91.33%)	13 (8.66%)	0 (00.00%)
3	Inter-cultivation through blade harrow or deshi plough	114 (76.00%)	16 (10.66%)	20 (13.33%)
4	Cleaning of machinery to prevent spread of weeds	5 (3.33%)	10 (6.66%)	135 (90.00%)
C	**Adoption of chemical practices**			
1	Use of different herbicides	90 (60.00%)	15 (10.00%)	45 (30.00%)
2	Use of recommended per ha. dose of herbicide	60 (40.00%)	20 (13.33%)	70 (46.67%)
3	Time of herbicide application (pre emergence/post emergence)	80 (53.34%)	2 (1.33%)	68 (45.33%)
4	Use appropriate recommended doses	50 (33.33%)	84 (56.00%)	16 (10.67%)
5	Use of pre sowing herbicide (Eg. Trifluralin, Fluclarin)	10 (6.67%)	5 (3.33%)	135 (90.00%)
6	Use of pre emergence herbicide (Eg. Pendamethalin, Diuron)	25 (16.67%)	18 (12.00%)	107 (71.33%)
7	Use of post emergence herbicide (Eg. Pyrithiobac, Quizalofop, Glyphosate)	90 (60.00%)	15 (10.00%)	45 (30.00%)
8	Application of herbicide when sufficient moisture present in soil	100 (66.67%)	5 (3.33%)	45 (30.00%)
9	Types of spray pump used for spraying herbicide (knapsack spray pump)	90 (60.00%)	15 (10.00%)	45 (30.00%)
10	Types of nozzle used for herbicide application in cotton(Flat fan /flood jet type nozzle)	50 (33.33%)	20 (13.33%)	80 (53.33%)
11	500 lit of water to be used for herbicide application	15 (10.00%)	70 (46.67%)	65 (43.33%)
12	**Precautions while using herbicide:-**			
12.1	Read the label before use	80 (53.33%)	10 (6.67%)	60 (40.00%)

12.2	Wear goggles, rubber gloves before handling and use of chemicals	25 (16.66%)	10 (6.67%)	115 (76.67%)
12.3	Avoid herbicide spraying during high speed wind and cloudy weather	87.00 (58.00%)	10 (2.67%)	53 (35.33%)
12.4	Use of clean water for herbicide application.	105 (70.00%)	0 (00.00%)	45 (30.00%)
12.5	Herbicide kept in a safe place	105 (70.00%)	0 (00.00%)	45 (30.00%)
12.6	Dispose of empty containers	97 (64.67%)	0 (00.00%)	53 (35.33%)
13	Use of separate sprayer to be used for herbicide application	21 (14.00%)	0 (00.00%)	129 (86.00%)
14	Intercultural operation within 4-5 days after herbicide application	70 (46.67%)	35 (23.33%)	45 (30.00%)
D	**Adoption of biological practices**			
1	Use of biological control method	0 (00.00%)	0 (00.00%)	0 (150.00%)
2	Precautions while using bioherbicide	0 (00.00%)	0 (00.00%)	0 (150.00%)
3	The bioagent not feed on other useful plants	0 (00.00%)	0 (00.00%)	0 (150.00%)
4	Use of mycoherbicide (Eg. *Dactyleariahigginsi*)	0 (00.00%)	0 (00.00%)	0 (150.00%)
5	Use of insects for control weeds Eg. (Beetels *Zygogramma biocolorata*)	0 (00.00%)	0 (00.00%)	0 (150.00%)
6	Use of fungi, mites, nematodes (Eg. *Pucciniacynodontys)*	0 (00.00%)	0 (00.00%)	0 (150.00%)
7	Use of birds like Geese(for grasses or nut sedge in cotton)	0 (00.00%)	0 (00.00%)	0 (150.00%)

*- Figures in parentheses indicate percentage

The practice wise adoption of IWM practices followed by the respondents given in Table-1 revealed that, the adoption of cultural practice sowing of cotton at proper time was adopted by 78.00 per cent of the respondents and other cultural practice hand weeding in cotton was also adopted by 81.13 per cent of the respondents. The number of hand weeding to be followed in 25 DAS, 45 DAS and 65 DAS was followed by 72.00 per cent, 80.00 per cent, and 70.00 per cent of the respondents respectively. However the respondents who were not adopting the cultural practices and weeding operations might be due to the reason that during peak period there may be scarcity of

inputs or labour which deprive them from complete adoption of these practices. The crop rotation and hoeing was adopted by 88.00 per cent and 71.33 per cents of the respondents respectively but the adoption of cover crops and use of smother crops (e.g. Cowpea, Green gram, Black gram, Sun hemp) was never adopted by the respondents. As regards the time of hoeing to be followed at 20 DAS, 40 DAS and 60 DAS, the practice was adopted by 61.33 per cent, 73.33 per cent and 68.67 per cent of the respondents respectively. Irrigation management was also adopted by 66.67 per cent of the respondents. However it was observed that, the operation hand chipping and balance use of fertilizer was never adopted by 66.67 per cent and 62.67 per cent of the respondents respectively. The farm hygiene was completely and partially adopted by 52.00 per cent and 45.00 per cent of the respondents respectively. The inter crop sowing along cotton crop reveal that, 52.00 per cent of the respondents were adopting Cotton + Green gram inter crop method in 1:1 ratio, Cotton + Black gram by 42.00 per cent of the respondents as partial adoption in (1:1) ratio. Whereas the cotton + Sunhemp and Cotton + Sorghum + Pigeonpea + Sorghum (6:1:2:1) was not adopted by 97.33 per cent and 81.33 per cent of the respondents. The stale seed bed method was adopted by 64.00 per cent of the respondents and broad bed furrow cultivation was not adopted by 90.00 per cent of the respondents. In fact the broad bed method of sowing is very useful for in situ moisture conservation.

The adoption of mechanical practices presented in 'B' section of Table-1 revealed that, the operation ploughing, harrowing, Inter-cultivation through blade harrow or deshi plough was completely adopted by 93.33 per cent, 91.33 per cent and 76.00 per cent of the respondents respectively. Whereas it was also observed that, the important practice cleaning of machinery to prevent spread of weeds was not adopted by 90.00 per cent of the respondents.

The adoption of chemical practices given in 'C' section of Table-1 showed that, 66.67 per cent of the respondents were applying the herbicides when sufficient moisture is present in the soil. It was followed by use of different herbicides, use of post emergence herbicide (e.g. Pyrithiobac, Quizalofop, Glyphosate) and type of spray pump to be used by spraying herbicides was completely adopted by 60.00 per cent of each the respondents respectively. Further it was observed that, time of application i.e pre emergence and post emergence herbicides and use of recommended per hectare dose of herbicides was completely adopted by 53.34 per cent and 40.00 per cent of the respondents respectively. Further it was observed that, use of appropriate and recommended doses of

herbicides was partially adopted by 56.00 percent of the respondents, where as 90.00 per cent and 71.33 per cent of the respondents were not adopting use of pre emergence and post emergence herbicides respectively.

The adoption of specific type of nozzle to be used for spraying herbicide and use of 500 litres of water per hectare for application of herbicide was adopted by 33.33 per cent and 10.00 per cent of the respondents respectively. The results pertaining to take precautions while using herbicides indicated that 70.00 per cent each of the respondents were completely adopting clean water for spraying and keeping the herbicides at safe place respectively. It was followed by 64.67 per cent, 58.00 per cent, 53.33 per cent and 46.67 per cent of respondents were completely adopting disposal of the containers after use, avoiding spraying during high wind speed and cloudy weather, reading of label before use and following inter culture operation within 4-5 days after herbicide application respectively. However it was also observed that, 86.00 per cent and 76.67 per cent of the respondents were not using separate spray pumps for spraying herbicides and not using goggle, wearing rubber gloves before handling and use of chemicals respectively.

The adoption of biological practices for control of weeds in cotton crops indicated that none of the respondents were adopting the biological control methods viz. use of biological control method, precautions while using bio herbicide and the bioagent not feed on other useful plants, use of mycoherbicide (Eg. Dactyleariahigginsi), use of insects for control weeds e.g. (Beetels Zygogrammabiocolorata), use of fungi, mites, nematodes (Eg. Pucciniacynodontys) use of birds like Geese for control of weeds in cotton crop. Thus it concluded that the gap exists in possessed knowledge by the respondents about recommended IWM practices and the practices actually adopted by the respondents for control of weeds in cotton crop.

II. Distribution of the respondents according to adoption level of IWM practices

The category wise distribution of the respondents according to adoption level of IWM practices was also studied and is given in Table-2.

Table-2: Distribution of the respondents according to their level of adoption of IWM practices

Sr. No.	Adoption index	Respondents (n=150)	
		Frequency	Percentage
1	Low (Up to 33.33)	33	22.00
2	Medium (33.34 to 66.66)	102	68.00
3	High (Above 66.66)	15	10.00
	Total	**150**	**100.00**

The adoption of IWM practices in cotton crop presented in Table-2 indicates that, over half of the respondents (68.00%) had medium level of adoption followed by 22.00 per cent respondents who had high level of adoption. Only 10.00 per cent respondents had low level of adoption for following IWM practices in cotton crop. Thus, it is concluded that over three fourth (78.00%) of the respondents had medium level adoption for IWM practices in cotton crop. Similar finding was observed byChopade (2000), Shinde(2000), Savant (2011) and Mohite (2013) who stated that more than half of the respondents had medium level of adoption.

III. Correlation analysis of adoption of integrated weed management practices

The correlation coefficient of personal, socio-economic, situational and communicational, psychological characteristics of respondent's with their adoption of IWM practices has been worked out and depicted in Table-3.

Table-3: Correlation coefficient of selected characteristics of the respondents with their adoption

Sr. No	Characteristics	Coefficient of correlation 'r' value
1	Age	-0.105
2	Education	0.390**
3	Family size	-0.041
4	Land holding	0.394**
5	Occupation	-0.061
6	Annual income	0.415**
7	Cropping pattern	0.283**
8	Area under cotton	0.369**
9	Sources of information	0.391**

10	Extension contact	0.316**
11	Economic motivation	0.411**

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

It could be clearly seen from Table-3 that, among all selected characteristics, the variables viz. education, land holding, annual income, area under cotton crop, extension contact, and economic motivation were positively and significantly correlated with adoption at 0.01 level of probability. The variable age, family size and occupation was negative and non-significant with the adoption of the respondents. The null hypothesis was therefore accepted. The above results indicated that some of the characteristics of the respondents have influences on adoption levels. It is quite logical that the respondents with higher level of education, possessing more land and putting area under cotton cultivation, having biseasonal cropping pattern, good annual income, having high sources of information, extension contact and economic motivation apply more knowledge in adoption of IWM practices for cotton crop.

Further it was noticed that, education, the variables land holding, annual income, area under cotton, cropping pattern were in line with the observation of Ankulwar et al.(2001), sources of information were in line with the observation of Gupta et al. (2001), Ashishkumar (2012), extension contact were in line with the observation of Mohite (2013),Age were in line with the observation of Shinde (2000) and Ashishkumar (2012), family size were in line with the observation of Bhople et al. (2015), occupation were in line with the observation of Mankar et al.(2015)and economic motivation were in line with the observation of Shinde (2000) Bansod (2002) and Jadhav (2008).

IV. Constraints faced in adoption of integrated weed management practices

Reading (1971) defined constraints as use of force to influence or prevent an action or quality or state of being compelled to do or not to do something. For the present study constraints refers to problem and difficulty faced by the cotton growers during the adoption or non adoption of integrated weed management practices.

Constraints faced by the respondents in adoption of integrated weed managementpractices were recorded while collecting the data and the constraints important constraints faced as expressed by the respondents are depicted in Table-4.

Table-4: Distribution of the respondents according to constraints faced by them in adoption of integrated weed management practices in cotton

Sr. No.	Constraints	Respondents (150)	
		Frequency	Percentage
1	Cost of herbicides is high	150	(100%)
2	load shedding	150	(100%)
3	Devastation from wild animal	150	(100%)
4	lack of technical guidance	146	(97.33%)
5	No knowledge of about biological weed control methods	142	(94.66%)
6	Inadequate supply of water in annual cropping system	128	(85.33%)
7	Inadequate supply of labour for hand weeding	90	(60.00%)
8	lack of knowledge about use appropriate dose of herbicide	80	(53.00%)
9	lack of proper information about chemical weed control	75	(50.00%)
10	Non-availability of money at proper time.	68	(45.33%)
11	Rains after spray hampers the effect of herbicide/insecticide	45	(30.00%)

The constraints recorded and presented in Table-4 revealed that, cent-percent of the respondents (100%) were facing the constraints viz. higher cost of herbicides, load shedding and problem of wild animals respectively, it was followed by lack of technical guidance (97.33%), no knowledge of about biological weed control methods (94.66%), inadequate supply of irrigation water in annual cropping system (85.33%), inadequate supply of labour for hand weeding (60.00%), lack of knowledge about use appropriate dose of herbicide (53.00%), lack of proper information about chemical weed control (50.00%) were some of the major constraints faced by the respondents. Bandgar (2003) Chavan (2007) Ashish Kumar (2012) Kale *et al*. (2014) alsofound similar constraints in adoption of improved technology of cotton cultivation.

CONCLUSION

The findings of the study concluded that, majority of cotton farmers having medium level of adoption regarding IWM practices in cotton crop. The overall adoption of IWM practices use by the cotton farmers were in medium level category. It is also found that majority of respondents have not adopted the IWM practices like cover crops, smother crops, hand chipping, recommended dose of fertilizer, cleaning of machinery to prevent spread of weeds,

using 500 lit of water per hectare for herbicide application, biological weed management, recommended dose of herbicide, recommended quantity of water for spraying herbicide. Constraints faced by the farmers for non adoption of integrated weed management were, high cost of herbicides, no knowledge about biological weed control methods, inadequate supply of labour for hand weeding, lack of knowledge about use of appropriate dose of herbicides, the lack of proper information about chemical weed control. In this context it is suggested that information about recommended integrated weed management practices in cotton crop should be disseminated to the cotton growers through extension functionaries of State Department of Agriculture, NGO's and Agriculture Universities by means of organization of demonstration, trainings field visits, distribution printed materials viz. leaflets, folders, booklets etc. and transfer of technology programmes through mass media for increase in adoption of integrated weed management practices by the cotton growers for boosting the production and productivity of cotton crop.

REFERENCES

Ankulwar, B.N. S.G. Jondhale and P.V. Rangari 2001.Extent of adoption of recommended package of practices of sunflower by the farmers. *Maharashtra J. ext. Educ.* XX: *63-65.*

Ashish Kumar. 2012. Adoption behavior of farmers about recommended technologies of soybean. M.Sc. Thesis (Unpub.), Dr. PDKV, Akola.

Bansod, Y.B. 2002. Adoption of package of practices of cotton M.Sc. (Agri.). Thesis (Unpub.), Dr. PDKV, Akola.

Bhople, P.P, Mankar, D.M. Kale, N.M, Wankhade, P.P, 2015. Work performance and drudgery perceived by the farm labourers in agril work and MANREGA. *Research Review Committee Project, Dr PDKV, Akola. March, 2015.*

Bhowmlk, P.C. 1998.Herbicides in relation to food security and environment a global perspective.Proc.First Int. Agronomy congress Nov. 23-27 (1998) New Delhi, India pp. 244-258.

Chopade, V.B, 2000. Knowledge and adoption of IWM practices by the farmers. M.Sc (Agri.)Thesis (unpub), Dr. PDKV, Akola.

Gupta, V., D. Mankar and Dundraswamy 2001. Knowledge of farmers about cultivation practices of rice in Jammu, Maharashtra J. Extn. Edu. 20: 74-77.

Jadhav, S. M. 2008. Technological gap in soybean cultivation. M.Sc. (Agri.) thesis (Unpub.), Dr. PDKV, Akola.

Kulshreshtha. G. and B.S. Parmar 1992, Resource management for sustainable crop production. Souvenir 1992. Indian soc. Agron.,pp-339-343.

Mathur, S.C. 1998, Pesticides Industry In India, pesticide information,23(1): 17-29

Mankar, D.M, Kale. N.M, Waghmare, R.S, Wankhade, P.P, Bhople, P.P and Katkar.R.N. 2015, Soil testing status of the farmers in the distress prone districts of vidarbha *Research Review Committee Project, Dr PDKV, Akola. March, 2015*.

Mohite, V. S. 2013. Adoption of biofertilizer by soybean growers in western Vidarbha. M.Sc. (Agri.) thesis (Unpub.), Dr. PDKV, Akola .

Sahoo, K.M. and V.N. Saraswat. 1988. Magnitude of losses in the yield of major crops due to weed competition in Indian pesticide information April - June pp 2 - 9.

Savant, S. M. 2011. Knowledge and adoption of weed management practices by cotton growers. M.Sc. Thesis (Unpub.), Dr. PDKV, Akola.

Shinde, J. S. 2000. Knowledge and adoption of weedicides in soybean by the farmers. M.Sc. (Agri.) thesis (Unpub.), Dr. PDKV, Akola.

RESEARCH ARTICLE

Leadership Styles and Work Effectiveness of Agriculture Assistants in Distress Prone District of Vidarbha

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ABSTRACT

The present investigation entitled Leadership Styles of Agriculture Assistants and their Work Effectiveness was carried out in Yavatmal district as a Distress Prone District in Vidarbha region of Maharashtra.Two Sub-Divisional Agril. Offices (SDAOs) namely Yavatmal and Darwha were selected purposively. From Yavatmal SDAOs office four talukas and ten mandal whereas, from Darwha SDAOs office three talukas and eight mandals were selected purposively based on more number of agriculture assistants. Thus from two SDAOs offices, seven talukas and eighteen (18) mandals agriculture assistants having more than 1 year experience was identified and selected purposively to constitute sample size of 125 respondents. Exploratory research design of social research was used.

Findings of the study revealed that, maximum number of the respondents(60.00%) had adopted Selling type of leadership styles and few Agriculture Assistants had adopted Delegating type of leadership styles. Whereas in case of work effectiveness of agriculture assistants it was observed that, more than one third (38.40%) of the AAs were above average in work effectiveness, while slightly less than one third (32.80%) of the AAs were below average in work effectiveness. More than one fifth (21.60%) of the AAs were good in work effectiveness.

INTRODUCTION

Leadership is the ability to influence the behavior of other members or to gain the acceptance of idea. It may also be defined as the relationship in which one person or the leader influences other to work together willingly on related task to attain that, which leader desires. Leadership is an elusive concept. It has been describe in many different ways by various protagonist. Obviously the activity of any leader includes much of what is called as executive work. Typically it includes planning, organizing, delegating, controlling, supervision, interpreting, training and coordination of activities. Finally there is the important

task of stimulating and vitalizing all the individuals who are contributing their efforts. It is at this point that the leader asserts himself as more than an executive, (Tead, 1935).

Work effectiveness generally refers to the achievement of given goals or objectives. It may be expressed in percent or ratio. It is difficult to measure effectiveness because so much depends upon who sets the goal and whether the goals themselves are relatively bad and inefficient. The performance of an individual at work in an organization depends on his own personal qualities and environment where he works.

Amongst extension workers of the State Department of Agriculture, agriculture assistants are the key person at village level to implement farm development programmes and farm strategic line between research, extension organizations and the farmers. The efficiency and effectiveness of extension person depends upon the duties assigned to them.

Leadership is a unique phenomenon found in every organization and human being. Hence, leadership that exists in agriculture assistant may have different styles, which can be truthfully used for increasing the job effectiveness. Menon (1985) observed that India has not been able to get results that commensurate with the huge investments that are being made on agriculture and rural development programme. The Government investing crores of rupees on department of agriculture for the benefits of the farmers but expected results have not been seen. It may be due to lacuna of the leadership styles of extension personnel and their work effectiveness. Agriculture assistants are the workers at grass root level responsible for transfer of technology. So, to know their leadership styles and work effectiveness in the line of their job for effective transfer of technology, present study was undertaken with the following objectives.

1. To study the leadership styles of agriculture assistants.
2. To study the work effectiveness of agriculture assistants

METHODOLOGY

The present investigation entitled Leadership Styles of Agriculture Assistants and their Work Effectiveness was carried out in Yavatmal district as a Distress Prone District in Vidarbha region of Maharashtra. Two Sub-Divisional Agril. Offices (SDAOs) namely Yavatmal and Darwha were selected purposively. From Yavatmal SDAOs office four talukas and ten mandal whereas, from Darwha SDAOs office three talukas and eight mandals were selected purposively based on more number of agriculture assistants. Thus from two SDAOs offices, seven talukas and eighteen (18) mandals agriculture assistants having more than 1

year experience was identified and selected purposively to constitute sample

Dependent variable:
Leadership style:

It refers to the way in which agriculture assistant influence the behavior of the beneficiaries. On the basis of leadership styles agriculture assistant was categorized as follows.

Sr. No.	Category
1.	Telling (High task, low relationship)
2.	Selling (High task, high relationship)
3.	Participating (High relationship, low task)
4.	Delegating (Low task, low relationship)

By using the procedure given by P. Harsey and K.H. Blanchard (1977), leadership styles were determined.

Determination of leadership style

Respondent perception about his leadership style on the Leadership Effectiveness and Adaptability Description (LEAD) instrument was determined as shown below. There are 12 statements indicative of different leadership styles. Under each statement

four alternatives have been provided. Alternatives were provided A, B, C, D. Each alternative represents different style of leadership of an individual. The action choices for each situations are not distributed alphabetically, but according to the style quadrant a particular action represent. Circled the letter the action, respondent chose for each situation and the total the number of times a letter was circled in each of the four sub-columns was calculated.

Situations	Alternative actions			
1	A	C	B	D
2	D	A	C	B
3	C	A	D	B
4	B	D	A	C
5	C	B	D	A
6	B	D	A	C
7	A	C	B	D
8	C	B	D	A
9	C	B	D	A
10	B	D	A	C
11	A	C	D	B
12	C	A	D	B
Quadrant Score	**1**	**2**	**3**	**4**

Quadrant score from alternative action categories i. e. A, B, C, D was transferred to the basic leadership behavior style in figure. 3. The quadrant numbers in each alternative action correspond to the quadrant numbers of the leadership model given in Figure. 3. Scores from the respective quadrant were transferred to respective quadrant in Figure. 3. Quadrant having highest score indicates respondents leadership style for example, if you score is 8 in Quadrant 1 his dominant leadership styles is characterized by high talk and low relationship orientation.

Quadrant 3	Quadrant 2
High relationship, Low task	High task, High relationship
Quadrant 4	Quadrant 1
Low relationship, Low task	High task, Low relationship

Low ⟵——— Task behaviour ———⟶ High
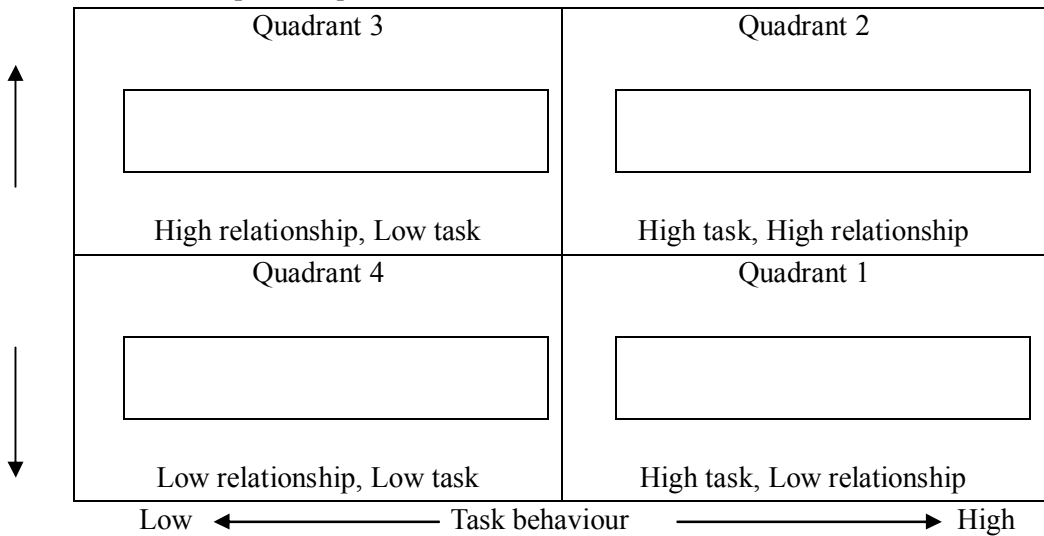
Figure. 3: Basic Leadership Behavior Style.

Determining leadership style score

The degree of style respondent indicates for himself as a leader was determined theoretically in Figure 4. The score given on each alternative action choices are circled and score is calculated as indicated.

A weighing of a +2 to -2 is based on behavioral science concepts theories and empirical research. The leadership behaviour with highest probability of success is always weighted a+2. The behaviour with the lowest probability of success is always weighed a-2. The second best alternative is weighed a+1 and the third a-1.

Situations	A	B	C	D
1	+2	-1	-1	-2
2	+2	-2	-1	-1

3	+1	-1	-2	+2
4	+1	-2	+2	-1
5	-2	+1	+2	-1
6	-1	+1	-2	+2
7	-2	+2	-1	+1
8	+2	-1	-2	+1
9	-2	+1	-2	-1
10	+1	-2	-1	+2
11	-2	+2	-1	+1
12	-1	+2	-2	+1
Sub total	+	+	+	+
			Total	

Work effectiveness

It refers to the work as indicated by the performance. It is operationally defined as the job activities assigned to the agriculture assistant and that activities performed effectively and efficiently within time limit was considered their work effectiveness.

To measure the work effectiveness, job activities of agriculture assistant were identified and there are 37 activities to be performed by the agriculture assistants.

Work effectiveness was measured by acquiring responses from agriculture assistants on three point continuum namely always, sometimes and never. The continuum, always and sometimes each was sub divided in to two continuums as timely and late and the score given for never was 0, in case of sometimes, score was assigned for late 1 and for timely 2. Similarly, for always score was assigned as 3 for late and 4 for early. The maximum score that one could obtain was 148 as there are 37 activities to be performed by the agriculture assistant and minimum was 0. The raw work effectiveness score of each individual agriculture assistant was then converted in to work effectiveness index as follows.

$$\text{Work Effectiveness Index} = \frac{\text{Actually obtained work effectiveness scores}}{\text{Maximum obtainable work effectiveness scores}} \times 100$$

The categorization was done as follows

Sr. No.	Work effectiveness	Index range
1	Poor	Up to 75
2	Below average	76 to 94

| 3 | Above average | 95 to 113 |
| 4 | Good | Above 113 |

RESULTS AND DISCUSSION

Table 1 Distribution of the respondents according to personal, situational, psychological and communication characteristics of the agriculture assistants

Sl No	Characteristics	Category	Respondents (n=125)	
			Frequency	Percentage
1	Age (Years)			
		Young	40	32.00
		Middle	67	53.60
		Old	18	14.40
2	Education	Diploma	69	55.20
		Graduation	38	30.40
		Post Graduation	16	12.80
		Ph. D	02	01.60.
3	Service experience	Up to 14	27	21.60
		15 to 23	76	60.80
		24 and above	22	17.60
4	Training received	Short duration (Up to 10 days)	46	36.80
		Medium duration (11 to 30 day)	51	40.80
		Long duration (1 to 6 month)	28	22.40
5	Background	Rural	100	80.00
		Urban	25	20.00
6	Number of villages under jurisdiction	Up to 4	35	28.00
		5 to 7	71	56.80
		Above 8	19	15.20
7	Number of farm families under jurisdiction	Up to 869	34	27.20
		870 to 1568	76	60.80
		1569 and above	15	12.00
8	Achievement motivation	Poor	3	02.40
		Below average	05	04.00

		Above average	35	28.00
		Good	82	65.60
9	Job satisfaction	Highly unsatisfied	2	01.60
		Unsatisfied	11	08.80
		Satisfied	71	56.80
		Highly satisfied	41	32.80
10	Job involvement	Poor	00	00.00
		Below average	02	01.60
		Above average	84	67.20
		Good	39	31.20

As regards age of AAs it is apparent from Table 1 that maximum number of the AAs (53.60%) belonged to the middle age group of 35-50 years. These findings are goes corroborate with the observations of Bosco (2000) who reported that 51.00 percent of AAOs were in age group of 35-50 years. The education wise distributions of Agriculture Assistants in Table 1 revealed that relatively higher proportion (63.72%) of the AAs were diploma holders.

The above findings conformity with the observations of Ingle *et al.* (2000), Nirban *et al.* (2000) and Shelar *et al.* (2000) and Raut (2006) also observed that majority of the AAs were either SSC or diploma holders.

It is evident from the data in Table 1 that maximum percentage of the AAs (60.80%) had 15 to 23 years of total service as an extension worker. It may be observed from Table 1 that maximum percentage (40.80%) of the AAs had

undergone training of up to 11 to 30 days during their service tenure. The findings about background of AAs presented in Table 1 revealed that, majority (80%) were from rural background. Only 20.00 per cent of the AAs were observed from urban background.. The results regarding work jurisdiction indicated that, most of the AAs has been 5 to 7 villages. This seems to be more than the prescribed norms of State Agriculture department. Normally it should be 3 or 4 villages per AA. With a view to have more work effectiveness it is necessary to allot the prescribed number of villages to each AA to look after. The data depicted in Table 1 reveal that majority of the AAs (60.80%) had 870 to 1568 farm families in their jurisdiction.

The results pertaining to the achievement motivation of AAs have been depicted in Table 1, It could be noted that majority of the AAs (65.60%) belonged to good achievement motivation

category. The distributional analysis pertaining to job satisfaction of AAs in Table 1indicated that over half of the AAs (56.80%) were satisfied with their job. It is apparent from the data presented in Table 1 that majority (64.00%) of the AAs were committed to their job to above average. The distributional analysis pertaining to job satisfaction of AAs in Table 1 indicated that over half of the AAs (56.80%) were satisfied with their job. It is apparent from the data presented in Table 1 that majority (64.00%) of the AAs were committed to their job to above average .It is seen from the results presented in Table 1 that majority of the AAs (67.20%) had exhibited above average level of job involvement.

Leadership styles

The leadership styles of an AAs is an indicative of his involvement in controlling, directing and guiding the work. Hence it has effect on peer's, subordinates as well as other fellow workers. However its direct effect may be on the work effectiveness of the concern Agriculture Assistants in Agriculture Department.

Table 2. Distribution of AAs according to their Leadership style

Sr. No.	Leadership style	Respondents	
		Frequency	Percentage
1	Telling	18	14.40
2	Selling	75	60.00
3	Participating	21	16.80
4	Delegating	11	08.80
Total		**125**	**100.00**

Data from table 2 revealed that the slightly less than two third (60.00%) of the AAs were found to be having Selling (High task and High relationship) type of leadership style, followed by Participating (High relationship Low task) 16.80 per cent of the AAs were observed. Whereas, Telling style (Low task and High relationship) 14.40 per cent of the respondents. Only 8.80 per cent of the respondents were found to be in delegating style (Low relationship and Low task) of leadership styles.

From the above observation it was concluded that maximum number of the respondents had adopted Selling type of leadership styles and few Agriculture Assistants had adopted Delegating type of leadership styles.

Finding of the same result were quoted by Bhole (2002) revealed that relatively higher proportion of the respondents i.e. 60.00 per cent were found to be having Selling type of leadership styles, followed 17.14 per cent by participating styles of leadership. 14.28 were reported in Telling styles of leadership and only 8.57 per cent of the respondents in Delegating styles of leadership.

Work effectiveness

The efficiency of an individual is visible through his work effectiveness in giving meaningful output in the organization. The work of an Agriculture Assistant of the study area depends upon work effectiveness. Work effectiveness of a AAs is an indicative of job performance. The self rating of the AAs themselves was secured and the distributed AAs according to their actual work performance.

Table 3 Distribution of AAs according to their Work Effectiveness levels

Sr. No.	Work Effectiveness levels	Respondents	
		Frequency	Percentage
1	Poor	09	07.20
2	Below average	27	21.60
3	Above average	48	38.40
4	Good	41	32.80
Total		**125**	**100.00**

Data inferred in the above table 3 indicates that more than one third (38.40%) of the AAs were above average in work effectiveness, while slight less tan one third (32.80%) of the AAs were below average in work effectiveness. More than one fifth (21.60%) of the AAs were good in work effectiveness. Whereas, meager 7.20 per cent were poor in work effectiveness.

Nearly same results were quoted by Dhillon and Sandhu (1978) revealed that 38.89 per cent of the District

Extension Specialists had high in job effectiveness, 42.59 percent had medium and 18.52 percent were low in job effectiveness.

CONCLUSION

From the findings of the study it is concluded that less than two third (60.00%) of the AAs were found to be having Selling (High task and High relationship) type of leadership style, followed by Participating (High relationship Low task) 16.80 per cent of

the AAs were observed. Whereas, Telling style (Low task and High relationship) 14.40 per cent of the respondents. Only 8.80 per cent of the respondents were found to be in delegating style (Low relationship and Low task) of leadership styles. Whereas in case of work effectiveness, more than one third (38.40%) of the AAs were above average in work effectiveness, while slight less than one third (32.80%) of the AAs were below average in work effectiveness.

REFERENCES

Tead, O. 1935. The Art of Leadership, McGraw Hill, New York, pp. 1-138.

Menon, K.P.A. 1985. Management of agriculture and rural development programmes Problems and Prospects. Indian J. Extn. Educ., 21(1&2) : 10-11.

Bosco Mohan, 2000. A Study on Job Performance and Job Satisfaction of Assistants Agricultural Officers in KSDA. M.Sc. (Agri.) Thesis (Unpub.), UAS Dharwad

Nirban, A.J. A.N. Desai, V.V. Sagvekar, M.S. Bhairamkar and K.D. Kokate 2000. A study on role perception and role performance of the extension personnel from single window system of Departments of Agriculture of Maharashtra State. AGRESCO Report, Extn. Educ. Dr. BSKKV, Dapoli. pp. 93-99.

Shelar, S.K., P.S. Patil, P.G. Patil, K.A. Girase and G.K. Waman 2000. A study on Role perception and role performance of extension personnel from single window system of Department of Agriculture, Maharashtra State. Research Review Committee Report of Extn. Educ., MPKV, Rahuri pp. 1 (2) : 77-84.

Raut, R.S. 2006. Job Competency, Job Performance And Job Satisfaction Of Agriculture Assistants In Single Window of Agriculture. Ph.D. (Agri.) Thesis (unpbu.), Dr. PDKV, Akola.

Bhole, M. K. 2002. Leadership Styles Of Agricultural Scientists and their Wok Effectiveness. M. Sc. (Agri.) Thesis (Unpub.), Dr. PDKV, Akola.

Dhillon J.S. and A.S. Sandhu, 1978. Measurement of job effectiveness of district extension specialist of a farm advisory service. J. Res. APAU. 15(1) : 45-50.

RESEARCH ARTICLE

Constraints Faced by Women Entrepreneurs towards Entrepreneurial Development: Learned Experiences from Women's Groups

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ABSTRACT

Women's groups are necessary to overcome exploitation, create confidence for the economic self-reliance of the rural poor women who are mostly invisible in the social structure. These groups enable them to come together for a common objective and gain strength from each other to deal with exploitation, which they are facing, in several forms. Rural women are dealing with a lot of issues with their full involvement in group operations until today. It could be mainly due to existing social customs men and women are placed on a different footing. For these constraints might be the existing social set up of Indian villages, multiple role responsibilities of rural women and discriminatory approach of women education. This study was conducted to make an understanding of constraints faced by rural women entrepreneurs under production and labor constraints, technical and managerial, and financial, marketing, personal/general constraints perspectives. The research was conducted in Raipur district of Chhattisgarh. Three villages were chosen from two selected blocks viz. Arang and Dharsiwa, and five women groups were selected from each village. A hundred and twenty respondents from thirty women groups were interviewed. This paper aims to identify and ranks constraints faced by women entrepreneurs toward their entrepreneurial development in agriculture.The paper engages with a qualitative methodology to categorize and rank entrepreneurial constraints by using Garrett's Ranking Technique. This study offers a broad overview and ranking ofthe constraints faced by women entrepreneurs toward their entrepreneurial developments. The results indicated the major constraints faced by women entrepreneur were high labour cost for production, complex procedural formalities to start an enterprise as a technical and managerial constraint, securing working capital as a financial constraint, low price for produce during marketing and lack of education of the women entrepreneurs.

Keywords – Women entrepreneurs, Constraints, Garrett's Ranking Techniques, Women's groups, Entrepreneurial development.

INTRODUCTION

Constraints indicate a forcible limitation and restraint of action. There are still a lot of modifications to bring the women into the mainstream in our community. Rural women are dealing with a lot of issues with their full involvement in group operations until today.It could be mainly due to existing social customs men and women are placed on a different footing. For these constraints might be the existing social set up of Indian villages, multiple role responsibilities of rural women and discriminatory approach of women education. However, in the sense of technological development, science perspective and females in all fields of life have demonstrated to be doing well on par with males, there is a need for a changed status for women in the modern world. Because the changes can be initiated in a short space of time, public policies, non-governmental and voluntary organization and other organizations should operate towards achieving these goals.

Analytical tool

Information regarding the constraints faced by the women entrepreneurs procured. Garrett's ranking technique enables to change orders of constraints and perks into numerical outcomes. The primary benefit of this method over simple frequency distribution is that the constraints are arranged from the respondent's point of perspective based on their severity.As perthis method; respondents have been asked to assign the rank for all factors and the outcomes ofsuch ranking have been converted into percent positions.

Garrett's formula for converting ranks into percent is:

Percent positions = 100 * (Rij – 0.5)/Nj

Where

R_{ij} = Rank given for the ith variable by jth respondents

N_j = Number of variable ranked by jth respondents

The percent position of each rank will be converted into scores referring to the table given by Garrett and Woodworth (1969).the percent positions estimated is converted into scores. Then for each factor, the scores of each individual are added and then total value of scores and mean values of score is calculated. The factors having highest mean value is considered to be the most important factor; the constraints will be accordingly ranked.

METHODOLOGY

The research was performed in Raipur district of Chhattisgarh. Three

villages were chosen from 2 selected blocks *viz.*Arang and Dharsiwa, and five women groups were selected from each village. A hundred and twenty respondents from thirty women groups were interviewed.Constraints were grouped underproduction and laborconstraints,technical and managerial, and financial, marketing, personal/general constraints containing 4, 6, 5, 4 and 5 statements respectively. The grouping is a modified version of statements used by Prasanna Kumar (2009). The responses were elicited in a three-point continuum, viz, more serious, serious, less serious, with a scoring pattern of 3, 2, and 1 respectively.Simple frequency was worked out to find out the level of response.The ranking of constraints faced by women entrepreneurs depicted by using Garrett's Ranking Techniques.In Table 1 according to more serious, serious, less serious rank or score value of 1, 2, and 3 the percentage positions calculated by using Garrett's formula. For 1 the percent position was 16.67, for 2 the percent position was 50 and, for 3 percent position was 83.33

Table 1. Percent positions and their corresponding Garret Value

100 (Rij-0.5)/Nj	Percent position	Garrett Value
100*(1-0.5)/3	16.67	69
100*(2-0.5)/3	50.00	50
100*(3-0.5)/3	83.33	31

The Garrett value multiplied with corresponding frequencies result of the respondents and the multiplied value for more serious, serious and less serious added together and divided by the total number of the respondents. With this found mean score the constraints accordingly ranked.

Constraints faced by women entrepreneurs towards their entrepreneurial development

Garrett ranking technique has been used to analyse and rank the constraints faced by womenentrepreneurs were classified underproduction and laborconstraints, technical and managerial, and financial, marketing, personal/general constraints.

Financial constraints faced by women entrepreneurs

From the Table 2 that it noted that in financialconstraints 'securing working capital' ranked first followed by 'less subsidy amount' rankedsecond, 'insufficient financial assistance by financial institution'ranked third, 'complex loan procedure'ranked fourth, 'the entire loan amount is not given' ranked fifth by women members.

It could also be seen women expressed that the lending institutions have their guidelines in deciding and advancing theloans based on different parameters which may not suit the financial requirements of the members.

The resource-poor members of the group may find it difficult to provide the matching amount with that of the loan. It is not surprising that women expressed less subsidy for the loan is a more serious problem in executing the enterprises selected. In WGs, under the active participation and continuous follow up by the sponsoring agencies, there is no difficulty in obtaining the loan. However, it is the subsidy component which they feel is inadequate. Normally, the members with limited earnings may not repay the loan. Further, the time to time policies of the government on loan and subsidies might have prompted them to rate this as a more serious problemamount provided by the financial institutions.

Technical and managerial constraints faced by women entrepreneurs

It evident from Table 2 that in technical and managerial constraints ranking gave by women members were 'complex procedural formalities in getting to start an enterprise' as first rank, 'highly expensive consultancy services of private agencies' as second rank, 'ineffective consultancy services provided by the govt. agency' as third rank, 'non-availability of efficient managers' as fourth rank, 'lack of good training facilities' as fifth rank 'lack of guidance from technical departments/resource persons' as sixth rank.

It is quite obvious that different technical departments do not participate in the process of formation of groups. Besides, the lack of coordination among different technical departments would also contribute to the above observation. The technical competency of the personnel working in different departments is a serious concern notonly in promoting group enterprises but also in the extension activities. It is an eye-opener for the departments to see that the lack of training facilities is rated as a serious problem for the better functioning of the groups. The promoting organizations have to develop close linkage with the different technical departments to provide need-based pieces of training to the members. Also, it is the primary duty of promoting organizations to select the right place and time for training the members by considering the convenience of the members.

Marketing constraints faced by women entrepreneurs

It evident from Table 2 that in marketing constraints ranking given by women members were 'low price for the produce'as first followed by 'lack of transportation facility' as second, 'lack of market related information' asthird, and 'long-distance of the market' asfourth.

Inadequate publicity in terms of the products produced by the members of the WGs for the use of consumers, the

place of its availability, the rate at which the product sold, etc. would have prompted them to indicate this as a serious problem. The prices are decided bythe economic principle of demand and supply in addition to its brand name and popularity among the general public in general and consumers in particular. Further, the prices need to be fixed on scientific lines by considering the cost of production.

Production and labour constraints faced by women entrepreneurs

It concluded from Table 2 that in production and labour constraints ranking given by rural women wereby 'high labour cost' as first followed by 'non-availability of skilled workers' as second, 'the high cost of inputs' as third, non-availability of input as fourth rank.

At present, the entire rural segment is suffering from non-availability of skilled workersand high cost of labour. This may be explained with the facts that the migration of rural youth to urban areas in search of employment might have created a scarcity of labours in rural areas interm might have lead to the high cost of the labours. Further, the WGs which are

running the economicactivity on a low profile with less investment may not be able to afford the high cost of the labour. The creation of economic enterprises to generate employment to the rural masses may improve the situation.

Personal/general constraints faced by women entrepreneurs

It revealed from Table 2 that in personal/general constraints ranking given by women members were 'low level of education'as firstfollowed by 'social customs and beliefs' as second rank, 'dual duties' fourth and 'non-cooperation of family members'as third and 'lack of freedom to take the decision'as fifth.

In case of personal constraints, it is worth to note that women entrepreneurs indicated that dual duties as a serious constraint. This could be easily understood that the women members need to undertake domestic and farming operations along with the economic activity undertaken by them. This would lead to theproblem of excessive tension. Further, the sense of excelling in their field of economic activity would pose a major challenge for them.

Table 2: Distribution of women entrepreneurs based on their constraints (n=120)

Items	1st	2nd	3rd	1st*69	2nd*50	3rd*31	Total	Mean score	Rank
Financial	No	No	No						
Securing working capital.	76	24	20	5244	1200	620	7064	58.86	1

Insufficient financial assistance from financial institutions.	60	38	22	4140	1900	682	6722	56.02	3
Complex loaning procedure	65	26	29	4485	1300	899	6684	55.7	4
The entire loan is not given at a time	61	32	27	4209	1600	837	6646	55.38	5
The subsidy amount is less	56	51	13	3864	2550	403	6817	56.80	2
Technical and managerial								
Ineffective consultancy services provided by the govt. agency.	60	36	24	4140	1800	744	6684	55.7	3
Highly expensive consultancy services of private agencies.	65	29	26	4485	1450	806	6741	56.17	2
Non-availability of efficient managers.	63	27	30	4347	1350	930	6627	55.23	4
Lack of guidance from technical departments/resource persons	45	36	39	3105	1800	1209	6114	50.95	6
Training facilities are not good	54	35	31	3726	1750	961	6437	53.64	5
Complex procedural formalities in getting to start an enterprise	72	28	20	4968	1400	620	6988	58.23	1
Marketing								
Long-distance of the market.	61	35	24	4209	1750	744	6703	55.85	4
Lack of transportation facilities.	68	29	23	4692	1450	713	6855	57.12	2
Lack of market information.	52	55	13	3588	2750	403	6741	56.17	3
Low price for the	11	7	3	7590	350	93	8033	66.94	1

produce									
Production and labour									
Non-availability of input materials	61	45	14	4209	2250	434	6893	57.44	4
High labour cost.	76	36	8	5244	1800	248	7292	60.76	1
Non-availability of skilled workers.	76	28	16	5244	1400	496	7140	59.5	2
The high cost of inputs	67	36	17	4623	1800	527	6950	57.91	3
Personal/General									
Dual duties	51	37	32	3519	1850	992	6361	53.00	4
Low level of education	63	40	17	4347	2000	527	6874	57.28	1
Non-cooperation of family members	51	46	23	3519	2300	713	6532	54.43	3
Social customs and beliefs	67	28	25	4623	1400	775	6798	56.65	2
Lack of freedom to take the decision	44	47	29	3036	2350	899	6285	52.37	5

CONCLUSION

The discussed constraints are consequently ranked to assist policymakers make better choices about resource allocation in priority sectors. Results indicate that women entrepreneurs face greater difficulties and that these challenges are intensified by negative circumstances in women's groups.Given the circumstances, it is tough for women entrepreneurs to set up and manage their enterprises. It is, therefore, necessary that policymakers are aware of this and support develop a conducive atmosphere for encouraging women entrepreneurship.

The research makes two significant contributions to the economics and politics of entrepreneurship: it expands the literature of entrepreneurship by addressing core problems for women involved in entrepreneurship and highlights interconnectedness between various constraints occurring in adverse conditions for women entrepreneurs. The mechanism provided to rank the constraints is designed to assist supporting institutions and policymakers

in shaping efficient planning and capital utilization choices, as there have been allegations of the need and effectiveness of promoted entrepreneurship programs that do not focus on improving women.

REFERENCES

Dhanavandan, S. 2016.Application of Garret Ranking Techniques: Practical Approach.International Journal of Library and Information Studies 6 (3): 135–40. https://doi.org/https://doi.org/10.1080/15325008.2013.834005.

Garret, H.E. and R.S. Woodworth. Statisticsin Psychology and Education. Vakils, Feffer and Simons Pvt. Ltd., Bombay. p-329 (1969)

Panda, Swati. 2018.Constraints Faced by Women Entrepreneurs in Developing Countries: Review and Ranking. Gender in Management 33 (4): 315–31. https://doi.org/10.1108/GM-01-2017-0003.

Prasanna Kumar. 2009. A Study on Group Dynamics and Entrepreneurial Behaviour of Women in Self Help Groups. PhD thesis. Department of Agricultural Extension, University of Agriculture Science, Banglore.

RESEARCH ARTICLE

Impact of Contract Farming

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ABSTRACT

The present study was conducted in the native state of Haryana. Four districts i.e. Hisar, Sirsa, Kurukshetra and Karnal.The results show that the social impact of contract farming was awareness about contract farming scheme, social status, social relationship, leadership, participation in social activities, social awareness, family unity and participation in Govt. schemes & programmes. The economic impact had change in annual income, market information, profit making, business techniques, financial management, capable to meet emergency needs, improvement of sales, purchase of goods/services, income generation activities and borrowing tendency.

Key Words: Impact, Contract faming, Farming, Contract

INTRODUCTION

The structure of Indian agriculture has undergone rapid changes during the nineties due to the pressure of commercialization and increased dependence on trade. One of the important characteristics of Indian agriculture is the small size of land holdings and the inability of the Indian farmers to compete with the large scale farming of the developed countries. 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 National Agricultural Policy 2000, announced by the Government of India, seeks to promote contract farming by involving the private sector to 'accelerate technology transfer, capital inflow and assured marketing of crop production' (Asokan, 2005). As with any form of contractual relationship, contract farming has both advantages and disadvantages. If any party does not follow the terms of the contract, then the affected party stands to

lose. Despite the problems, contract farming is gaining popularity in rural India. This study reviews the major advantages and disadvantages of contract farming in India. It refers to overall change or effect of the contract farming programme on the farmers in the term of changes in their personal, social, economic and agricultural attributes. The impact of contract farming was studied by following four parameters: (i) Personal impact, (ii) Social impact, (iii) Economic impact and (iv) Agricultural impact. Secondly, to see overall level of impact of contract farming, the responses were further divided into three categories i.e. low, medium and high categories.

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 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 impact of contract farming was evaluated by following four parameters: (i) Personal impact (ii) Social impact (iii) Economic impact and (iv) Agricultural impact. These variables were measured by constructing a structured schedule. The responses of all contract farmers were obtained from respondents. At last, rank order was given to each item based on their weighted mean score for observing the relevancy of each aspect of impact. Secondly, to see overall level of impact of contract farming, the responses were further divided into three categories i.e. low, medium and high categories of impact.

RESULTS & DISCUSSION

The impact of contract farming was computed on the basis of effect of contractual deal on four different aspects viz., personal impact, social impact, economic impact and agricultural impact.

1. Personal impact of contract farming

The data presented in Table 1 revealed that the majority of the respondents i.e. 47.2 per cent had medium level of personal impact followed by 35.2 per cent who had low level of personal impact. The data highlighted that wide range of respondents i.e. 82.4 per cent was low to medium degree of personal impact by participating for contractual programme.

Table 1: Personal impact of contract farming   N=160

Sr. No.	Level of impact	Frequency	Per cent
1.	**Low** (10 to 12 score)	56	35.2
2.	**Medium** (12 to 14 score)	76	47.2
3.	**High** (14 to 16 score)	28	17.6
	Total	**160**	**100.00**

1.1 Distribution of the respondents according to personal impact of contract farming

The data shown in Table 2 indicates that the personal impact on cultivators after adopting the contractual programme was the change in living standard, ranked first with the highest mean score of 1.85. Increase in confidence ranked second and current news or general awareness ranked third were considered as other items on which

personal impact was observed with mean score of 1.83 and 1.74, respectively.

It was also found from the data that rise in self-respect was among the major priorities and was considered as personal impact of contract farming with mean score of 1.85. The other personal impacts of contract farming were communication skills (1.60), infrastructure development (1.21), technical competence (1.20) and decision making ability (1.03).

1. Social impact of contract farming

The data furnished in Table 3 represents the social impact of contract farming which highlighted that majority of the respondents i.e. 35.8 per cent had low level of social impact followed by 35.2 per cent of cultivators who had high level social impact, whereas remaining 28.9 per cent of the contract farmers had medium level of social impact by actually adopting the contract farming programme.

Table 3: Social impact of contract farming   N=160

Sr. No.	Level of impact	Frequency	Per cent
1.	**Low** (08 to 10 score)	57	35.8
2.	**Medium** (10 to 12 score)	47	28.9
3.	**High** (12 to 15 score)	56	35.2
	Total	**160**	**100.00**

2.1. Distribution of the respondents according to social impact of contract farming

The results in Table 4 show the social impact of contract farming. An analysis of data presented in the table highlighted that among the impacts on awareness about contract farming scheme was considered to be ranked first with mean score 1.87. It was also found that social status ranked second and social relationship ranked third with the mean score of 1.80 and 1.71, respectively.

It was also found from the data that there were some other social impact on farmers like as leadership with a mean score 1.55, participation in social activities with a mean score 1.13, social awareness with a mean score 1.10, family unity with a mean score 0.91 and participation in Govt. schemes and progammes with a mean score 0.79

Table 2: Distribution of the respondents according to personal impact of contract farming   **N=160**

Sr. No.	Aspects	Impact			Total weighted score	Weighted mean score	Rank
		Improved	Somewhat improved	No change			
1.	**Personal**						
a.	Increase in confidence	136	21	03	293	1.83	**II**
b.	Decision making ability	19	128	13	166	1.03	**VIII**
c.	Living standard	142	13	05	297	1.85	**I**
d.	Current news / General awareness	125	29	06	279	1.74	**III**
e.	Communication skills	107	42	11	256	1.60	**V**
f.	Consumers` choice	19	102	39	140	0.87	**IX**
g.	Self-respect	118	37	05	273	1.70	**IV**
h.	Technical competence	50	93	17	193	1.20	**VII**
i.	Infrastructure development	43	109	10	195	1.21	**VI**

Table 4: Distribution of the respondents according to social impact of contract farming   **N=160**

Sr. No	Aspects	Impact			Total weighted score	Weighted mean score	Rank
		Improved	Somewhat improved	No change			
2.	**Social**						
a.	Social relationship	122	30	08	274	1.71	**III**
b.	Social status	131	26	03	288	1.80	**II**
c.	Social awareness	29	118	13	176	1.10	**VI**
d.	Family unity	22	103	35	147	0.91	**VII**
e.	Awareness about contract farming scheme	142	16	02	300	1.87	**I**
f.	Participation in social activities	47	87	26	181	1.13	**V**
g.	Participation in Govt. schemes & programmes	34	59	67	127	0.79	**VIII**
h.	Leadership	99	50	11	248	1.55	**IV**

3. Economic impact of contract farming

The data revealed from Table 5 that approximately, half of the respondents i.e. 45.3 per cent had medium level of economic impact followed by 33.3 per cent who had low level of impact, whereas remaining 21.4 per cent of contract farmers had high level of economic impact after adopting the programme. The data highlighted that wide range of respondents had low to medium level of economic impact as a result of contract farming.

Table 5: Economic impact of contract farming   **N=160**

Sr. No.	Level of impact	Frequency	Per cent
1.	**Low** (10 to 13 score)	53	33.3
2.	**Medium** (13 to 16 score)	72	45.3
3.	**High** (16 to 19 score)	35	21.4
	Total	**160**	**100.00**

3.1 Distribution of the respondents according to economic impact of contract farming

The data in Table 6 represents the distribution of respondents according to economic impact of contact farmers with mean score perceived by each item. The change in annual income as an economic impact was found highest with mean score of 1.85 and ranked at first position. Also, the market information was perceived high by contract farmers with mean score of 1.78 and ranked second.

The other economic impacts of contract farming were profit making with a mean score of 1.67, business techniques with a mean score of 1.55, financial management with a mean score of 1.53, capable to meet emergency needs with a mean score of 1.47 and repayment of loan/debt with a mean score of 1.37.

It was also found from the data that the impact observed was on the improvement of sales (1.09), purchase of goods/services (1.07), income generation activities (0.86) and borrowing tendency (0.67).

Table 6: Distribution of the respondents according to economic impact of contract farming   **N=160**

Sr. No.	Aspects	Impact			Total weighted score	Weighted mean score	Rank
		Improved	Somewhat improved	No change			
3.	**Economic**						
a.	Financial management	106	34	20	246	1.53	**V**
b.	Profit making	115	38	07	268	1.67	**III**
c.	Change in annual income	139	19	02	297	1.85	**I**
d.	Income generation activities	18	102	40	138	0.86	**X**
e.	Market information	130	26	04	286	1.78	**II**
f.	Improvement of sales	29	117	14	175	1.09	**VIII**
g.	Purchase of goods/services	21	130	09	172	1.07	**IX**
h.	Business techniques	109	30	21	248	1.55	**IV**
i.	Repayment of loan/debt	85	50	25	220	1.37	**VII**
j.	Capable to meet emergency needs	99	38	23	236	1.47	**VI**
k.	Borrowing tendency	23	62	75	108	0.67	**XI**

4. Agriculture impact of contract farming

The results in Table 7 show that almost half of the respondents i.e. 45.9 per cent had low level of agricultural impact followed by 33.3 per cent contract farmers who had high level of agricultural impact, whereas remaining 20.8 per cent respondents had medium level of agricultural impact as a result of adoption of contract farming programme.

Table 7: Agriculture impact of contract farming   **N=160**

Sr. No.	Level of impact	Frequency	Per cent
1.	**Low** (11 to 14 score)	73	45.9
2.	**Medium** (14 to 16 score)	33	20.8
3.	**High** (16 to 19 score)	54	33.3
	Total	**160**	**100.00**

4.1 Distribution of the respondents according to agricultural impact of contract farming

Data from Table 8 indicates that the agricultural impact of contract farming was considered as change in cropping intensity, ranked first with mean score of 1.64. It was also interesting that quality and quantity of agril. produce, ranked second with mean score of 1.57 followed by change in production, ranked third with a mean score of 1.50. It was also experienced by contract farmers that change in productivity also had impact with a mean score of 1.57.

The other agricultural impacts of contract farming were like information on crop production (1.43), weather forecasting (1.30), prevention & control of crop diseases & pests (1.25), awareness about improved technologies (1.15), use of improved agricultural implements (1.09), quality of work done through improved tools (1.07) and reduction in drudgery in agriculture (0.85).

5. Overall impact of contract farming

The overall impacts of contract farming, found on the basis of score in percentage, are presented in Table 9. It was found from the results that among the contract farmers majority of the respondents i.e. 63.1 per cent had experienced medium level of impact followed by 21.9 per cent of the contract farmers who had realised high level of impact, whereas remaining 15.0 per cent of the respondents had low level of overall impact of contract farming. The analyzed data also represented the wide range of contract farmers i.e. 85.0 per cent who had medium to high degree of effect as a result of utilization of contract farming.

Table 8: Distribution of the respondents according to agricultural impact of contract farming N=160

Sr. No.	Aspects	Impact			Total weighted score	Weighted mean score	Rank
		Improved	Somewhat improved	No change			
4.	**Agriculture**						
a.	Information on crop production	90	50	20	230	1.43	V
b.	Weather forecasting	83	42	35	208	1.30	VI
c.	Use of improved agricultural implements	50	75	35	175	1.09	IX
d.	Change in production	99	43	18	241	1.50	III
e.	Change in productivity	107	38	15	252	1.57	IV
f.	Change in cropping intensity	113	37	10	263	1.64	I
g.	Quality of work done through improved tools	51	70	39	172	1.07	X
h.	Reduction in drudgery in agriculture	43	50	67	136	0.85	XI
i.	Quality & quantity of agril. produce	99	54	07	252	1.57	II
j.	Awareness about improved technologies	53	78	29	184	1.15	VIII
k.	Prevention & control of crop diseases & pest	75	51	34	201	1.25	VII

Table 9: Overall impact of contract farming   **N=160**

Sr. No.	Level of impact	Frequency	Per cent
1.	Low (43 to 50 score)	24	15.0
2.	Medium (50 to 57 score)	101	63.1
3.	High (57 to 65 score)	35	21.9
	Total	**160**	**100.00**

6. Association between socio-economic and personal characteristics of the farmers and their impact of contract farming

The association between dependent and independent variables was studied by using statistical tool chi-square test (χ²). The association presented in Table 10 shows that among twelve variables taken up for the study, only variable economic motivation was highly significant in association with impact of contract farming. Variables like education, farm power and risk orientation had significant association with impact of contract farming. Whereas variables like age, land holding, irrigation facility, innovativeness, farm income, social participation, mass media exposure and area under contract farming were not significantly associated with impact of contract farming.

Table 10: Association between socio-economic and personal characteristics of the farmers and their impact of contract farming   N=160

Sr. No.	Independent Variable	Chi-square (χ²)
1.	Age	0.980
2.	Education	0.010*
3.	Land holding	0.010*
4.	Farm power	0.107
5.	Irrigation facility	0.010 *
6.	Innovativeness	0.309
7.	Farm income	0.010 *
8.	Social participation	0.024 **
9.	Risk orientation	0.203
10.	Mass media exposure	0.234

| 11. | Economic motivation | 0.293 |
| 12. | Area under contract farming | 0.018 * |

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

CONCLUSION

The impact of contract farming was computed on the basis of effect of contractual deal on four different aspects viz., personal impact, social impact, economic impact and agricultural impact. The personal impact on cultivators after adopting the contractual programme was the change in living standard, increase in confidence, current news or general awareness, raise in self-respect, communication skills, infrastructure development, technical competence and decision making ability. The results show that the social impact of contract farming was awareness about contract farming scheme, social status, social relationship, leadership, participation in social activities, social awareness, family unity and participation in Govt. schemes & programmes. The economic impact had change in annual income, market information, profit making, business techniques, financial management, capable to meet emergency needs, improvement of sales, purchase of goods/services, income generation activities and borrowing tendency. The agricultural impacts of contract farming were considered as change in cropping intensity, quality & quantity of agril.

produce, change in production, change in productivity, change in information on crop production, weather forecasting, prevention & control of crop diseases & pests, awareness about improved technologies, use of improved agricultural implements, quality of work done through improved tools and reduction in drudgery in agriculture. The overall impacts of contract farming were found from the results that among the contract farmers majority of respondents i.e. 63.1 per cent had experienced medium level of impact followed by 21.9 per cent of contract farmers who had realised high level of impact, whereas remaining 15.0 per cent of respondents had low level of overall impact of contract farming. The association shows that among 12 variables taken up for the study, only variable economic motivation was highly significant in association with impact of contract farming. These finding are in line with the findings of Venu Prasad (2008).

REFERENCES

Agwu, A. E., Ekwueme, J. B. and Anyanwu, A. C. (2008). Adoption of improved agricultural technology disseminated via radio farmers programme by farmers in Enugu State, Nigeria, African. Journal of Technology. **7** (9): 1277-1286.

Arunkumar, S. (2002). Economics of contract farming in vegetable – A case of Belgaum district. *M.Sc. (Agri.) thesis,* Univ. Agric. Sci., Dharwad, Karnataka.

Asokan, S. R. (2005). A perspectives of contract farming with special reference to India*, Indian J. Agril Makg.,* **19**(2): 94-106.

Bhosale, U. S. (2010). Participation of rural youth in paddy farming in Anand district of Gujarat state. *M. Sc. (agri.), thesis* (Unpublished), AAU, Anand.

Chinnavere Gowda B.N. (2012). *Economics of contract framing in Indian agriculture.* 1st ed. Published by serial publications, Darya Ganj, New delhi-110002 (India)

Eaton, C., Shephard, A. (2001). Contract farming - partnership for growth, FAO Agricultural Services Bulletin. pp. 145

Erappa, S. (2006). Conttract farming in Karnataka: A Boon or a Bane? Research Report: Agricultural Development and Rural Transformation Centre, Institute for Social and Economic Change, Nagarbhavi, India. pp. 113-117.

Jagdish Kumar and Prakash K. (2008). Contract farming: problem, prospects and its impact on income and employment. *Agricultural Economic Research Review.* 21 July-December 2008. Pp. 243-250.

Kumar, A., Singh, R. and Verma, R. P. S. (2011). Contract farming on barley: a viable option for Indian farmers. Abstract published in 5th National Seminar on Multi Sectoral Innovations for Rural Prosperity. pp. 124-125.

Nwachukwu, C. A. (2010). Adoption of organic agricultural technologies: Implications for radio farmer agricultural extension programme I Imo state. Nigeria. Agricultural Extension Department, Federal University of Technology, Owerri, Nigeria.

Rohila, A. K. (2014). Direct seeded rice (DSR) cultivation in Haryana: problems and prospects. M. Sc. thesis (Unpublished), Department of Extension Education, COA, CCSHAU, Hisar.

Singh, R., Kumar, A., Verma, R. P. S., Chand, R., Kumar, A., Riar, A. B. S. and Singh, S. S. (2011). Scope of malt barley cultivation through contract farming in Punjab. *Progressive Agriculture*, **11 (2):** 390-396.

Venu Prasad H. D. (2008). Impact of contract farming of gherkin in Karnataka state, *M. Sc. Thesis* (Unpublished), Dept. of Extn. Educ., Division of agricultural extension, IARI, New Delhi.

RESEARCH ARTICLE

Satisfaction Gained by Urban Homemakers after Performing the Household Activities

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ABSTRACT

Domestic work is the world's major occupation. The job of home making encompasses a core of activities essential to our existence. It is inclusive of essentially prevailing mental activity and the dominant physical activity. Casual observations and some research data indicate that many home makers feel inadequate to cope with the heavy demands of household work. The long hours of work, much efforts and labour in repetitive operations results in fatigue and drudgery. Hence the data was collected by conducting a survey through interview schedule to know the Satisfaction gained by urban homemakers after performing the daily routine household activities. The sample was divided in to two age groups viz., 20 to 35 and 36 to 50 years. Results depicted that group I homemakers derived most satisfaction from the activities like personal grooming, marketing followed by washing clothes manually, preparation of breakfast and lunch preparation where as group II women were mostly satisfied by performing activities-lunch preparation, washing clothes, followed by serving food, child care, preparation of breakfast, cutting vegetables, dinner preparation and entertaining guests.

Key words: Drudgery, Satisfaction, Household activities

INTRODUCTION

Women play a pictorial role in shouldering the multifarious job of home making for smooth running of the entire household. Statistics reveals that women bear the brunt of duties associated with child care. According to Maryland Pennell (1959) homemakers are important for the welfare of the state and for families. The household work performed by women is not all considered as the economic activity and in any way a contribution to the household development. Any amount of time spent, any number of activities performed by women will go unnoticed because of its non-economic value in spite of its high drudgery cost. The drudgery involved in it

is very high. Drudgery is generally termed as physical and mental strain, agony, monotony and hardship as experienced by human being.

The unpaid work amongst housewives is a major category in India. A recent survey done by Gave Ahmed (2013)and it suggested that on an average a housewife spends almost 6.2 hours a day doing household chores. On an average Indian Homemakers spend approximately 6 to 9 hours on household work. (Varghese *et al,* 1989, Masur and Surendra 1990, Kulkarni and Murali, 1991).) Varghese et al (1994) stated that Indian women spend 41.5 % calories of energy for household activities. Sarswati *et al.* (2000) reported that Indian women spend about 5-7 hours a day in kitchen for cooking and related activities which amount to about ¼ of their life period. Gupta & Yeshyeshwini (2016) concluded that women spends 2 fold more time than male in doing the unpaid activities like cleaning the house, cooking food, washing clothes etc. According to census of India (2011) household workers are those doing household tasks like cleaning the house, caretaking of the children or the house, groceries shopping are considered as non workers.

The household routine activities consist of washing clothes, washing utensils, fetching and storing water, serving food, grooming, entertaining guests, keeping home neat and tidy, paying bills, marketing, decorating the home, care of children and elders etc. (the list is unending) which are to be carried out daily, regularly and sometimes occasionally. Besides these housewife takes care of all her family members. The frequency of performing various tasks influences the input of various physical costs to the worker to a great extent.

Varghese *et al*. (1989) also reported that Maharashtrian homemakers spend more time on household activities and on service and travel. Such multifarious duties performed by women in home and outside, make their life quite miserable as the tasks are quite tedious and time consuming. The long hours of work, much efforts and labour in repetitive operations results in fatigue and drudgery.

Most homemakers readily identify some tasks as liked and other are not liked. This aspect may contribute to homemakers perceived exertion and satisfaction gained after performing particular activity.

Hence an attempt has been made to elicit the information regarding daily or routine household activities carried out by the homemakers; satisfaction gained and perceived exertion after the performance of these activities.

1. Experimental Procedure

A sample of 50 women in the age group of 20-50 years was randomly selected from two districts i.e. Nagpur and

Parbhani. The data was collected by conducting a survey through interview schedule. The whole sample is divided in to two groups viz., 20 to 35 and 36 to 50 years. The satisfaction gained after the performance of household activities was recorded by using a five point scale *(Varghese et al 1994)* i.e. satisfaction scale was measured on the scale viz., Satisfaction scale-Most Satisfied -5, Satisfied-4, Neutral -3, Unsatisfied -2, Not at all Satisfied -1. Total mean scores of satisfaction were calculated.

2. Observation and Analysis

General information of the homemakers

The general information of the women selected for the experiment is given in Table 1.

Income

Majority (48%) of the women of Group I and Group II were falling in the income range of Rs. 25000-50000/- per month. 36 and 40 per cent homemakers from group I and Group II were in the income group below Rs.25000/- per month respectively. Remaining sample of homemakers (16 % from group I and 12 % from group II) was distributed in the income category above Rs. 50000/- per month.

Education

In case of education, it was observed that maximum (84%) women from group I and 40 per cent women from group II were educated up to high school.

Maximum women from group II (48%) and 16 per cent women from group I were educated up to high school to graduate level. Least per cent of the homemakers (12%) from group II category were educated up to post graduate level.

Type of family

Maximum homemakers from group I and group II (60% and 52 %) were belonging to nuclear family. 40 per cent and 44 per cent homemakers from group I and group II were belongs to the joint families. Only few per cent (4%) families from group II were falling in the category of extended family.

Size of family

Majority of the respondent from Group I and Group II (64 & 68 %) were belonging to medium family size i.e. 3 to 5 family members, while 20 and 12 per cent of the respondents of Group II and Group I belonged to large family i.e. 5-8 members in the family, where as 16 percent from Group I and 20 percent from Group II respondents were belonged small size family.

Number of rooms in the house

Numbers of rooms available in the house were 4-8 rooms for majority of the respondents from Group I (60 %) followed by 1-3 (40%), whereas 1-3 rooms were available to majority (64%) home makers of Group II followed by 4-8 rooms (36%). No one family has rooms more than eight and less than one.

Light and ventilation

It is clear from the table and fig 3 that most of the home makers from group I (52%) and group II (68%) were having adequate light and ventilation facility in their homes except 48 % and 32% respectively that were reported to have the inadequate lighting and ventilation facility in their homes.

Table 3 depicts the information regarding level of satisfaction of derived by group I and group II home makers from selected home making activities

Group I

It was observed that 80 percent women of group I homemakers derived most satisfaction from personal grooming and marketing (80% each), followed by washing clothes manually (60%), preparation of breakfast (52%), entertaining guests (48%) and lunch preparation (44%). 40 percent homemakers were mostly satisfied after performing tea making, cleaning of cereals, cleaning of kitchen and child care activities. The activities like grinding and pounding gave the most satisfaction to 36 percent homemakers of group I respondents followed by cutting vegetables, preparation of dinner and care of sick persons (32% each). Least percentage of respondents most satisfied with activities such as serving food, fetching water (28% each), washing vessels, mopping, washing clothes with paid help and flour milling (20% each).

Most of the group I respondents were only satisfied by performing the activities child care, dinner preparation (48% each), followed by mopping, flour milling (44% each). This was followed by preparation of breakfast, cutting vegetables, washing clothes manually and by machine, care of sick persons and entertaining guests (40% each).

The activities like grinding and pounding, cleaning of kitchen, serving food, fetching water were rated as 'satisfied' by 36 percent women followed by tea making, lunch preparation, washing clothes by paid help (32 % each). Least percentage of women rated the activities such as washing vessels, sweeping (24%), cleaning of cereals, personal grooming and marketing as 'satisfied' (20% each).

Maximum women rated 'neutral' satisfaction on the scale of satisfaction for the activities such as dusting (56%), followed by washing vessels, sweeping, (40% each), serving food, mopping, fetching water (36% each), cleaning of cereals (32%), tea making and grinding and pounding (28% each). Least percentage of group I women expressed neutral satisfaction regarding the activities such as cutting vegetables, lunch and dinner preparation (20% each), followed by flour milling (16%), cleaning of kitchen, washing clothes with machine, child care, care of sick persons and entertaining guests (12% each). Only 8

percent women expressed neutral satisfaction from preparation of breakfast.

Maximum women (40%) were unsatisfied by performing the activities dusting, which was followed by sweeping (28%), washing clothes by paid help, flour milling (20% each), washing vessels, care of sick persons, (16 % each), cleaning of cereals and kitchen (12%) etc. Only few homemakers reported dissatisfaction towards the activity cutting vegetables. Four and twenty four percent women were not at all satisfied after performing the activities dusting and washing clothes by paid help respectively.

Group II

Regarding group II women it was observed that maximum women were mostly satisfied by performing activities- lunch preparation (80%), followed by washing clothes manually (60%), serving food, child care (52%), preparation of breakfast, cutting vegetables, dinner preparation and entertaining guests (48% each).

Forty percent women derived most satisfaction from tea making, cleaning of cereals, grinding and pounding, sweeping, fetching water, marketing and care of sick persons followed by mopping, personal grooming (32% each), cleaning of kitchen, washing vessels (28% each), washing clothes by paid help (24%) dusting and flour milling (20% each).

The activities like tea making, cutting vegetables (52%), were rated as 'satisfied followed by preparation of breakfast, serving food, sweeping, child care, personal grooming and marketing (48% each). Forty percent homemakers rated the activities such as - preparation of dinner, mopping, fetching water, washing clothes manually and by paid help, flour milling, care of sick persons and entertaining guests as 'satisfied'.

Minimum percentage of home makers expressed satisfaction towards the activities like- cleaning of cereals, grinding and pounding, cleaning of kitchen, washing clothes with machine, (32% each), followed by washing vessels (24%), lunch preparation (20%), and dusting (16%).

The percentage of women expressing the satisfaction as 'neutral' after performing the activities such as dusting (44%), cleaning of kitchen, washing vessels (40% each), followed by personal grooming, flour milling and care of sick persons (20% each), washing clothes with paid help (16%), cleaning of cereals, grinding and pounding, preparation of dinner, sweeping, mopping, marketing and entertaining guests (12% each). Only eight and four percent homemakers expressed neutral satisfaction towards the activities such as tea making and preparation of breakfast respectively.

Maximum (40%), women were unsatisfied regarding the activity washing clothes by machine, followed by paid help, dusting (20% each), cleaning of

cereals, grinding and pounding and mopping (16 % each). Only 12 percent women reported non satisfaction for washing vessels. None of the woman from group II expressed 'not at all satisfied' i.e. last score for the satisfaction scale for any type of household activities. These results are in the line of study carried out by Kulkarni *et al* (2011). According to the study washing clothes and mopping floor was observed as most exertive tasks by the selected homemakers. The study also indicated that with an increase in the age of home makers extent of likes increased in cooking, cleaning grains and washing clothes.

The description regarding satisfaction gained after performing various household activities was totally dependent upon the respondent's personal feelings. This personal feeling may be influenced by several factors such as skill to do the activity, health condition of the respondents time consumed, type of activity, healthy atmosphere in their homes, help of family members received to the homemakers and personal interest shown by the respondents in performing the activities.

CONCLUSION

To conclude with this it can be said that group I homemakers derived most satisfaction from the activities like personal grooming, marketing followed by washing clothes manually, preparation of breakfast and lunch preparation where as group II women were mostly satisfied by performing activities-lunch preparation, washing clothes, followed by serving food, child care, preparation of breakfast, cutting vegetables, dinner preparation and entertaining guests. The most disliked activities to maximum women of both age groups were washing clothes by machine and by paid help, dusting, cleaning of cereals, grinding and pounding, flour milling and mopping. It can also be concluded that age was the major contributing factor in showing the satisfaction after performance of activities by younger age group and elder age groups homemakers.

Table 1. General Information of the Homemakers

Parameters	Group I		Group II	
	Frequency	Percentage	Frequency	Percentage
Income(Rs./Month)				
Below 25000/-	09	36	10	40
25000-50000/-	12	48	12	48
Above 50000/-	04	16	03	12

Education				
Up to High school	21	84	10	40
High school-Graduate	04	16	12	48
Post Graduate	--	--	03	12
Type of family				
Nuclear	15	60	13	52
Joint	10	40	11	44
Extended	--	--	01	4
Size of family				
Small	04	16	05	20
Medium	16	64	17	68
Large	05	20	03	12
No. of Rooms in House				
1-3	10	40	16	64
4-8	15	60	9	36
Above 8	--	--	--	--
Light & Ventilation				
Adequate	13	52	17	68
Inadequate	12	48	08	32

Table 2. Satisfaction gained by homemakers from selected home making activities (group I and Group II)

Sr No	List of activities	Group I					Group II				
		5	4	3	2	1	5	4	3	2	1
1	Tea making	10(40)	8(32)	7(28)	--	--	10(40)	13(52)	2(8)	--	-
2	Preparation of breakfast	13(52)	10(40)	2(8)	--	--	12(48)	12(48)	1(4)	--	-
3	Precooking Activities 1.Cleaning of cereals 2. Cutting vegetables 3. Grinding & pounding	10(40) 10(40) 8(32) 9(36)	5(20) 5(20) 9(36)	8(32) 7(28)	3(12) 2(8)	-- -- --	10(40) 12(48) 10(40)	8(32) 13(52) 8(32)	3(12) -- 3(12)	4(16) -- 4(16)	- - - -
4	Cooking activities 1.Lunch preparation 2.Dinner	11(44) 8(32)	8(32) 12(48)	5(20) 5(20)	-- --	-- --	20(80) 12(48)	5(20) 10(40)	-- 3(12)	-- --	- - -

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No.	Activity										
5	Post cooking activities										
	1.Cleaning of kitchen	10(40)	9(36)	3(12)	3(12)	--	6(24)	8(32)	10(40)	--	-
	2. Washing vessels	5(20)	6(24)	10(40)	4(16)	--	7(28)	6(24)	10(40)	3(12)	-
6	Serving food	7(28)	9(36)	9(36)	--	--	13(52)	12(48)	--	--	-
7	Cleaning the house										
	1. Dusting*	--	--	14(56)	10(40)	1(4)	5(20)	4(16)	11(44)	5(20)	-
	2. Sweeping	2(8)	6(24)	10(40)	7(28)	--	10(40)	12(48)	3(12)	--	-
	3. Mopping	5(20)	11(44)	9(36)	--	--	8(32)	10(40)	3(12)	4(16)	-
8	Fetching water*	7(28)	9(36)	9(36)	--	--	10(40)	10(40)	5(20)	--	-
9	Washing of clothes										
	1. Manually	15(60)	10(40)	--	--	--	15(60)	10(40)	--	--	-
	2. Paid help	5(20)	8(32)	1(4)	5(20)	6(24)	6(24)	10(40)	4(16)	5(20)	-
	3. With machine	12(48)	10(40)	3(12)	--	--	--	8(32)	--	10(40)	-
10	Child care	10(40)	12(48)	3(12)	--	--	13(52)	12(48)	--	--	-
11	Personal grooming	20(80)	5(20)	--	---	--	8(32)	12(48)	5(20)	--	-
12	Occasional activities										
	1.Marketing*	20(80)	5(20)	--	--	--	10(40)	12(48)	3(12)	--	-
	2.Flour milling*	5(20)	11(44)	4(16)	5(20)	--	5(20)	10(40)	5(20)	--	-
	3.Care of sick person*	8(32)	10(40)	3(12)	4(16)	--	10(40)	10(40)	5(20)	--	-
	4.Entertaining guests*	12(48)	10(40)	3(12)	--	--	12(48)	10(40)	3(12)	--	-

Satisfaction scale-Most Satisfied -5, Satisfied-4, Neutral -3, Unsatisfied -2, Not at all Satisfied -1,

* Denotes activities performed weekly/fortnightly/As per the requirement

REFERENCES

Gazi Ahmed (2015)., Survey studies time spent on paid and unpaid work.

Kulkarni M. S., Sarambekar H. L., Umrikar S. H. (2015), Perceived exertion of Homemakers while performing selected household activities and their attitude towards these tasks", International Journal of Innovative

Research and development, Vol 4, Issue 9

Kulkarni , M. S., Murali D. (1991). Time expenditure pattern of tribal homemakers. Annual Research Report, M.A. U., Parbhani

Maryland Y. Pennell (1959)., Charecteristics of families served by homemakers., State Department of health. Public health services, 49, (11)

Masur S. B. and Surendra, M.S., (1990)Factors affecting the utilization of time in performing household activities by rural homemakers. Journal of Maha. Agril. Universities. 15:1, 43-45

Saraswathy Eswaran, Swaminathan, K. R., Kathirud, K. and Pushpa, G. (2000) Energy expenditure pattern by rural women Folk in Tamilnadu., Energy Management : 11 (3): P : 211-217.

Sujata Gupta Kedar & yesyeshwini Gopinathan (2016)., Life satisfaction and contribution of homemakers through unpaid household work, Human rights International Journal: Vol. 4, Issue 1(2016) pp 157-160.

Upadhyay R. K. (2005). Physiological workload of working women while performing professional activities. Unpublished Ph.D. thesis submitted to Swami Ramanand Tirth University, Nanded.

Varghese, M.A., Atreya, M. Chattarjee, L., Bhatnagar, A. (1989). Ergonomic evaluation of household activities, Dept. of Family Resource Management, Dept. of Resource support (UGC), Dept. of Post Graduate, Studies and Research in Home Science, SNDT Women's University, Bombay pp. 2-13.

Varghese M. A., Atrey, N., and Bhatnagar, A. (1989). Studies on workload and perceived exertion in household work. Report of FRM Dept, Dept of PG studies in Home science, SNDT Women's University, Bombay .

RESEARCH ARTICLE

Personal, Socio-economic and Psychological characteristics of kiwifruit growers in Arunachal Pradesh

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ABSTRACT

Arunachal Pradesh has a vast scope for economic sustainability and scope for cultivation of horticultural crops which would be a major source of income for farmers unlike other allied sectors. In recent times, growing popularity of exotic fruit like kiwi which is extremely conducive for northeast region of India has opened a door for farmers of Arunachal Pradesh for uplifting their socio-economic status. To analyze their personal, socio-economic and psychological characteristics, the present study was conducted in Lower Subansiri district of Arunachal Pradesh.With the help of Kiwi Growers Co-operative Society Ltd., a total of 120 respondents were selected who were engaged in kiwifruit cultivation. The statistical tools such as frequency, percentage, mean, standard deviation, co-efficient of correlation were used for the analysis of data. The result shows thatmost of the kiwifruit growers (75.00%) were under middle age category and 30.83 per cent of farmers had high school level education. It was found that 47.50 per cent of respondents were found in semi-medium land holding category and most of the respondents (56.25 %) had medium area under kiwifruit cultivation. Also the result indicates that 78.12 per cent of farmers categorized under medium level of annual income and 50.00 per cent of the kiwifruit growers had medium marketing behavior followed by 43.75 per cent had high marketing behavior. The data show that 53.13 per cent of the respondents had medium social participation and most (68.75%) of kiwifruit growers belonged to medium mass media use category.

Key Words: Socio-economic, kiwi fruit growers, Arunachal Pradesh

INTRODUCTION

The North Eastern States of India are highly conducive for the growth of various horticulture crops. These states have been producing many such crops, which have a potential for supplying to the export market in the fresh and processed forms. In the recent times, popular fruit like Kiwi (*Actinidia*

deliciosa) is grown in most of the North Eastern States. Arunachal Pradesh has 18 lakh hactares of land available for horticulture of which only 1.13 lakh hactares have till date being under cultivation. Therefore, there is a tremendous potential for cultivation of horticulture crops. Arunachal Pradesh bears the highest production of kiwifruit in India. Kiwifruit has been assessed as one of the important future commercial fruits. It provides high return per unit area and the farmers can earn about Rs. 4 to 5 lakhs per hectare annually. Kiwifruit bears heavily every year with no crop failure. Farmers of Arunachal Pradesh practice subsistence farming which is self-sufficient for their family but not for commercial purpose. Venturing into kiwi entrepreneurships can definitely give them a good harvest and income hence, uplifting their socio-economic status.

Socio-economic status of the farmers plays a major role in adoption of modern agricultural technologies by influencing knowledge, attitude, perception. aspiration level etc of a farmer. It also determines farmer's accessibility to the agricultural resources, livelihood security etc. Hence the present study was conducted to investigate the socio-economic status of the kiwi fruit growers which directly or indirectly influences their entrepreneurial behaviour.

METHODOLOGY

The present study was conducted in purposively selected Lower Subansiri district since the district pioneered in kiwifruit cultivation and is one of the dominant districts of Arunachal Pradesh in kiwifruit production. The two tehsils Ziro and Old Ziro were selected purposively based on area of production. Three villages from each tehsils and twenty respondents from each villages were selected. Thus, a total 120 kiwifruit growers were selected as sample. The data was collected by interviewing 120 kiwifruit growers with well-designed and pre-tested schedules. The respondents were divided into several categories based on mean and standard deviation of the data.

RESULTS AND DISCUSSION

Personal, socio-economic and psychological characteristics of kiwifruit growers:
Age

It is apparent from Table 1 that majority of the respondents (75.00%) were under middle age category followed by old age (18.50%) and (6.50%) young age categories. The middle age group are financially independent and have adequate knowledge and experience. They are good decision makers and often have wider range of networks as compare to young age group. Low percentage of young age group is because they are more

inclined towards job service rather than farming in Arunachal Pradesh.

Education

Data presented in Table 1 revealed that only 6.67 per cent of farmers had educated up to post graduate level whereas, 22.50 per cent of farmers had educated up to graduate level and 24.17 per cent of farmers had educated up to higher secondary school level, while 30.83 per cent of farmers had high school level education and 3.33 per cent farmers had middle school level education. While 3.33 per cent farmer had educated up to primary school and 9.17 per cent farmers were illiterate.

The probable reason for 9.17 per cent farmers to be in illiterate category might be due to illiteracy of their parents, non-realization of importance of formal education and low annual income.

Land holding

As regards with the land holding, it is evident from the Table 1 that higher percentage 47.50 per cent of respondents were found in semi-medium land holding category, followed by 25.00 per cent were in medium land holding category, 24.17 per cent of them from small land holding category. None of them were found in marginal land holding category and only 3.33 per cent were found in large land holding category.

The probable reason for 0.00 per cent in marginal land holding category is due to large land holding capacities. Since, Arunachal Pradesh has the lowest population density and largest state in area wise among North Eastern states therefore it justify for being none in marginal land holding category.

Area under kiwifruit

Table 1 revealed that 56.25 per cent of the respondents had medium area under kiwifruit cultivation followed by 25.00 per cent under large area and 18.75 per cent under small area since Arunachal Pradesh is new in kiwifruit cultivation and most of the respondents are on trial basis.

Annual income

It is clear from Table 1 that 78.12 per cent of farmers categorized under medium level of annual income followed by 12.50 per cent farmers had high level of annual income and 9.37 per cent of farmers had low level of annual income.

The probable reason which could be attributed for varied income levels of respondents might be the size of the land holding and practicing of subsidiary occupations by the respondents.

Marketing behavior

It is depicted from Table 1 that majority 50.00 per cent of the kiwifruit growers had medium marketing behavior followed by 43.75 per cent had high

marketing behavior followed by 6.25 per cent had low marketing behavior.

The probable reason for majority of the kiwifruit growers under medium marketing behavior is that almost all farmers engaged in kiwifruit cultivation are members of Kiwi Growers Cooperative Society and all the marketing activities are done together. Therefore, major input purchasing and sale of produce was performed by the said society.

Social participation

It is elucidated from Table 1 that 18.75 per cent respondents had high social participation while, 53.13 per cent of the respondents had medium social participation and 28.12 per cent of the respondents were found in category of low social participation.

The possible reason for medium social participation may be that they are hesitating to participate in the formal and non-formal organization due to the dominance of higher caste, higher income groups and higher socio-economic status, people and non-availability of time to participate in the different organizations.

Mass media exposure

It is observed from Table 1 that 12.50 per cent of the respondents belonged to high mass media use. Whereas majority (68.75%) and 18.75 per cent of farmers belonged to medium and low mass media use categories, respectively.

CONCLUSION

An overall idea of socio-economic status will help in identifying the particular variables which are related to entrepreneurial behaviour of the kiwi fruit growers and it will accelerate the process of effective transfer of technology as because it largely affects the adoption process of kiwi fruit production technologies. The present study provides a glimpse of socio-economic profile of a sample of kiwi fruit growers. On the basis of the variables under the study, most of the kiwifruit growers fall under medium category except high school education and semi-medium size of land holding. It shows that there is a high potential for kiwifruit farmers for improving their socio-economic status by venturing into kiwifruit entrepreneurship and by narrowing the constraints. As Arunachal Pradesh has bright prospects in horticultural sector, farmers can harness this opportunity bestowed by nature and uplift their livelihood status.

REFERENCES

Lalhriatpuii, 2015. Entrepreneurial Behaviour of Anthurium Growers in Aizawl District of Mizoram State. M.Sc. (Agri.) Thesis, MPKV, Rahuri, Maharashtra.

Nagesh, B., Halakatti, S.V., and Hanchinal, S.N., 2011. Study on entrepreneurial behaviour of pomegranategrowers. Agriculture Update. 6(3&4): 122-125.

Neelaveni, S., Rambabu and Punna Rao. 2002. Developmental priorities of farm women in agribusiness management – A case of an adopted village K. B. Palm. *MANAGE Extension Research Review*, 6(3): 74-83.

Patil, V.G., Mahadik, R.P. and Patil, A.S., 1999. Entrepreneurial behaviour of littlegourd growers. *Maharashtra J. of Extn. Edn.*18: 240-243.

Patel, M. M., Chatterjee, A. and Khan, M., 2003. Adoption of wheat production technology. *Indian Journalof Extension Education*. 39(1-2):58-62.

Table 1: Personal, socio-economic and psychological characteristics of kiwifruit growers.

Sr. No	Traits	Category	Frequency	Percentage	Mean	SD
1.	*Age*	Young (Up to 35)	08	06.50	47.40	8.81
		Middle (36 - 55)	90	75.00		
		Old (56 andabove)	22	18.50		
2.	Education	Illiterate	11	9.17	3.59	1.64
		Primary (IV std)	04	03.33		
		Middle (VIII std)	04	03.33		
		High school (X std)	37	30.83		
		Higher secondary school (XII std)	29	24.17		
		Graduate	27	22.50		
		Post Graduate	08	06.67		
3.	Land holding	Marginal (Up to 1.00 ha.)	0	0	4.37	2.94
		Small (1.01 to 2.00 ha.)	29	24.17		
		Semi-medium (2.01 to 4.00 ha.)	57	47.50		
		Medium (4.01 to 10.00 ha.)	30	25.00		
		Large (10.01 ha. and above)	04	3.33		
4.	Area under kiwifruit	Small (Up to 1.68 ha)	22	18.75	2.53	0.84
		Medium (1.69 ha to 3.37 ha.)	68	56.25		
		Large (3.38 ha. and above)	30	25.00		
5.	Annual income	Low (Up to 100288)	11	9.17	3,96,562.5	2,96,273.7
		Medium (1,00,289 to 6,92,836)	94	78.33		
		High(6,92,837 and above)	15	12.50		
6.	Marketing behaviour	Low (Up to 2.76)	08	06.25	3.37	0.61
		Medium (2.77 to 3.98)	60	50.00		
		High (3.99 and above)	52	43.75		
7.	Social participation	Low (Up to 2.11)	34	28.12	4.28	2.11
		Medium (2.12 to 5.14)	64	53.13		
		High (5.15 and above)	22	18.75		
8.	Mass media exposure	Low (Up to 13.07)	23	18.75	21.19	8.12
		Medium (13.08 to 29.30)	82	68.75		
		High (29.31 and above)	**15**	**12.50**		

RESEARCH ARTICLE

Constraints in Contract Farming

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ABSTRACT

Contract farming defined as those contractual arrangements between farmers and companies whether oral or written specifying one or more conditions of production and / or marketing of an agricultural product Roy (1963). Above mentioned definition was considered as much broader as it included marketing or forward contract. The study is a micro level study, as it covers only four districts of Haryana state. It is highly difficult to represent the country as a whole. 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. The constraints are an obstacle or hindrance faced by the farmers under contract farming. Based on the information furnished by concerned company, the constraints being faced by contract agencies in practising contract farming and problems were ranked and prioritized by using the schedule developed with slight modification. The study on constraints was conducted on two phases. These phases are 1. Constraints faced by farmers and 2. Constraints faced by agencies. Approximately one-half i.e. 49.4 per cent of the contract farmers faced medium level of constraints followed by 35.6 per cent of contract farmers who had faced low level, whereas only 15.0 per cent of contract farmers faced highlevel of constraints under contract farming. It is evident that most (50.0 %) of the private firms or agencies were facing low level of problems from contract farmers followed by 37.5 per cent contracting companies realised high level of constraints, whereas only 12.5 per cent agencies felt that medium level of constraints faced by agencies under contract farming. The association between dependent and independent variables was studied by using the statistical tool chi-square test(x^2). The association shows that among 12 variables taken up for the study, only age was highly significantly associated with the constraints.

Key Words : Constraints, Contract faming, Farming, Contract

INTRODUCTION

Contract farming distinguished relationship between cultivators and private or state enterprises those substitute for open market exchange by linking normally independent family farmers of widely variant assets with a central processing, export or purchasing unit that regulates in advance price, production practices, product quality and credit (Davis, 1979).

A more universal definition of contract farming should encompass all such cases. That is, contract farming is a form of vertical coordination between the producers and the contractor (processor or marketing firm or a third party such as an input manufacturer or service provider) where the later directly influences the production decision and exercises some control at the production point under the obligation of purchasing certain quantity of produce at specific price from the cultivators. The quantity and price relate to delivery of specific quality produce at designated location and for a period of time.

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 farmers suffer from financial problems and a lack of capacity to adopt agricultural innovation. Contract farming can overcome this constraint and deliver the scale benefits typically associated with large agricultural production system. Contract farming clearly offers numerous opportunities for farming community. It also gives access to assured market, provides guaranteed and fixed cost, as well as most importantly provides access credit, inputs and production service. On the other hand, it can stimulate farm technology and skill transfer.

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.

This variable was measured by constructing a structured schedule. A several numbers of contract farmers and private firms/organisations were contacted to form an inventory of the prospects. A review of literature concerned to the field was also deeply consulted. The constraints are an obstacle or hindrance farced by the farmers under contract farming and constraints faced by the agencies under contract farming system. The responses of all contract farmers were obtained from respondents. To make out the conclusion, the ranks were converted into scores such as two for very serious statement, one for serious statement and zero for not serious statement. Later on, score for each problem was aggregated and mean score

was calculated. Higher the mean value for the constraint showed its importance.

RESULTS & DISCUSSION:

After personal interviewing of the 160 contract farmers of the four districts and kinds of contracting firms/companies which were selected randomly, it was found that there were numbers of problems which not only retarded the economic growth in agricultural sector but also became a question mark on participation in contract farming programmes. The study on constraints was conducted on two phases. These phases were:

1. Constraints faced by farmers &
2. Constraints faced by agencies.

1. Constraints faced by farmers:

It is revealed from Table 1 reveals that approximately one-half i.e. 49.4 per cent of the contract farmers faced medium level of constraints followed by 35.6 per cent of contract farmers who had faced low level, whereas only 15.0 per cent of contract farmers faced high level of constraints under contract farming. The data emphasized that vast majority of the contract farmers (85.0%) had low to medium degree of problems which prevented their participation in contract farming.

Table 1: Constraints faced by farmers under contract farming   **N=160**

Sr. No.	Level of constraints	Frequency	Per cent
1.	**Low** (15 to 21 score)	57	35.6
2.	**Medium** (21 to 27 score)	79	49.4
3.	**High** (27 to 33 score)	24	15.0
	Total	**160**	**100.00**

1.1 Distribution of respondents according to various constraints faced by farmers under contract farming

Constraint faced by farmers under contract farming was measured by farmers rating on 20 selected constraints. The ratings ranged from 1 (strongly disagree) to 5 (strongly agree). The mean score by statement in rank order of constraints faced by farmers under contract farming are presented in Table 2. The mean score of the items in the schedule represented the farmers` constraints.

An examination of Table 2 highlights that delay in arranging inputs was the most important constraints faced by farmers under contract farming with a mean score of 1.73.

Lack of advisory services was another important constraint with mean score of 1.71. Scarcity of labours during peak periods and lack of government control were other important constraints faced by famers with mean score of 1.64 and 1.53, respectively.

Farmers also faced the constraints under contract farming like as delay in procurement of produce, lack of quality inputs, related to marketing/procurement, lack of awareness about legal aspects, related to delivery of payment/ disbursements, lack of credit for crop production and lack of provision of farm machinery and equipments when required with mean score of 1.51, 1.45, 1.41, 1.28, 1.25, 1.16 & 1.13 respectively.

There were some other important constraints faced by cultivators, those are as with their mean score like lack of credits for crop production (1.16), poor service delivery by firm (1.08), provision of inputs at higher rate (1.05), frequent power cutting (0.97), delayed payment for crop produce (0.88) which creates the obstacle in agril. produce and economic development of cultivator as well.

There are some other important problems which are further indicated in Table 4.10 were faced by farmers under contract farming. These were: cheating by an agency (0.72), lower price for crop produce (0.66), difficulty in meeting quality requirements (0.53), Scarcity of water for irrigation (0.52), faulty grading by an agency (0.65).

Table 2: Distribution of respondents according to various constraints faced by farmers under contract farming   **N=160**

Sr. No.	Constraints	Very serious	Serious	Not serious	Total weighted score	Weighted mean score	Rank
1.	Lack of credit for crop production	42	102	16	186	1.16	X
2.	Lower price for crop produce	30	46	84	106	0.66	XVII
3.	Faulty grading by an agency	05	94	61	104	0.64	XVIII
4.	Scarcity of water for irrigation	14	56	90	84	0.52	XX
5.	Difficulty in meeting quality requirements	15	55	90	85	0.53	XIX
6.	Lack of quality inputs	85	62	13	232	1.45	VI
7.	Provision of inputs at higher rate	31	106	23	168	1.05	XIII
8.	Poor service delivery by firms	50	74	36	174	1.08	XII
9.	Delay in arranging inputs	117	43	00	277	1.73	I
10.	Delayed payment for crop produce	23	96	41	142	0.88	XV
11.	Frequent power cutting	37	82	41	156	0.97	XIV
12.	Scarcity of labour during peak periods	125	13	22	263	1.64	III
13.	Delay in procurement of produce	84	75	01	243	1.51	V
14.	Lack of government control	96	54	10	246	1.53	IV
15.	Cheating by an agency	16	84	60	116	0.72	XVI
16.	Lack of advisory services	115	45	00	275	1.71	II
17.	Related to marketing/procurement	90	46	24	226	1.41	VII
18.	Related to delivery of payment / Disbursement	75	51	34	201	1.25	IX
19.	Lack of awareness about legal aspects / Documentation	69	68	23	206	1.28	VIII
20.	Lack of provision of farm machinery and equipment when required	43	95	22	181	1.13	XI

2. Constraints faced by agencies:

It is evident from Table 3 that most (50.0 %) of the private firms or agencies were facing low level of problems from contract farmers followed by 37.5 per cent contracting companies realised high level of constraints, whereas only 12.5 per cent agencies felt that medium level of constraints faced by agencies under contract farming. Cultivators created number of constraints even after deal.

Table 3: Constraints faced by agencies under contract farming   N=160

Sr. No.	Level of constraints	Frequency	Per cent
1.	**Low** (10 to 12 score)	80	50.0
2.	**Medium** (12 to 14 score)	20	12.5
3.	**High** (14 to 16 score)	60	37.5
	Total	**160**	**100.00**

2.1 Distribution of respondents according to constraints faced by different agencies involved in contract farming.

An examination of Table 4 highlights that farmer`s negligence in maintaining quality was found to be the most important constraint faced by different agencies involved in contract farming with a mean score of 1.87. Selling of produce to other companies by farmers was another important constraint with mean score of 1.81. Contract breakdown, farmer`s noncooperation with the company and non-availability of SMS were other important constraints faced by different agencies with a mean score of 1.66, 1.62 & 1.50, respectively. Dissatisfaction of farmers with supply of inputs, dissatisfaction with price, dissatisfaction of farmers regarding training, holding-up of transport vehicles by farmers and lack of proper management by the company with a mean score of 1.26, 0.88, 0.87, 0.41 & 0.37, respectively were also some of the constraints. There were some other important constraints faced by different agencies with their mean score like inability to provide proper transport facilities to farmers due to poor road network, strike, etc (0.27), scarcity of transport vehicles during peak periods (0.25), lack of proper management by the company (0.12), high rate of rent for hiring transport vehicles (0.07).

Table 4: Constraints faced by different agencies involved in contract farming

N=160

Sr. No.	Constraints	Very serious	Serious	Not serious	Total weighted score	Weighted mean score	Rank
1.	Lack of proper management by the company	00	20	140	20	0.12	XIII
2.	Non-availability of SMS	80	80	00	240	1.50	V
3.	High rate of rent for hiring transport vehicles	00	12	116	12	0.07	XIV
4.	Inability to provide proper transport facilities to farmers due to poor road network, strikes, etc.	00	44	126	44	0.27	XI
5.	Scarcity of transport vehicles during peak periods	00	40	120	40	0.25	XII
6.	Holding-up of transport vehicles by farmers	00	67	93	67	0.41	IX
7.	Violation of terms and conditions by farmers	00	60	100	60	0.37	X
8.	Selling of produce to other companies by farmers	131	29	00	291	1.81	II
9.	Farmer's negligence in maintaining quality	140	20	00	300	1.87	I
10.	Contract breakdown	106	54	00	266	1.66	III
11.	Farmer`s non-cooperation with the company	120	20	20	260	1.62	IV
12.	Dissatisfaction of farmer with supply of inputs	80	42	38	202	1.26	VI
13.	Dissatisfaction of farmers regarding training	00	140	20	140	0.87	VIII
14.	Dissatisfaction with price	00	142	18	142	0.88	VII

3. Overall constraints faced under contract farming

The data pertaining to Table 5 also gave a clear picture of overall constraints faced under contract farming. It was found from the study that majority of the respondents i.e. 58.8 per cent faced medium level of constraints followed by one-third of the respondents i.e. 29.4 per cent who faced low level of constraints, whereas only 11.9 per cent faced high level of constraints under contract farming. The data emphasized that vast majority (88.2%) had low to medium degree of problems under contract farming.

Table 5: Distribution of the respondents according to overall constraints faced under contract farming   N=160

Sr. No.	Level of constraints	Frequency	Per cent
1.	**Low** (25 to 33 score)	47	29.4
2.	**Medium** (33 to 41 score)	94	58.8
3.	**High** (41 to 48 score)	19	11.9
	Total	**160**	**100.00**

4. Association between Socio-economic and Personal Characteristics of the Farmers and the Overall Constraints involved in Contract Farming

The association between dependent and independent variables was studied by using the statistical tool chi-square test (χ^2). The association presented in Table 6 shows that among 12 variables taken up for the study, only age was highly significantly associated with the constraints. Remaining all variables like education, land holding, farm power, irrigation facility, innovativeness, farm income, social participation, risk orientation, mass media exposure, economic motivation and area under contract farming, etc. had non-significant association with the constraints involved in contract farming.

Table 6 Association between socio-economic and personal characteristics of the farmers and the overall constraints involved in contract farming   N=160

Sr. No.	Independent variables	Chi-square (x^2)
1.	Age	**0.045 ****
2.	Education	**0.525**
3.	Land holding	**0.549**
4.	Farm power	**0.089**

5.	Irrigation facility	0.696
6.	Innovativeness	0.091
7.	Farm income	0.149
8.	Social participation	0.654
9.	Risk orientation	0.444
10.	Mass media exposure	0.101
11.	Economic motivation	0.195
12.	Area under Contract Farming	0.528

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

CONCLUSION

By and large this study concluded that contract framing in Haryana state was a profitable venture for both farmers and contracting companies. Although farmers were satisfied with terms and conditions mentioned in the agreements, there must be some government intervention since farmers were not getting any compensation for their lost crop. Approximately, one-half i.e. 49.4 per cent of contract farmers were faced medium level of constraints followed by 35.6 per cent of contract farmers who had faced low level constraints. Delay in arranging inputs, lack of advisory services, scarcity of labours during peak periods and lack of government control were important constraints faced by the farmers in contract farming. Exactly, 50.0 per cent of private firms or agencies felt problems from contract farmers followed by 37.5 per cent contracting companies realised the same. Farmer`s negligence in maintaining quality, selling of produce to other companies by farmers, contract breakdown, farmer`s non-cooperation with the company and non-availability of SMS were other important constraints faced by different agencies. It was found from the study that majority of the respondents faced medium level of constraints followed by one-third of respondents who faced low level of constraints.

REFERENCES

Anilkumar (2011). Prospects and problems of contract farming in baby corn and sweet corn. *M. Sc.(Agri.) thesis,* (Unpublished), Department of Extension Education, COA, Punjab Agricultural University, Ludhiana.

Baker, Nora Abu. (2012). Organic farming prospects and constraints. *M. Sc. Thesis* (Unpublished), Department of Extension Education, CCS HAU, Hisar.

Banumathi and Sita Devi (2001). Problems in marketing of jasmine in Tamil Nadu. *Economics and Political Weekly*, **27** (8): 127-142.

Davis (1979). Property without power: A study of the development of contract farming in the US. Ph. D. dissertation, Cornell University. Little, Peter, D. and Michael, J. Watts (eds) *Living under Contract: Contract Farming and Agrarian Transformation in Sub Saharan Africa.* The University of Wisconsin Press, Wisconsin, 1994.

Eaton, C., Shephard, A. (2001). Contract farming - partnership for growth, FAO Agricultural Services Bulletin. pp. 145

Ghosh, J. (2003). Corporate Agriculture: The Implications for Indian Farmers. hptt//www.cacroscan.com.

Jagdish Kumar and Prakash K. (2008). Contract farming: problem, prospects and its impact on income and employment. *Agricultural Economic Research Review.* 21 July-December 2008. Pp. 243-250.

Kaur, R. (1990). *A study of prospects, problems, attitude and training needs of Punjab farmers with respect to diversification in farming.* Unpublished *Ph. D. dissertation*, Punjab Agricultural University, Ludhiana, India.

Roy, Ewell Paul (1963). Contract Farming. The Interstate Printers and Publishers Inc. Denville, Illinois.

Satish, K., Verma, Senga, R. S. and Suryawanshi, R. K. (2011). A study on constraints in adoption of organic farming practices in Chhattisgarh state. *Bhartiya Krishi Anusandhan Patrika.* **26** (3-4).

Sharma, B. K. and Singh, V. B. (2005). Constraint in adoption of mustard technology in Manipur. *Agril. Extn. Rev.* **13** : 12-15.

Shivkumar, G. (2002). Contract Farming. National Bank Rev., **18** (1): 64-67

Singh, S. (2005). Role of the State in contract Farming in Thailand: Experiences and Lessons. *ASEAN Economic Bulletine* 22 **(2)**, 217-228.

RESEARCH ARTICLE

Relevance of Post Graduate Research to the Needs of Farmers in State Agricultural Universities of Southern India

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ABSTRACT

The present study was conducted to find out the relevance of Post Graduate Research conducted in State Agricultural Universities to the needs of farmers of respectivestates. Relevance was observed between the research being conducted and the farmer preferences in all the research areas in Agriculture.However, relevance was more in TNAU when compared to ANGRAU and PJTSAU. Resource management as an important research area was recognised by the farmers of Tamilnadu and Soil and Water pollution and Soil health management are recognised as important areas by the farmers of Telangana and Tamilnadu when co mpared to farmers of Andhra Pradesh. Studies on nutrient management were given top priority by the farmers of AP and Tamilnadu while water management is prioritised in Telangana and accordingly research is being conducted. Management of insect pests and diseases was recognised as top priority area by the farmers of the three states and accordingly research is being conducted. Farmers have not recognised the importance of post harvest pest and disease management in all the three states while the importance of biological control of insect pests and diseases was more felt by the farmers of Tamilnadu compared to AP and Telangana. Studies on pesticide resistance were more demanded by the farmers of AP than other two states. Studies on stress management were recognised as top priority by the farmers of Telangana and Tamilnadu while research studies are more towards genetic deviance in ANGRAU, PJTSAU and character association and selection studies were more in TNAU. The importance of crop growth models were recognised by the farmers of Tamilnadu only. The farmers of AP and Telangana have given highest importance to diffusion and adoption studies while impact studies were prioritised by farmers of Tamilnadu and accordingly research is being planned except in AP where production economics occupied top place. In all the universities studies on agricultural finance and credit were given almost equal importance while studies crop insurance was given least importance

in ANGRAU. The results recommended planning necessary strategies for considering the farmers needs as top most priority in selection of PG research topic for the students and accordingly the teachers experience in the subject and innovativeness should also be integrated.

INTRODUCTION

To improve agricultural production appropriate technology is necessary. Appropriate technology is defined as the latest scientific and technological development that has been adjusted to suit the local conditions to the highest possible degree (FAO, 1996). It is known that State Agricultural Universities (SAU) are involved in developing many technologies through research and Post Graduate Research is one such platform which is noticeable. In all the SAUs in the country the existing Post Graduate system includes course work for two semesters followed by research work for two semesters and at Doctoral level course work for two semesters followed by research work for four semesters. Accordingly, lot of data is being generated at the SAUs from the research work conducted by the students. Studies should be conducted to find out whether the outcome generated through PG research is meeting the needs of farmers directly or indirectly. This will be happening only withcarefulplanning and designing of Post Graduate research works. Sandra *et al*. (1989) noted that the goal of agricultural research is the development of stable technologies; the

production system changesbecomes the most limiting and new technology must be developed or adjusted to suit farmers needs. Keeping this in view it is felt that a study should be conducted to know the relevance of Post Graduate Research in southern State Agricultural Universities (SAU's) and farmers needs of respective three states i.e., Andhra Pradesh,Telangana and Tamilnadu.

METHODOLOGY

The study was conducted in Andhra Pradesh, Telangana and Tamilnaduand the Agricultural colleges offering Post Graduate courses in all the respective State Agricultural Universities i.e., AcharyaN.G.Ranga Agricultural University (ANGRAU), Professor JayashankarTelangana State Agricultural University (PJTSAU) and Tamilnadu Agricultural University (TNAU) were selected for analysing the PG Research.

Post Graduate research work conducted during the period 2011-16 were collected department wise from the Colleges of three selected State Agricultural Universities. The data was tabulated research area wise and compared with the preferred areas of research by the farmers in the State of Andhra Pradesh, Telangana and Tamilnadu. Farmer's

preferences were collected from a randomly selected sample of 500 farmers in A.P, 300 farmers in Tamilnadu and 200 farmers in Telangana. The data collected werecorrelated with the major areas of research in the respective agricultural universities of the state to compare the farmers' preference and PG research conducted in the three states. The categorisation made for PG research conducted into Crop production, Cropprotection, Crop improvement and Social sciences and analysed with farmer preferences which are given in Table 1 to 4.

Rank correlation analysis was done to find out the relevance between the farmer preferences and research conducted in State Agricultural Universities.

FINDINGS

1. Analysis of farmer preferences and research conducted in Crop production

The farmers of Andhra Pradesh have given more preference to research on nutrient management of crops (19.27%) followed by weed management (17.03%), integrated crop management (13.96%), soil biology and fertility management (12.29%) and cropping &farming systems (10.05%) while least preference was given to studies on climate resilient agriculture (0.27%) and remote sensing (0.27%). None of the farmers have demanded for research on resource management which clearly indicates the need to educate farmers on the importance of this subject. Equal importance was given by farmers of Andhra Pradesh for soil health management and soil & water pollution studies (1.11%). In crop production, water management (14.84%) was given top priority by the farmers of Telangana state followed by soil biology and fertility management (13.53%), integrated crop management (13.10%), nutrient management (10.91%) and cropping and farming systems (9.17%). In case of the farmers of Tamilnadu similar trend to that of Andhra Pradesh was observed were studies on nutrient management were more preferred followed by soil biology, weed management, integrated crop management and water management. This clearly shows that studies on water management is highly important for the farmers of Telangana while nutrient management is highly important for farmers of Andhra Pradesh and Tamilnadu. The importance of resource management was more recognised by the farmers of Tamilnadu (5.88%) when compared with the farmers of other two states. Studies on soil and water pollution and soil health management are recognised as important areas by the farmers of Telangana (7.86%, 6.11%) and Tamilnadu (8.14%, 6.78%)when compared to farmers of Andhra Pradesh (1.11%, 1.11%)(Table 1).

The comparison of Post Graduate research in three universities was presented in Table 1. Top priority was given to research on nutrient management (23.43%) followed by weed management (15.62%) and soil biology and fertility management (10.93%) in ANGRAU and in accordance with the farmers preference. However, the importance given to integrated crop management is very low (4.68%) even though the farmer preference was high (13.98%). Recognising the importanceofresource management and soil health management research is being conducted in ANGRAU. Enough research is being conducted on performance of cultivars in ANGRAU (7.29%) even though farmers reference is very low (3.63%) which is not needed since these studies will be conducted while releasing the varieties. In PJTSAU

top priority in research is given to water management (18.33%) followed by nutrient management (16.66%) and is in accidence with the farmer requirement. Enough research on soil biology (13.53%) and weed management (10.83%) is being conducted in PJTSAU and is in accordance with farmers demand while more concentration has to be given for research on integrated crop management. Adequate importance was given to resource management and soil health management by the researchers of PJTSAU but research should be more focussed on soil and water pollution studies. Alex *et al.*(2010) also expressed that the University Research Policy , Strategy and Organisation should reach the clients by publishing the research results.

Table 1.Analysis of farmer preferences and PG research conducted in Crop production

Research areas	Universities					
	ANGRAU		PJTSAU		TNAU	
	FP (n=359)	PG (n=194)	FP (n=229)	PG (n =120)	FP (n=221)	PG (n =105)
Integrated crop management	50 (13.96)	9 (4.68)	30 (13.10)	8 (6.66)	14 (6.33)	8 (7.61)
Nutrient management	69 (19.27)	45 (23.43)	25 (10.91)	20 (16.66)	26 (11.76)	14 (13.33)
Weed management	61 (17.03)	30 (15.62)	18 (7.86)	13 (10.83)	19 (8.59)	9 (8.57)
Water management	21 (5.86)	10 (5.20)	34 (14.84)	22 (18.33)	22 (9.95)	8 (7.61)
Organic agriculture	32 (8.93)	8 (4.16)	15 (6.55)	6 (5)	16 (7.23)	7 (6.66)
Cropping and farming systems	36 (10.05)	11 (5.72)	21 (9.17)	7 (5.83)	17 (7.69)	10 (9.52)

Performance of cultivars	13 (3.63)	14 (7.29)	9 (3.93)	4 (3.33)	9 (4.07)	2 (1.90)
Studies on climate resilient agriculture	1 (0.27)	2 (1.04)	1 (0.43)	2 (1.66)	4 (1.80)	3 (2.85)
Soil survey and classification	16 (4.46)	17 (8.85)	7 (3.05)	3 (2.5)	9 (4.07)	2 (1.90)
Soil health management	4 (1.11)	15 (7.81)	18 (7.86)	5 (4.16)	18 (8.14)	8 (7.61)
Soil biology and fertility management	44 (12.29)	21 (10.93)	31 (13.53)	17 (14.16)	28 (12.66)	15 (14.28)
Resource management	0 (0)	10 (5.20)	2 (0.87)	9 (7.5)	13 (5.88)	7 (6.66)
Remote sensing & GIS	1 (0.27)	1 (0.52)	4 (1.74)	1 (0.83)	6 (2.71)	5 (4.76)
Soil & water pollution studies	4 (1.11)	1 (0.52)	14 (6.11)	3 (2.5)	15 (6.78)	7 (6.66)
Others (Soil transformation, Soil delineation etc)	7 (1.95)	0 (0.00)	0 (0.00)	0 (0.00)	5 (2.26)	0 (0.00)
r value	0.628		0.796		0.860	

In TNAU PG Researchtop priority was given to soil biology and fertility management (14.28%) followed by nutrient management (13.33%) and was in close relevance to farmers needs. Enough importance was given for research on weed management (8.57%), water management (7.61%) and resource management (6.66%). Importance given to research on soil and water pollution studies and farmers preference was high in TNAU when compared to other two states. Studies on performance of cultivars are low in TNAU when compared to other two states even though farmer preference is high. Comparison between three universities in crop production research and farmer preference clearly indicated that nutrient management was given top priority in Andhra Pradesh, water management in Telangana and soil biology and fertility management in Tamilnadu. This has given inference that the needs of the farmers depend upon the resources available and constraints in those states. Among the three states, relevance was high between farmer preference and PG research conducted which means that the PG research is being planned as per the requirement of farmers in Tamilnadu followed by Telangana and Andhra Pradesh.

2. **Analysis of farmer preferences and research conducted in Crop protection**

The results pertaining to the crop protection of three states were compared in Table 2. The results indicated that the farmers of three states ie., Andhra Pradesh, Telangana and Tamilnadu have highest preference towards research on Management of pests and diseases

(41.53%, 40.23%, and 33.72% respectively). The farmers of AP have given second priority to insecticide resistance (12.46%), insect and disease development factors (9.90%) and the least preference was given to studies on taxonomy of insects and diseases (2.55%). None of the farmers have demanded research on post harvest technologies for the management of insects and diseases in Andhra Pradesh while it was least in Telangana (1.14%) and Tamilnadu (0.78%). Second priority was given for insect and disease development factors (15.52%) by the farmers of Telangana while for isolation and characterization of insects and diseases (20.39%) by the farmers of Tamilnadu. Biological control of insect pests and diseases is more preferred by the farmers of Tamilnadu when compared

to that of AP and Telangana; however research is being conducted more in AP (10.15%) than in Telangana (4.00%) and Tamilnadu (5.26%). It is also observed that studies on pesticide resistance are more demanded by the farmers of AP (12.46%) than Tamilnadu (9.01%) and Telangana (9.77%) while PG research was relatively more concentrated in Telangana (13.33%) followed by AP (10.93%) and Tamilnadu (9.01%). Importance of insect and disease development factors were more recognised by the farmers of Telangana (15.52%) and accordingly research is also being more concentrated (18.67%). The study conducted in crop protection has revealed that relevance was high between farmer preference and PG research conducted in PJTSAU followed by TNAU and ANGRAU.

Table 2.Analysis of farmer preferences and PG research conducted in Crop protection.

Research areas	ANGRAU		PJTSAU		TNAU	
	FP (n=313)	PG (n=129)	FP (n=173)	PG (n=72)	FP (n=255)	PG (n=95)
Management Studies of insect pests and diseases	130 (41.53)	51 (39.84)	70 (40.23)	24 (32.00)	86 (33.72)	38 (40.00)
Taxonomic studies of insect pests	8 (2.55)	2 (1.56)	5 (2.87)	3 (4.00)	15 (5.88)	9 (9.47)
Pesticide resistance	39 (12.46)	14 (10.93)	17 (9.77)	10 (13.33)	23 (9.01)	6 (6.31)
Studies on isolation/ characterization of insect pests and diseases	27 (8.63)	19 (14.84)	30 (17.24)	16 (21.33)	52 (20.39)	19 (20.00)
Biological control of insect pests and diseases	10 (3.19)	13 (10.15)	6 (3.44)	3 (4.00)	14 (5.49)	5 (5.26)
Insect and disease	31	12	27	14	26	14

development factors	(9.90)	(9.38)	(15.52)	(18.67)	(10.19)	(14.74)
Grain Storage pests and their management	13 (4.15)	4 (3.12)	4 (2.29)	0 (0.00)	5 (1.96)	2 (2.10)
Post-harvest technologies to minimize the yield losses by insect pests	0 (0.00)	1 (0.78)	2 (1.14)	0 (0.00)	2 (0.78)	0 (0.00)
Disease causing organisms	25 (7.98)	13 (10.15)	12 (6.89)	2 (2.66)	22 (8.62)	2 (2.10)
Others (interaction among biotic pathogens, compatibility studies etc)	30 (9.58)	0 (0.00)	0 (0.00)	0 (0.00)	10 (3.92)	0 (0.00)
r value	0.533		0.915		0.890	

3. Analysis of farmer preferences and PG research conducted in Crop improvement

The data pertaining to the area of crop improvement were presented in Table 3. The farmers of AP has preferred research to be conducted on genetic deviance (22.22%) followed by nutritional studies (15.55%), stress management studies (14.22%) and studies on heterosis and combining ability (13.33%). Farmers of Telangana and Tamilnadu has preferred studies on stress management as top priority (16.09%, 15.62%) followed by character association and selection studies (14.36%, 13.67%), nutritional studies (12.06%, 12.89%) and studies on genetic deviance (11.49%, 11.32%). Farmers of Tamilnadu have recognised the importance of studies on crop growth models (2.34%) while importance was not recognised by the farmers of other two states. The importance of plant growth regulators were recognised by the farmers of Telangana and Tamilnadu but not by farmers of AP.

The PG researchers of ANGRAU and PJTSAU have given top priority for research on genetic deviance (29.31%, 22.05%) while for character association and selection studies in TNAU (16.03%). Studies on characterization of genotypes were almost equally recognised by the farmers of all the three states. Research on heterosis and combining ability has occupied second place according to the importance given by the researchers in ANGRAU (17.24%) while fourth place in PJTSAU (11.76%) and fifth in TNAU (9.43%) (Table 3). Importance of studies on seed physiology was recognised by the researchers of TNAU but not by ANGRAU and PJTSAU. Studies on stress management was given equal importance as like genetic deviance and occupied second place in TNAU (14.15%) but not in ANGRAU and PJTSAU. Studies on crop growth models is being conducted in PJTSAU and TNAU but not in ANGRAU

while on plant growth regulators relatively more research is being conducted in TNAU (6.60%) followed by ANGRAU (4.31%) and PJTSAU (2.94%). The correlation coefficients clearly indicated that relevance was observed in all the three universities between farmer preference and PG research but relatively more in TNAU when compared with ANGRAU and PJTSAU.

Table 3.Analysis of farmer prefer ences and PG research conducted in Crop improvement.

Research areas	ANGRAU		PJTSAU		TNAU	
	FP **(n=225)**	**PG** **(n=116)**	**FP** **(n=174)**	**PG** **(n=68)**	**FP** **(n=256)**	**PG** **(n=111)**
Genetic Deviance	50 (22.22)	34 (29.31)	20 (11.49)	15 (22.05)	29 (11.32)	15 (14.15)
Heterosis& Combining Ability	30 (13.33)	20 (17.24)	13 (7.47)	8 (11.76)	25 (9.76)	10 (9.43)
Stability Analysis	22 (9.77)	9 (7.75)	16 (9.19)	5 (7.35)	21 (8.20)	9 (8.49)
Path Analysis	1 (0.44)	0 (0.00)	10 (5.74)	0 (0.00)	2 (0.78)	0 (0.00)
Character association & Selection studies	25 (11.11)	13 (11.20)	25 (14.36)	11 (16.17)	35 (13.67)	17 (16.03)
Bio technology/ Genetically modified crops	0 (0.00)	0 (0.00)	11 (6.32)	4 (5.88)	12 (4.68)	8 (7.54)
Characterization of genotypes	15 (6.66)	13 (11.20)	16 (9.19)	10 (14.70)	19 (7.42)	11 (10.37)
Crop growth models	0 (0.00)	0 (0.00)	0 (0.00)	1 (1.47)	6 (2.34)	7 (1.88)
Plant growth regulators	0 (0.00)	5 (4.31)	4 (2.29)	2 (2.94)	10 (3.90)	7 (6.60)
Stress management	32 (14.22)	13 (11.20)	28 (16.09)	5 (7.35)	40 (15.62)	15 (14.15)
Nutritional studies	35 (15.55)	9 (7.75)	21 (12.06)	7 (10.29)	33 (12.89)	9 (8.49)
Seed physiology	8 (3.55)	0 (0.00)	7 (4.02)	0 (0.00)	9 (3.51)	3 (2.83)
Others (genetic variability, detection, mapping and gene pyramiding studies etc)	7 (3.11)	0 (0.00)	3 (1.72)	0 (0.00)	15 (5.85)	0 (0.00)
r value	0.730		0.774		0.835	

4. Analysis of farmer preference and PG research conducted in Social sciences

The data pertaining to the comparison between farmer preference and PG research conducted were presented in Table 4. The data indicate that the farmers of AP has demanded for organisational studies as top priority (20.33%) followed by diffusion and adoption studies (11.29%) and production economics &farm management studies (11.29%) while least preference was given to studies on Indigenous Technical Knowledge (ITK's) (1.12%). The farmers of Telangana preferred research on diffusion and adoption studies (14.48%) as top priority while farmers of Tamilnadu preferred research on impact studies (16.22%) as top priority. Studies on developmental programs was given second priority by the farmers of Tamilnadu (11.40%) followed by production economics and farm management (10.08%). Study on ICTs also preferred by the farmers of the three states to an extent of 2.80 per cent to 7.45

per cent. Research studies indicated that Production economics and farm management in ANGRAU has occupied first place (25.00%) while in PJTSAU diffusion and adoption studies (21.12%) and impact studies in TNAU (19.73%). Diffusion and adoption studies occupied second place in ANGRAU (12.03%) followed by agricultural finance and credit (11.11%) and entrepreneurship (9.25%). In PJTSAU agricultural finance and credit and production economics and farm management were given equal importance and occupied second place (12.67% each) followed by impact assessment and evaluation studies (9.85%). IN TNAU, diffusion and adoption studies occupied second place (115.78%) followed by production economics and farm management (13.15%). In all the universities studies on agricultural finance and credit were given almost equal importance while studies crop insurance was given least importance in ANGRAU (1.85%) compared with PJTSAU (4.22%) and TNAU (5.26%).

Table 4. Analysis of farmer preferences and PG research conducted in social sciences

Research areas	ANGRAU		PJTSAU		TNAU	
	FP (n=183)	PG (n=108)	FP (n=145)	PG (n=71)	FP (n=228)	PG (n=76)
Diffusion & adoption studies	20 (11.29)	13 (12.03)	21 (14.48)	15 (21.12)	21 (9.21)	12 (15.78)
Entrepreneurship	18 (10.16)	10 (9.25)	7 (4.82)	3 (4.22)	8 (3.50)	5 (6.57)
Developmental programmes	10 (5.64)	9 (8.33)	11 (7.58)	6 (8.45)	26 (11.40)	4 (5.26)

Organizational studies (Training Needs)	36 (20.33)	3 (2.77)	12 (8.27)	3 (4.22)	12 (5.26)	1 (1.31)
Impact studies	13 (7.34)	8 (7.40)	15 (10.34)	9 (12.67)	37 (16.22)	15 (19.73)
Information and Communication Technologies (ICT's)	5 (2.82)	3 (2.77)	9 (6.20)	1 (1.40)	17 (7.45)	2 (2.63)
Indigenous Technical Knowledge (ITK)	2 (1.12)	1 (0.92)	3 (2.06)	1 (1.40)	4 (1.75)	1 (1.31)
Agricultural Policies	6 (3.38)	5 (4.62)	4 (2.75)	2 (2.81)	8 (3.50)	5 (6.57)
Agricultural marketing	15 (8.47)	6 (5.55)	7 (4.82)	3 (4.22)	9 (3.94)	3 (3.94)
Crop Insurance	4 (2.25)	2 (1.85)	10 (6.89)	3 (4.22)	11 (4.82)	4 (5.26)
Agricultural finance & credit	14 (7.90)	12 (11.11)	12 (8.27)	9 (12.67)	18 (7.89)	8 (10.52)
Production economics & farm management	20 (11.29)	27 (25.00)	14 (9.65)	9 (12.67)	23 (10.08)	10 (13.15)
Impact assessment & evaluation studies	9 (5.08)	9 (8.33)	9 (6.20)	7 (9.85)	16 (7.01)	6 (7.89)
Others (Psychological studies, studies on rural development, economic modelingetc)	11 (6.21)	0 (0.00)	11 (7.59)	0 (0.00)	18 (7.89)	0 (0.00)
r value	0.608		0.696		0.529	

CONCLUSION

The study indicated that the PG Research conducted in all the three state agricultural universities was on par with the needs and preferences of the farming community. There was not much variation in the three universities with respect to Farmers preferences and PG Research conducted. This indicates that utmost care was taken by the researchers to conduct research as per the preferences of the farmers which are very much needed in the present agricultural scenario. However,certain areas preferred by farmers are not adequately researched in all the three universities which needs careful planning for the future.

REFERENCES

Adesina, A and Baidu, F. J., 1995. Farmers' perceptions and adoption of

newagricultural technology: evidence from analysis in Burkina Faso and Guinea,West Africa. Agricultural Economics. 13, 1-9.

Alex, G., Derek, B., Solomon, B., Ed, Q.I., Serejski, and Willem, Z. 2010. Investing in Integration of Universities intoNational Agricultural Research and Extension Systems.(Draft). Washington DC: World Bank.

Alphonce, C., 1997. Application of the analytic hierarchy process in agriculture indeveloping countries. Agricultural Systems. 53, 97-112.

Antle,J and Diagana, B., 2003. Creating incentives for the adoption of sustainableagricultural practices in developing countries: the role of soil

carbonse questration. American Journal of Agricultural Economics. 85, 1178-1184.

Food and Agriculture Organisation (FAO). 1996. Food for all Report of the World. Food Summit 13-17 November, 1996. 32-39.

Sandra, R., Bremer, Fox, J., Poats, S and Graig. L. 1989. Gender Variable in Agricultural Research. A Report prepared for the Women in Development Office U.S. 3-4.

Sustainable Management of Agroecological Resources for Tribal Societies (SMARTS), 2009.SMARTS Proposal: Response to EEP comments. University of Hawaii at Manoa, Honolulu, Hawaii.

RESEARCH ARTICLE

Model for ICT based Agricultural Information Management System for the Agricultural Development in Bangladesh

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ABSTRACT

The agricultural production system requires not only the proper source of information on farm technologies, but also agro-meteorological information supported by remote sensing data. Unique blending of such action into a platform can best serve the need of the day. Satellite based remote sensing technology or tool is increasingly gaining recognition as an important source of agro-based information as it can complement well with the traditional information flow to the growers. This paper explores the potential of the new information and communication technologies to improve the access to an efficient information management system. A repository model of crops, fisheries, livestock, and forestry has been developed using meteorological data, production data, and remote sensing data. Geographic Information Systems (GIS) technology is becoming an essential tool for combining various images and satellite data in the model that simulates the interactions of complex natural systems.A panel of experts of different disciplines like information professionals and agro scientists, extension agents, academia, is engaged to interpret the meteorological database to create productionrelated issues and queries. Farmers' database will be integrated in the system for quick flow of such information access. Through the model, the farmers will be empowered with knowledge, skills towards enhanced income that ensures social security.

Keywords: Agriculture; Remote sensing; Agro-meteorological information; Technology adoption

INTRODUCTION

Information is itself a power for the development of different sectors in both national and global contexts. Dissemination of relevant and reliable information in a user friendly way based on scientific research to the end-users for maximizing farm income and ensuring

food security makes the efficient information management. Integration of multi-dimensional information with the involvement of multi- sectoral strength is considered most important challenge to meet the demand of the growers for their welfare.

Farm production and growth in agriculture are key indicators for the economic development of the country. Keeping this in mind, farmers need to have easy access to the knowledge and the output produced by the professionals involved in research and extension. Farm production is made of an aggregation of individual commodity grown in a unit area with the aim of having gain in productivity and income in a sustainable manner, which is harvested for economic purposes. Ultimately, the agricultural scientists can anticipate future crop or livestock based on anticipated climate change by simulating the characteristics of the natural environmental system that studied in an abbreviated time scale through an appropriate model.

Most natural systems like weather, climate, storms, rain, drought, temperature, flood etc. that cause pest and disease hazards affect agricultural production may not have boundaries. Murthy (2002) stated that it is a difficult task to produce a comprehensible, operational representation of a part of reality, which grasps the essential elements and mechanisms of that real world system and even more demanding, when the complex systems encountered in environmental management. On the other hand, decisions solely dependent upon mean climatic data are likely to be of limited use for at least two reasons. The first is concerned with definition of success and the second with averaging and time scale.

The agricultural production system is directly dependent on the commonly known inputs like seed, fertilizer, irrigation, fungicide and pesticides. Post-harvest factors and marketing also play an important role to ensure fair prices of products that farming communities grow. However, the agro-climatic factors have an important role in influencing production system of agriculture. For example, the high soil moisture in standing water situations associated with high humidity induces incidence of insect-pest like brown plant hopper in rice. Similarly, it is said that virus attack of poultry industry (avian influenza) is associated with low temperature during winter.

With the effect of climate change, the agricultural production can directly be affected, with not only crop but also livestock and fisheries. The chances of the prevalence of pest and disease infestations increase with increasing cropping intensity. The incidence of extreme climatic events like flood, drought, high rainfall, and cyclones are expected to

appear more frequently than before due to climate change that will damage crops, livestock and aquaculture farms. This requires well organized ICT based climatic advisory services to the grass root level.

An example of the necessity of remote sensing data is clear when the mango growers in Rajshahi may need information on pest management (controlling fruit flies) during fruit formation stage in March with rising temperature or aquaculture farmers may require a knowing feeding pattern of fin fish in Satkhira in June. To make the process successful, the individual parameters of the cycle must be well understood and proper attention to be given. Remote sensing (RS) data provides in many ways an enhanced and very feasible alternative to manual observation with a very short time delay between data collection and transmission. In some countries where only few stations are in operation as in Northern Turkmenistan (Seitnazarov, 1999), remotely sensed data can improve information on crop conditions for an early warning system. Crop forecasting yield estimation before harvesting, stock assessment of fishes are good examples of remote sensing data use in agriculture.

Agricultural weather and climate data systems are necessary to expedite generation of products, analyses and forecasts that affect Satellite Remote Sensing and GIS Applications in Agricultural Meteorology. Satellite Remote Sensing and GIS applications in Agricultural Meteorology ease agricultural cropping and management decisions, irrigation scheduling, commodity trading and markets, fire weather management and other preparedness for calamities, and ecosystem conservation and management (Sivakumar & Hinsman, 2000). Agricultural meteorology had always been an important component of the National Meteorological Services since their inception. A formal Commission for Agricultural Meteorology (CAgM) which was appointed in 1913 by the International Meteorological Organization (IMO) became the foundation of the CAgM under WMO in 1951. Reports were published covering the use of remote sensing for obtaining agro-meteorological information (Kleschenko, 1983), operational remote sensing systems in agriculture (Kanemasu and Filcroft, 1992), satellite applications to agro-meteorology and technological developments for the period 1985-89 (Seguin, 1992), statements of guidance regarding how well satellite capabilities meet WMO user requirements in agro-meteorology (WMO, 1998) etc.

CAgM recognized the potential of remote sensing applications in agricultural meteorology early in the 70s and at its sixth session in Washington in 1974 the

Commission agreed that its programme should include studies on the application of remote sensing techniques to agro-meteorological problems and decided to appoint a rapporteur to study the existing state of the knowledge of remote sensing techniques and to review its application to agro-meteorological research and services.

A model is a schematic representation of the conception of a system or a set of equations which represent the behavior of a system, with the purpose of aiding, understanding and improving performance of the system (Rauff & Bello, 2015). There are different types of models that have been developed over the years. Statistical models, Mechanistic models, Deterministic models, Dynamic models, Stochastic models, Static model, Simulation Models, Explanatory models and Descriptive modelare to be mentioned in model typology. The proposed model is constructed by integrating different data, such as meteorological data, production data, remote sensing data etc. for the entire system. It contains descriptions of distinct processes such as crops, livestock, fisheries and forestry. Therefore, this process or system is usually used as a way of analyzing and solving problems or making predictions. Based on the study result, an idea of generating a model can be developed for information rich farming community with a view to enhancing

agricultural production in a sustainable way. The proposed model is designed with the aim to enhance farm profitability based on the updated knowledge delivery system. To enrich farmer's knowledge regarding modern technology, it is proposed to develop an ICT based information dissemination system.

Agro-meteorological model is needed to implement for the sustainability of agriculture. Some studies emphasize on agro-meteorological model for sustainable development of agriculture.

Bifad (1988) maintains that sustainability refers to successful management of resources for agriculture to satisfy changing human needs while maintaining or enhancing the quality of the environment and conserving natural resources. Conway (1985) preferred the ability of a system to maintain productivity in spite of major disturbance like climate change, land, soil, pest and disease hazard. Davis and Schirmer (1987) stated that among the topics considered under sustainable agriculture are resource management issues dealing with soils, land, natural resources and watersheds; and environmental problems such as desertification, soil degradation etc. Ruttan (1989) emphasized development of technology and practices that maintain and/or enhance the quality of land and water resources.

METHODOLOGY

The study focused on reviewing existing agricultural information delivery system in Bangladesh, its strength and weakness and developed an integrated knowledge platform for efficient information management system. In doing so, the study also examined the system in operation in the SAAARC countries. The design is soundly based on and entirely appropriate to the study of agricultural production and growth. Several studies reported are supported to enrich the proposed model. Different types of monographs, journal articles, proceedings, reports, dissertations related to a crop, livestock (poultry, cattle) and fishery production have been consulted to determine indicators of placing a standard model. For the purpose, several researchers with their proposed models are discussed here.

Gommes et al. (2010) explained the best approach to agro-meteorological services as FADO (Farm Adaptive Dynamic Optimization). That is a technologically sophisticated approach that basically constitutes a modernization of farming. Based on African, Chinese, Indian and Indonesian (Stigter, 2010a) experience, FADO may now be considered a technically feasible approach, which, however, is rarely implemented in developing countries. The national meteorological organizations provide weather data for crop modeling purposes through observatories across the globe (Sivakumar et al., 2000).

Stigter et al. (2010) in their study explored that agro-meteorological service in the developed countries focuses on the provision of environmental data and information to national policy and decision makers. They do that in support of sustained food production, sustainable development, carbon sequestration in agro-ecosystems and land management practices that affect exchange processes of greenhouse gasses. Because developed countries may have or develop technology to initially adapt more readily to climate change and climate variability, technology transfer may play a certain role, but local innovations, such as those in multiple cropping, remain most important for application under the very different conditions in developing countries.

Rao and Manikandan (2008); Kushwaha et al. (2008) in their studies in India showed that the economic impact of an Agro-Advisory Service (AAS) based on weather forewarning is significant and benefited the AAS farmers to a large extent through weather-tuned farming. AAS farmers reaped more yield when compared to non-AAS farmers owing to technical guidance on all cultivation aspects, especially selection of varieties, timely application of fertilizer/pesticides, inputs, saving in terms of water,

manpower, electricity, and fuel through proper irrigation scheduling.

Das et al. (2010) found that a farmer may want to use forecasts for decisions at a number of scales; in order to manage farm decisions; to plan water resource management depending on how much rain is expected in the catchment or to use the expected national food supply forecast to decide on the investment in inputs. This illustrates that although users may operate primarily at one scale, their decision-making may depend on information from a variety of scales and so varying levels of forecast skill might be acceptable. Despite the scale of action and decision-making, it is paramount to accompany improved dissemination with improved explanations of forecast characteristics and limitations. Although seasonal forecasts are expected to be used more frequently in the future, the cost of taking precautions (based on the forecast) must be weighed against the savings that the precautions would bring if the unwanted climate event occurred. Users of seasonal forecasts could, for example, be more actively engaged in economic evaluation assessments (Richardson, 2000) to get an idea of the potential rewards and penalties accrued in unfavorable weather situations.

The East African team, led by the University of Maryland in the US used two fixed-wing UAVs to map maize-based agricultural systems support the collection of national agricultural statistics and food security policy-making in Tanzania. The Bangladeshi team, led by CIMMYT, uses two octocopters with the same model of RGB and multispectral camera (for the first one) used by the African teams. This UAV is also used to map how the fraction of vegetation cover changes over time. The STARS project hopes to help Bangladeshi farmers grow an extra crop per year to improve their financial and food security. Remote sensing technology helps farmers to optimize the use of water pumps and it provides valuable information for a sustainable intensification of their lands.

Proposed Model

The proposed model has been entitled '**Efficient Agricultural Information Management System'** (Fig. 1) based on necessary farm advisory service in the rural Bangladesh; the following model is developed in proposed form for implementation. The objective of the model is to ensure crop, livestock (poultry, cattle) and fishery production through knowledge based advisory services.
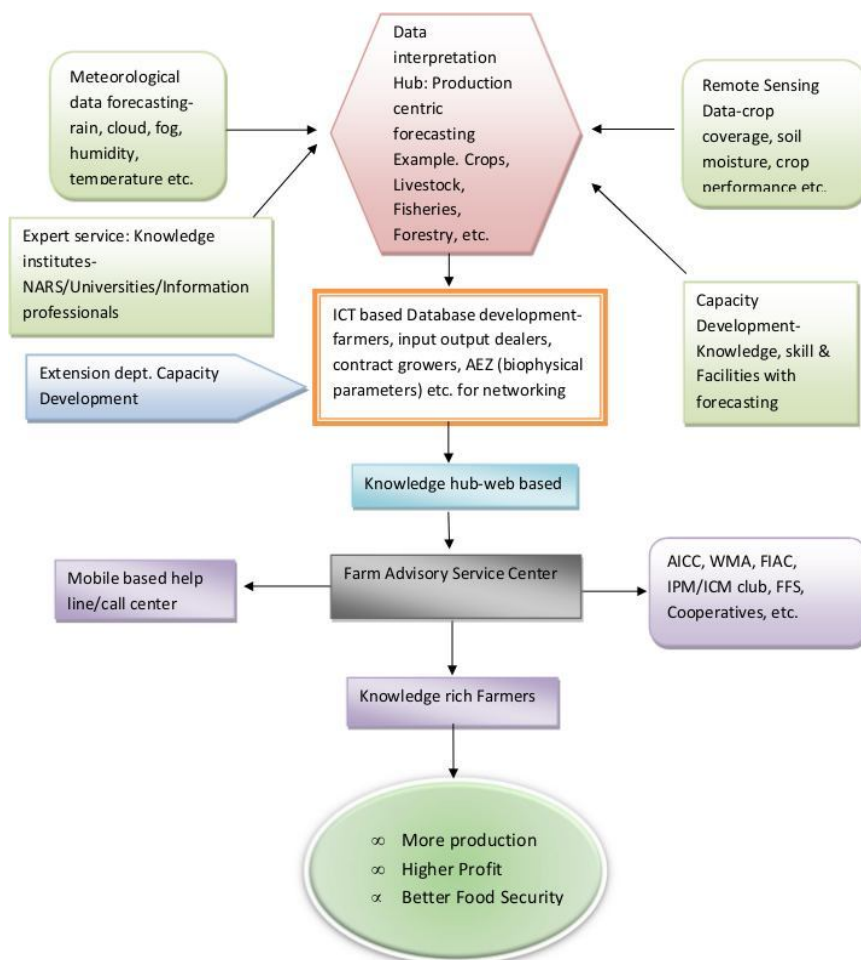
Fig. 1. EfficientAgricultural Information Management System

Discussion on model parameters

Each of the activities under the purview of the model has definite role to play to make the process of making an efficient information delivery system successful. In developing this model, both public and private sector participation have been considered important. The main idea of the conceptual framework is to deliver authentic, location specific, real time answers to the production problems.

Meteorological data forecasting: The data to be collected by the public agency (Department of Meteorology) associated

with the production of various crops, fisheries and livestock will be taken into consideration. The data to be provided will contain 3-10 days' forecasting of parameters (temperature, sunshine/ cloudiness, relative humidity, rainfall etc.) that influence agricultural production. The precision of forecasting data depends on the skill and capacity of the agency involved. It is of great significance to obtain the crop condition information from the early stages in the crop growing season until maturing stage. Sometimes it is even more important than acquiring the exact production after harvest time, especially when large-scale food supply shortage or surplus happens. Accurate monitoring can actually avert a disastrous situation and help with strategic planning to meet the demands.

Remote sensing (RS) data: It will be used in the service that will include a real time image of cloud cover, fog, soil moisture, climatic depression in the bay, cyclones, rainfall in the upstream of Bangladesh, pest migration pattern etc. The images will be collected from SPARRSO (Bangladesh Space Research & Remote Sensing Organization) (format to be decided by the expert groups) on the crop coverage, extend and depth of water bodies, forecasting of occurrence of climatic extremes and possible route. The climatic parameters will be used by the pool of the expert panel with a view to protecting crops, livestock and fisheries under cultivation. The information of extreme events may also be used for potential opportunity of agricultural insurance schemes. Tracking of trans-boundary pest and disease monitoring will have to be accomplished through remote sensing.

Data interpretation hub: The above climatic data and remote sensing images will be analyzed, interpreted in the data interpretation hub. The input of experts in individual commodity will be crucial in this stage. Accordingly forecasting will be made in relation to the standing crops or other agricultural enterprises (fisheries and livestock). Knowledge based interpretation of agro-climatic data will lead to advice agro-enterprises to take relevant management options (fertilizer, irrigation, pest and disease management, seed, selection of fish fingerlings, vaccination of animal, animal feed, marketing) to protect the farm output and increase profitability.

Subject specific expert service: This will be deployed for the interpretive exercise of both climatic and RS data in any given geographical location. A panel of experts will be hired based on their skill in interpretation of the data affecting agricultural production and the panel will be updated periodically. National Agricultural Research System (NARS) having 12 national research institutes

spread over the country and its regional centers and stations will serve in the expert services. Agricultural universities and relevant information professionals will also be involved in the data interpretation hub. As the precision of the data has an important role to play, capacity development of data source (climatic and RS) will be required for better precision of forecasting including the interpretation hub.

ICT based data based development: Region wise farmers' database will be developed with details of farm sizes (marginal, small, medium etc.) and farm categories (owned or tenant, etc.) to determine the possible answers of production constraints. Also to facilitate the farmer's information management system (advisory service), a strong Agro-ecological database will be maintained where the experts may strengthen their answers supported by bio-physical parameters. The bio-physical data base will include soil type, inundation, hydrology to suggest crop/fisheries suitability in a given area and advice on soil and water, fertility management.

Knowledge hub: The output of the exercise of interpretation hub will be transmitted to the web based knowledge hub to be updated regularly for using of diversified beneficiaries through farm advisory farm service.

Farm Advisory Service: Information delivery system may be institutionalized through Farm Advisory Service (FAS) which will be interactive, location specific and capable to address ever evolving farm problem. The FAS will be the center of a network of experts having experience with agro-climatic variables towards addressing farmers' day to day questions.

The existing centers and various operators including media (example, AICC, IPM community radio, mobile phone operators) will be linked to disseminate location specific information.

Experiences of present web based practices (example, online fertilizer recommendation guide, rice knowledge bank) will be used in implementing the proposed model.
Implementation of such model will ensure higher production and enhance farm income which is expected to bring social were of the farming.

FINDINGS

The research outcomes have revealed that the use of ICT through different rural organizations, either supported by public or NGO initiatives resulted favorably towards increasing productivity and farm income. The research further recommended that if organized properly and replicated further throughout the country, may benefit farmers and the society as a whole. Further to this contemporary experience

through a number of studies also support the development of the model to enhance the efficiency of the ICT based initiatives and makes these sustainable. Through the model, the farmers will be empowered along with their production to be augmented, and it will enrich them with knowledge, with a view to enhancing the skill towards higher profit margin in the production system. All kinds of ICT based media will be used and linked to disseminate the knowledge in the relevant field.

CONCLUSION

The study constructed the theoretical and empirical basis of models on agriculture. The proposed model could be taken as an ICT based initiative for sustainable agricultural development. The Model is expected to accelerate national production, increase GDP and strengthen the farming community. The model can help to develop a strong ICT based National Agricultural Information System. The system tends to boost national capacity to collate access, share and use agricultural information. This actually assists to govern, validate and regulate information flow and use to protect national interests related to development and intellectual property. The Model integrates and coordinates information flow and access to a country's agricultural research system to benefit its stakeholders through informed research and development activities.

Recent developments in remote sensing and GIS hold much promise to enhance integrated management of all available information and the extraction of desired information to promote sustainable agriculture and development. Active promotion of the use of remote sensing and GIS in the National Meteorological and Hydrological Services (NMHSs) could enhance improved agrometeorological applications. To this end it is important to reinforce training in these new fields. The promotion of new specialized software should make the applications of the various devices easier, bearing in mind the possible combination of several types of inputs such as data coming from standard networks, radar and satellites, meteorological and climatological models, digital cartography and crop models based on the scientific acquisition.

REFERENCES

Bifad (Board for International Food and Agricultural Development) Task Force, (1988). *Environment and Natural Resources: Strategies for Sustainable Agriculture. U. S*. Agency for International Development, Washington DC.

Conway, G. R., (1985). Agroecosystem analysis. *Agricultural Administration 20*, 1–25.

Das, H. P., Doblas–Reyes, F. J., Garcia, A., Hansen, J., Mariani, L., Nain, A., Ramesh, K., Rathore, L. S., & Venkataraman, R. (2010). *Chapter 4: Weather and Climate Forecasts for Agriculture*. In in *Guide to Agricultural Meteorological Practices (GAMP)*. Geneva, CH: WMO.

Davis, T. J. & Schirmer, I. A. (Eds.), (1987). *Sustainability issues in agricultural development. Proceedings of the Seventh Agriculture Sector Symposium*. The World Bank, Washington DC.

Dutton, J. A. (2002). *The Ceaseless Wind: An Introduction to the Theory of Atmospheric*

Motion. Dover Publications, Mineola, 640 p.

Gommes, R., Acunzo, M., Baas, S., Bernardi, M., Jost, S., Mukhala, E., & Ramasamy, S. (2010). Communication approaches in applied agro meteorology. Chapter II.D in Stigter, K. (Ed.), Applied agrometeorology, Springer Verlag, (Heidelberg etc.), pp. 263-286. ISBN: 978-3-540-74697-3

Kanemasu, E.T. & I. D. Filcroft. (1992). *Operational remote sensing systems in agriculture*. CAgM Report No. 50, Part I. Geneva, Switzerland: World Meteorological Organization.

Kleschenko, A. D. (1983). *Use of remote sensing for obtaining agrometeorological information.* CAgM Report No. 12, Part I. Geneva, Switzerland: World Meteorological Organization.

Kraus, H. (2004). Die Atmosphäre der Erde. Springer, Berlin Heidelberg, 422 p.

Kushwaha, H. S., Menkamehra, H. K. R., & Singh, R. S. (2008). Economic impact analysis of Agro-meteorological services for farmers of tarai and Bhabar. *Journal of Agro-meteorological Service for Farmers*, 187-194.

Murthy, V.R.K. (2002). Basic Principles of Agricultural Meteorology. Book Syndicate Publishers, Koti, Hyderabad.

Rao, G.S.L.H.V.P., Manikandan, N. (2008). Economic impact of agrometeorological advisory services over central Kerala. *Journal of Agrometeorology, (India) (Special issue) 10,* 230-234.

Rauff, K.O. and Bello, R. (2015). A Review of Crop Growth Simulation Models as Tools for Agricultural Meteorology. Agricultural Sciences, 6, 1098-1105. Retrieved 12th June 2016 from http://dx.doi.org/10.4236/as.2015.69105

Richardson, D. S. (2000). Skill and economic value of the ECMWF ensemble prediction system. Quart. *J. Roy. Meteor. Soc.*, *126*, 649–668.

Ruttan, V.W. (1989). Sustainability is not enough. Better crops with plant food. Potash and Phosphate Institute, Atlanta, Georgia, USA. *Spring*, 6–9.

Seguin, B. (1992). *Satellite applications to agrometeorology: technological developments for the period 1985-*

1989. CAgM Report No. 50, Part II. Geneva, Switzerland: World Meteorological Organization.

Seitnazarov, (1999). *Technology and methods of collection, distribution and analyzing of agrometeorological data in Dashhovuz velajat, Turkmenistan.* In: Contributions from members on Operational Applications in the International Workshop on Agrometeorology in the 21st Century: Needs and Perspectives, Accra, Ghana. CAgM Report No. 77, Geneva, Switzerland: World Meteorological Organization

Sivakumar, M.V.K & Hinsman, E Donal (2000). Satellite Remote Sensing and GIS Applications in Agricultural Meteorology and WMO Satellite Activities, Agricultural Meteorology Division and Satellite Activities Office World Meteorological Organization (WMO), 7bis Avenue de la Paix, 1211 Geneva 2, Switzerland.

Sivakumar, M.V. K., Gommes, R. & Baier, W. (2000). Agrometeorology and sustainableagriculture. *Agricultural and Forest Meteorology 103*, 11–26, 11-26.

Stigter, K., Baier, W., Barrie, I., Brunini, O., Dommermuth, H., Gat, Z., Gommes, R., & Keane, T. (2010). *Chan Ah General. Chapter 1 in Guide to Agricultural Meteorological Practices (GAMP),* WMO 134 (3rd Ed.), WMO, Geneva.

Stigter, K. (Ed.). (2010a). Applied agro-meteorology. *Springer*, Heidelberg etc., xxxviii + 1101 pp. *International Maize and Wheat Improvement Center (CIMMYT)*, New Delhi, India.

WMO. (1998). *Preliminary statement of guidance regarding how well satellite capabilities meet WMO user requirements in several application areas, SAT-21*, WMO/TD No. 913, Geneva, Switzerland: World Meteorological Organization.

RESEARCH ARTICLE

Opinion of Visitors about Services Rendered by Agricultural Technology Information Centre

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ABSTRACT

ATIC allows optimistic interaction between farmers and scientists for effective technology transfer and livelihood improvement.The study was an attempt to investigate few aspects related to ATIC and it was based on the opinion and expectations of the respondents, which may not be free from bias.The research findings revealed that majority of the visitors were from village area. This implies that the majority of the visitors had rural background and was engaged in farming. In this context, it is suggested to provide information on vocational aspects so that one can get the opportunity to create self employment and raise one's standard of living. The ATIC may prepare a plan of bringing out publications on aspects suggested by visitors such as poultry, cultivation of various crops such as paddy, mango, cashew etcMajority of the visitors was found visiting ATIC for seeking information about new technology, seek advice about agricultural development, to purchase the seeds / grafts/ publications and get solved the field problems.

Key Words : ATIC, Opinion, Visitors

INTRODUCTION

ATIC provides all the information on innovative technologies, techniques, knowledge and available materials of the host institution, which includes planting material, seed, advisory services, diagnostic services etc. through single window system. This system allows optimistic interaction between farmers and scientists for effective technology transfer and livelihood improvement. The outstations regional centers and Krishi Vigyan Kendras situated in different districts are also involved and part of the system is meant for meeting the requirements of the farmers in various areas of farm activities

ATICs are started as an institute where not only information package but also inputs and services for farmer are available at a single corner. Thus, success of ATIC is fully laid on the fact that to which farmers have the contact with ATIC, which is a direct function of frequency of visit of the farmers to the ATIC (either by personal visit or teleconnectivity). Its success also depends on the effectiveness with which it functions. The ATIC so established, will be able to achieve the objectives, only when it fulfills the needs and expectations of visitors. It is important to have a strong database in respect of nature and subjects of guidance and services required by the individuals and group of different categories of people visiting to ATIC of the University.

Objective

The specific objective of the study was as follows

1. To know the opinion of visitors about information about services rendered by ATIC

METHODOLOGY

The study was conducted in Dapoli tahsil of Ratnagiri district, which is head quarter of Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth and where the Agricultural Technology Information Centre is located. All the visitors visiting ATIC during month of November - December 2011 and January 2012 with or without prior intimation formed the universe. In all, 200 respondents were interviewed with the help of specially designed interview schedule and analyzed with frequencies and percentage, average and standard deviation to interpret the results.

FINDINGS

Opinion of visitors about information provided by ATIC

Information pertaining to this aspect was collected in relation to major topics namely, technology products purchased and University publications.

1. **Technology products of the University**

Of the respondents, nearly two-third (61.00 per cent) respondents purchased one or the other technology product of the University from ATIC sale counter.

1.1 Opinion about utility of technology products

An attempt was made to know the opinion of the respondents about the utility of technology products made available by the University. The details on this parameter are given in Table 1.

Table 1: Distribution of the respondents according to their opinion about the utility of technology products

Sl. No.	Utility	Respondents (N=122)	
		Number	**Percentage**
1.	Very useful	66	54.10
2.	Useful	54	44.26
3.	Moderately useful	2	1.64
4.	Least useful	-	-
5.	Not useful	-	-
	Total	**122**	**100.00**

It can be inferred from Table 15 that in case of 54.10 per cent respondents, the technology products made available were 'very useful'. The percentage of respondents stating that the technology products were 'useful' was 44.26 per cent. Only two respondents were remarked that the products were 'moderately useful'.

Thus, it can be said that PHT products, tools, implements and inputs are being supplied according to expectations of its ultimate users. The findings are in conformity with the findings of Hegade (2001), Hardikar *et al*.(2011) and Mahadik *et al*.(2012).

1.2 Opinion about relevancy of technology products

The information on this aspect is presented in Table 2.

Table 2: Distribution of the respondents according to their opinion about relevancy of technology products

Sl. No.	Relevancy	Respondents(N=122)	
		Number	**Percentage**
1.	Most relevant	56	45.90
2.	Relevant	62	50.82
3.	Moderately relevant	3	2.46
4.	Least relevant	-	-
5.	Not relevant	1	0.82
	Total	**122**	**100.00**

In the opinion half (50.82 per cent) of the respondents, the technology product made available were 'relevant', while, 45.90 per cent of the respondents

stated that those were 'most relevant'. Not a single respondent rated the technology products as 'least relevant, however, one respondent was found rating the technology products as 'not relevant'.

Thus, it can be said that by and large the visitors were satisfied with the available products of the University. The findings are similar with the findings of Hegade (2001) and Hardikar *et al.* (2011).

1.3 Opinion about price of technology products

Price is one of the important factors affecting the sale of products. With this idea in mind, the information about the opinion of respondents regarding cost of technology products was collected and the same is presented in Table 3.

Table 3: Distribution of the respondents according to their opinion about prices of technology products

Sl. No.	Price	Respondents(N=122)	
		Number	**Percentage**
1.	Very high	11	9.02
2.	High	33	27.05
3.	Reasonable	78	63.93
4.	Low	-	-
5.	Lowest	-	-
	Total	**122**	**100.00**

It is gratifying to note that more than half (63.93 per cent) of the respondents expressed that price of the university products was 'reasonable'. On the other hand 27.05 per cent of the respondents felt that the price is 'high' and 9.02 per cent of the respondents felt that the price is 'very high'.

One-third of the visitors felt high cost of the products. Such respondents may be either from resource poor families or it may be attributed to human psychology. The findings are consistent with the findings of Hegade (2001),

Hardikar *et al.* (2011) and Mahadik *et al.*(2012).

2. University publications

Of the respondents, nearly one-half (54.00 per cent) of the respondents purchased one or the other publication from ATIC sale counter.

2.1 Opinion about utility of university publications

Since establishment, the ATIC has been bringing out need based publications for the benefit of farming

community. The findings regarding the opinion of visitors about the utility of these publications are given in Table 4.

Table 4: Distribution of the respondents according to their opinion about utility of the University publications

Sl. No.	Utility	Respondents(N=108)	
		Number	**Percentage**
1.	Very useful	59	54.63
2.	Useful	48	44.44
3.	Moderately useful	1	0.93
4.	Least useful	-	-
5.	Not useful	-	-
	Total	**108**	**100.00**

Table 4 indicates that in the opinion of 54.63 per cent respondents, the publications were 'very useful'. This was followed by 44.44 per cent respondents stating that publication were 'useful'. Only one respondent was found rating the university publications as 'moderately relevant'.

The study has brought out that almost all the visitors were satisfied with the utility of available university publications. The findings are similar with the findings of Hardikar *et al.*(2011).

2.2 Opinion about relevancy of university publications

Visitors were asked to express their views about relevancy of the publications brought out by ATIC. The details are presented in Table 5.

Table 5: Distribution of the respondents according to their opinion about relevancy of the University publications

Sl. No.	Relevancy	Respondents(N=108)	
		Number	**Percentage**
1.	Very relevant	51	47.23
2.	Relevant	53	49.07
3.	Moderately relevant	3	2.77
4.	Least relevant	1	0.93
5.	Not relevant	-	-
	Total	**108**	**100.00**

Nearly half (49.07 per cent) of the respondents felt that the publications were 'relevant', followed by 47.23 per cent of the respondents viewed these publications as 'most relevant'. In the opinion of 2.77 per cent of the respondents, the publications were 'moderately relevant'.

This might be due to the fact that majority of the visitors might have been concerned with similar crops and cropping pattern.The findings are consistent with the findings of Suvarna Gavhane (2005).

2.3 Opinion about price of university publications

The views of the respondents about the price of the university publications are enlisted in Table 6.

Table 6: Distribution of the respondents according to their opinion about price of the university publications

Sl. No.	Price	Respondents (N=108)	
		Number	Percentage
1.	Very high	9	8.33
2.	High	21	19.44
3.	Reasonable	77	71.30
4.	Low	1	0.93
5.	Lowest	-	-
	Total	**108**	**100.00**

Table 6 reveals that about three-fourth (71.30 per cent) of the respondents stated that the price of University publications was 'reasonable'. In view of 19.44 per cent and 8.33 per cent respondents, respectively the price was 'high' and 'very high'.

The discussion regarding the price of technology products also holds true in this case. The findings are in conformity with the findings of Hegade (2001), Suvarna Gavhane (2005) and Hardikar *et al.* (2011).

CONCLUSION

The research findings revealed that majority of the visitors were from village area. This implies that the majority of the visitors had rural background and was engaged in farming. In this context, it is suggested to provide information on vocational aspects so that one can get the opportunity to create self employment and raise one's standard of living. The ATIC may prepare a plan of bringing out publications on aspects suggested by visitors such as poultry, cultivation of

various crops such as paddy, mango, cashew etcMajority of the visitors was found visiting ATIC for seeking information about new technology, seek advice about agricultural development, to purchase the seeds / grafts/ publications and get solved the field problems. In such a situation, the strong data base with ATIC is a must along with efficient arrangements for the sale of technology products. Purchased by the visitors, university publications in terms of their utility, relevancy and price wherever applicable were satisfactory. However, there is scope for improvement, especially in respect of commercialization of technology products. The findings will be helpful to the planners and administrators of respective authorities for improving their functioning. The study was an attempt to investigate few aspects related to ATIC and it was based on the opinion and expectations of the respondents, which may not be free from bias. Therefore, findings cannot be generalized

REFERENCES

Hardikar, D.P., Nirban A.J. and Warawadekar, S.C. (2011). Opinion of visitors of ATIC. Report of Research Review Committee, Department of Extension Education, Dr. BSKKV, Dapoli. 89 -96.

Hegade, D.A. (2001). A study on opinion of visitors of Agricultural Technology Information Centre. M.Sc. (Agri) Thesis, submitted to Dr. B.S.K.K.V., Dapoli (M.S.)

Lanjewar, D.M. and Shirke, R.A. (1997). Perception about social forestry among farmers. *Maharashtra Journal of Extension Education.* 10 (1) : 93-98

Mahadik, R.P., Bhairamkar, M.S., Mehta P.G., Hardikar, D.P. and Sawant, P.A. (2012). Feedback of visitors about sale counter of ATIC. Report of Research Review Committee, Department of Extension Education, Dr. BSKKV, Dapoli. 25-31.

Mishra, B.P., Alok Kumar, Sujan, D.K. and Kanwar Manish (2010). Use of services of ATIC by the farmers of Eas tern U.P. *Journal ofCommunication Studies*. 28: 16-21.

Roy Sabyasachi and Sarangi Anjali. (2003). Perception of farmers about the utility of farm publication in Bengali dailies. *Maharashtra Journal of Extension Education.* 22(1) : 20-22.

Suvarna Gavhane (2005). A study of visitors opinions about functioning of agriculture technology information centre, MPKV, Rahuri. M.Sc.(Agri.) Thesis, submitted to MPKV, Rahuri. (M.S.)

RESEARCH ARTICLE

Dryland Technologies in Scarcity Zone of Maharashtra: Constraints Analysis

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ABSTRACT

Agricultural production in the state of Maharashtra is mainly dependent upon monsoon rains. Therefore, dryland agriculture is very important.Efforts of the state government is encouraging the farmers in adoption of dryland technologies for agricultural production and soil and water conservation technologies. The study conducted in two districts of scarcity zone of Ahmednagar and Solapur districts in Maharashtra state aimed to find out the constraints faced by the farmers and the solution for effective implementation and adoption of dryland technologies. The results of the study showed that constraints related to organization of various groups at dryland technology were the most important perceived by farmers, second was the constraints related to soil and water conservation, followed by various cropping systems, alternate land use systems/agro forestry, crop management practices and agricultural implement use. Proper and fair selection ofdryland secretary and volunteers, publicity of constitution of all committees were the most important suggestions by farmers for adoption of technology for dryland development.

Keywords: Dryland technology; Adoption; Constraints; Suggestions.

INTRODUCTION

Over very own survival on the earth essential depends on two basic resources soil and water, natures two valuable gifts to mankind. Mother nature gives protection to these resources through natural vegetation. This protection shied of land is distribution by our interference, making the soil susceptible to detachment and transportation. A no-care attitude and gross negligence coupled with our ever increasing needs and demands over the years have taken the problems to threatening dimensions. The dryland agricultural development must lead to

peoples self- reliance, self support and self esteem, if must enrich the life of the people and improve its quality at the grass root level. Land use adjustment is very vital to the implementation of dryland technology programmes.Meaningful and effective adjustment can be achieved only if landowners are aware of the advantages that will accrue. Though people's institutions people's action can be organized. It is necessary to develop local capabilities and local initiatives. Dryland approach to development of agriculture and rural areas in Maharashtra state is not a new strategy. The state has made pioneering efforts in evolving improved dry farming technologies or practices at Dryland Farming Research Station, Solapur since 1933 and has advocated many improved dryland agricultural technologies for the farmer. There is a national policy of giving special help to the drought prone area. The agricultural production in the state of Maharashtra state is mainly dependent upon monsoon rains. Rainfall in Maharashtra is generally irregular, scanty, untimely and unevenly distributed with prolonged drought periods. The natural resources like soil, water vegetation of the state are under tremendous stress due to ever increasing biotic pressures, pollution, deforestation, sand dune shifting, land degradation, lowering of water table and continuous drought. As a result there is prevalence of unemployment and poverty problems.

Despite the efforts of the state government adoption of dryland technologies is not at par with the expectations. Hence, the present study was undertaken to understand the "Constraints in adoption of dryland technologies" and find solution through their suggestions for effective implementation and adoption of dryland technologies.

METHODOLOGY

The study was undertaken in Scarcity Zones of Maharashtra having the largest geographical area and population lives in Ahmednagar and Solapur districts, thus these districts have been selected purposively. The study has further been confined to randomly select four PanchayatSamities, two from each selected district. The list of villages of each tahsil was obtained from their respective PanchayatSamiti Office. Out of these villages, four villages from each tahsil were selected by simple random sampling method. Thus, total sixteen villages were selected from these four tahsils. Thereafter a list of farmers from the selected villages was obtained from the '*Talathi*' (Revenue Department) of respective villages. In order to get representation of all farmers, 18 respondents from each village were selected by using random sampling procedure. Thus, total 288 representative respondents were selected from all sixteen

selected villages of Ahmednagar and Solapur districts.

In order to measure constraints faced by the farmers in effective implementation of soil and water conservation technologies. All possible impediments were included in questionnaire. Thus, total 39 statements on constraints were finalized and grouped in to six categories viz. constraints towards contour bunding, graded bunding and compartment bunding, contour cultivation, mulching techniques, organic recycling and addition of organic manures, ridges and furrows and farm pond. To measure the degree of severity of constraints, the responses were recorded on a three point continuum *viz.*, most severe, severe and least severe which were assigned 3, 2 and 1 scores respectively. The data were collected with interview schedule and were analyzed accordingly.

RESULTS AND DISCUSSION

1. **Soil and water conservation constraints faced by the farmers in adoption of dryland technology :** This part included various categories of constraints related to soil and water conservation, cropping systems, alternate land use systems /agro forestry, crop management and agricultural implements use which were faced by the farmers. Among soil and water conservation constraints, data in Table 1 depicts that the constraints unorganized market for organically grown produce, preparation of ridges and furrows, is expensive and labour intensive in heavy soil and erratic nature of rainfall in the rainy season was having the highest mean score (2.58), hence, it was ranked first. The last rank was awarded to the constraint mulching requires large quantity of crop residue material (2.01).

It could be inferred that preparation of ridges and furrows, is expensive and labour intensive in heavy soil and erratic nature of rainfall in the rainy season was regarded as the most severe constraint. This constraint was perceived by farmers because majority of the farmers in dryland area were economically backward having low socio-economic status and smaller size of land holding. Rainfall in Maharashtra state depends upon monsoon which generally remains abnormal, being irregular, scanty untimely, unevenly distributed with prolonged drought periods and wind storm.

Table 1. Relative severity of soil and water conservation constraints faced by farmers in adoption of drylandtechnologies

Sr. No.	Constraints	MS	S	LS	TS	MS	R
1	Smaller sized bunds particularly on arable land	120	88	80	616	2.14	VI
2	Treatments and design were not suitable for the local area	127	73	88	615	2.14	VI
3	Easy breakage of bunds in heavy rainfall and other causes, it required maintenance every year	112	95	81	607	2.11	VIII
4	Every time drawing of contours on field is tedious and time consuming	122	108	58	640	2.22	IV
5	Difficult to sow and cultivate crops exactly on contour across the slope	130	102	56	650	2.26	III
6	Non-availability of sufficient mulching material	118	95	75	619	2.15	V
7	Mulching requires large quantity of crop residue material	67	158	63	580	2.01	XI
8	Low premium price for organic produce	78	166	44	610	2.12	VII
9	Unorganized market for organically grown produce	192	72	24	744	2.58	I
10	Preparation of ridges and furrows, is expensive and labour intensive in heavy soil	192	72	24	744	2.58	I
11	Erratic nature of rainfall in the rainy season	192	72	24	744	2.58	I
12	In heavy soil lateral movement of water is restricted	146	60	82	640	2.22	IV
13	Smaller land holdings and land lost in farm pond reduces income and yield	176	72	40	712	2.47	II

MS=Most Severe, *S*=Severe, *LS*=Least Severe, *TS*=Total Score, *MS*=Mean, Score, *R*=Rank

2. **Cropping systems constraints faced by the farmers in adoption of dryland technology:** Among cropping systems constraints, the data in Table 2 showed that less time is available for intermediate seed bed preparation was awarded the highest mean score (2.41), hence, it was ranked first and the intensive cropping depletes the soil fertility (2.33) was ranked second. The last rank was awarded to the constraintsless more per unit cost of production (1.89). The findings conform to the findings of Singh and Sinha (2005).

Among the cropping systems constraints, the least sever constraints as perceived by the farmers was more per unit cost of production and ineffective field trial cum demonstration. This problem might have been perceived because of the majority ofdryland farmers were

having low socio-economic status and lack of provision of subject matter
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specialist and extension experts in the Department of agriculture.

Table 2. Relative severity of cropping systems constraints faced by farmers in adoption of drylandtechnologies

Sr. No.	Constraints	MS	S	LS	TS	MS	R
1.	Less time is available for intermediate seed bed preparation	168	70	50	694	2.41	I
2.	Intensive cropping deplete the soil fertility	142	100	46	672	2.33	II
3.	Difficult to carryout different field operations	105	103	80	600	2.09	V
4.	Less awareness about crops suitable for inter cropping	144	56	88	632	2.19	IV
5.	Difficulties in shifting to different cropping patterns in short duration of time	144	80	64	656	2.28	III
6.	Less awareness about improved cropping systems	96	120	72	600	2.08	VI
7.	Ineffective field trial cum demonstration	72	144	72	576	2.00	VII
8.	More per unit cost of production	106	44	138	544	1.89	IX
9.	Proper crop rotation is required	75	136	77	574	1.99	VIII

MS=Most Severe S=Severe LS=Least Severe TS=Total Score MS=Mean, Score R=Rank

3. **Alternate land use systems /agro forestry constraints faced by the farmers in adoption of dryland technology:** Among alternate land use systems /agro forestry, the data in Table 3 indicate that insufficient and irregular rainfall (highest mean score 2.53). The second and third ranks were awarded to the no possibility to irrigate the crop in summer season (2.44), and lack of irrigation facilities nearby areas (2.33). The least mean score (1.64) secured by the constraint was

unscientific utilization of pastures; hence, it was awarded last rank.

The first, second and third constraints, insufficient and irregular rainfall,no possibility to irrigate the crop in summer season and lack of irrigation facilities nearby areas, this constraint was perceived by the farmers because rainfall in Maharashtra depends upon south-west monsoon which generally remains abnormal, being irregular, scanty untimely, unevenly distributed with prolonged drought periods and wind storm. Plants are

destroyed by stray cattle, goats and wild animals' constraint was observed due to the fact that there was no legal provision to control the stray animals and goat rearing is very common in dryland areas, where grazing in opened public lands.Unscientific utilization of pastures anddoubts on ownership of forest products might have occurred due to lack of knowledge about management and poor supervision and control over community resources. The findings conform to the findings of Puroshotam and Singh (2005).

Table 3. Relative severity of alternate land use systems /agro forestry constraints faced by farmers in adoption of drylandtechnologies

Sr. No.	Constraints	MS	S	LS	TS	MS	R
1.	Lack of irrigation facilities nearby areas	160	64	64	672	2.33	III
2.	Insufficient and irregular rainfall	152	136	-	728	2.53	I
3.	No possibility to irrigate the crop in summer season	168	80	40	704	2.44	II
4.	Plants are destroyed by stray cattle, goats and wild animals	85	120	83	578	2.00	IV
5.	Doubts on ownership of forest products	64	88	136	504	1.75	VI
6.	Lack of efforts for preservation of natural grasses	56	168	64	568	1.97	V
7.	Unscientific utilization of pastures	32	120	136	472	1.64	VII

MS=Most Severe, *S*=Severe, *LS*=Least Severe, *TS*=Total Score, *MS*=Mean Score, *R*=Rank

4. Crop management constraints faced by the farmers in adoption of dryland technology: Among crop management constraints, the data in Table 4 showed that lack of sufficient technical knowledge about proper method of weed control was awarded the highest mean score (2.58), hence, it was ranked first and the lack of technical knowledge about crop management and lack of knowledge about HYV's, and package of practices of dryland crops (2.47) was ranked second. The last rank was awarded to the constraintshigh cost and non-availability of inputs (2.08).

Among the crop management constraints, the most sever constraints as perceived by the farmer's waslack of sufficient technical knowledge about proper method of weed control. This was due to fact that weedicides were

costly and dryland personnel could not convince the farmers about the use of weedicides by and large

farmers used physical method of weed control.

Table 4. Relative severity of crop management constraints faced by farmers in adoption ofdrylandtechnologies

Sr. No.	Constraints	MS	S	LS	TS	MS	R
1.	Lack of technical knowledge about crop management	176	72	40	712	2.47	II
2.	Lack of knowledge about HYV's, and package of practices of dryland crops	173	78	37	712	2.47	II
3.	Lack of sufficient technical knowledge about proper method of weed control	192	72	24	744	2.58	I
4.	Non-availability of inputs	144	80	64	656	2.28	III
5.	High cost and non-availability of inputs	104	104	80	600	2.08	IV

MS=Most Severe,*S*=Severe,*LS*=Least Severe, *TS*=Total Score, *MS*=Mean Score,*R*=Rank

5. Agricultural implements use constraints faced by the farmers in adoption of dryland technology: Among agricultural implements use, the data in Table 5 indicate that inability to purchase agril. Implements and modern equipments (highest mean score 2.53). This constraint was perceived by farmers because majority of the farmers in dryland area were economically backward having low socio-economic status and smaller size of land holding. The second and third ranks were awarded to the

maintaining various types of agril. Machineries for various crop is not possible (2.39), and unsatisfactory quality of subsidized seed drills (2.25). The least mean score (1.81) secured by the constraint was non availability of quality seed drill; hence, it was awarded last rank.

Timely availability of agricultural credit from Govt. organizations and high interest rate charged by private finance agencies was ranked fourth and fifth with 2.11 and 2.08 mean score by the respondents, respectively.

Table 5. Relative severity of agricultural implements use constraints faced by farmers in adoption of drylandtechnologies

Sr. No.	Constraints	MS	S	LS	TS	MS	R
1.	Non availability of quality seed drill	64	104	120	520	1.81	VII
2.	Unsatisfactory quality of subsidized seed drills	112	136	40	648	2.25	III
3.	Lack of knowledge regarding calibration of the seed drill	88	72	128	536	1.86	VI
4.	Timely availability of agricultural credit from Govt. organization	104	112	72	608	2.11	IV
5.	High interest rate charged by private finance agencies	96	120	72	600	2.08	V
6.	Inability to purchase agril. implements and modern equipments	192	56	40	728	2.53	I
7.	Maintaining various types of agril. machineries for various crop is not possible	168	64	56	688	2.39	II

MS=Most Severe, *S*=Severe, *LS*=Least Severe*, TS*=Total Score, *MS*=Mean Score, *R*=Rank

Suggestions made by farmers for effective implementation of dryland technologies:

The farmers (95.49 %) suggested that there should be creation of irrigation facilities through construction of dam, well, watershed structures viz., nala bund, percolation tanks, KT wears and farm ponds through Govt. schemes andimproved agril. implements, machineries and modern equipment's should be made locally available on subsidized rate of Table 6. The second suggestion was make provision of different types of irrigation facilities for attaining better results by the farmers' (93.75 %). And third suggestion was develop suitable location specific treatments and designs for construction of contour bund and graded bunds in the local area (92.01 %). About less than half farmers suggested detail training should be given to farmers about low cost technology, package of practices of crop, various dryland technologies, supply of good quality inputs in reasonable cost, provide irrigation and crop loan facilities. The results confirm with the results of Arya and Singh (2006), Singh and Sinha (2006) andMeena and Sharama (2012).

Table 4.57: Suggestions made by farmers for effective implementation and adoption of dryland technologies

Sr. No.	Suggestions	No.	Per-cent	Rank
1.	Creation of irrigation facilities through construction of dam, well, watershed structures *viz.*, nala bund, percolation tanks, KT wears and farm ponds through Govt. schemes	275	95.49	I
2.	Make provision of different types of irrigation facilities for attaining better results by the farmers'	270	93.75	II
3.	Develop suitable location specific treatments and designs for construction of contour bund and graded bunds in the local area	265	92.01	III
4.	In detail training should be given to the farmers on cropping and farming systems	233	80.90	VII
5.	Agricultural universities should develop location specific need based cropping systems for dryland area	212	73.61	IX
6.	Develop effective low cost technology for soil moisture conservation technique	255	88.54	IV
7.	Regular and timely training on low cost input technology should be provided	192	66.67	XI
8.	Agriculture Universities should develop short duration and drought tolerant varieties of crops	190	65.97	XII
9.	Detail training should be given regarding suitability and requirement of soil and climate for raising of different fruit crops	240	83.33	V
10.	Good quality grafts/planting material should be made available on subsidized rate at local level	212	73.61	IX
11.	Need for more technical information /guidance from extension field functionaries of concerned departments regarding alternate land use systems	210	72.92	X
12.	Assured irrigation facility should be provided	255	88.54	IV
13.	Agril inputs and implements should be made available at village level at proper time on subsidized rate	240	83.33	V
14.	Publications in simple local language about the package of practices of crops be maid easily available	233	80.90	VII
15.	Supply agril. inputs through co-operative societies on no loss no profit basis	229	79.51	VIII

16.	A special training on handling and maintenance of the implements and machineries should be provided	255	88.54	IV
17.	Provision of sufficient credit facility with low interest rate for the purchase of implements and machinery through financial agencies	233	80.90	VII
18.	SAUs should develop multipurpose self-propelled low cost agril. implements and machineries for reducing labour requirement and expenditure on it by increasing accurately and efficiency of field work	275	95.49	I
19.	Improved agril. implements, machineries and modern equipment's should be made locally available on subsidized rate	237	82.29	VI

CONCLUSION

Constraints related to effective implementation of dryland technologies were the most perceived constraints by the farmers followed by constraints related to soil and water conservation, cropping systems, alternate land use systems/agro forestry, crop management and agricultural implements use. The important suggestions made by the farmers were related to proper and fair selection of dryland Secretary and Volunteers, publicity of constitution of various groups at dryland level, proper representation exploration of additional irrigation facilities, plantation, pasture development, fairness in use of budget, involvement of rural institution and need based demonstrations.

REFERENCES

Arya,S. and Singh,P.,2006. Impact of capacity building measures of Integrated Watershed Development Project. *Indian J. of Extn. Edu., Vol.42(1&2):136-139.*

Purushottam and Singh, B., 2005. Participation issues in implementation of watershed projects. *Indian J. of Extn. Edu., Vol.41(1&2):58-62.*

Singh, L. and Sinha, B. P.,2005. Development orientation of watershed projects functionaries. *Indian J. of Extn. Edu., Vol.41(1&2):7-11.*

Singh, L. and Sinha, B. P.,2006. Institutionalization of development processes in watershed projects. *Indian J. of Extn. Edu., Vol.42(1&2):31-35.*

Meena, M. and Sharama, N.,2012. Watershed Technology in Arid Zone of Rajasthan:Constraints Analysis. *International J. of Extn. Edu. Vol.8:37-43.*

RESEARCH ARTICLE

Knowledge of Beneficiary Farmers about Jalyukta Shivar Abhiyan

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ABSTRACT

The present study was conducted in Latur district of Marathwada region of Maharashtra state. For the study of *Jalyukta Shivar Abhiyan*, exploratory research design was used. After completion of one year of *Jalyukta Shivar Abhiyan* it was studied for its knowledge. After analysis it was observed that 63.34 per cent of the respondents had high level of knowledge regarding *Jalyukta Shivar Abhiyan*. In implementation of *Jalyukta Shivar Abhiyan* beneficiaries were facing problems such as soil material which hold and percolate water get scrapped (60.83%), followed by procedural delays in approvals, sanctions and fund disbursal (56.67%), activities not carried out timely (51.67%) and high rate of evaporation in summer season (48.33%) etc.

INTRODUCTION

In the state of Maharashtra, inconsistency of rains in the very times of crop growth and discontinuity of rains create drought like situation. Nearly, 82 per cent area of the state falls in rainfed sector and 52 per cent area is drought prone, due to which agriculture field is heavily affected. Heavy ups and downs have been observed in the production of crops on dryland in the state. Less availability of water is a major factor responsible for this situation. To permanently overcome internal drought situation and to increase water availability, in December 2014, Maharashtra government has launched a new programme named Jalyukta Shivar (waterful surrounding) programme to make Maharashtra a drought-free state by2019. There is convergence of various schemes related to water conservation.This programme focused on restoration, repair, rejuvenation and construction of

local water bodies, where possible, it also linked to nearby rivers, allowing a continuous, uninterrupted flow of water for local irrigation requirements. Success of any development programme depends on degree of involvement of the people and at what level of knowledge they have about it. Keeping in view a study of knowledge of beneficiary farmers about *Jalyukta Shivar Abhiyan* in Latur district of Maharashtra state was under taken.

OBJECTIVES

1) To study knowledge of beneficiary farmers about *Jalyukta Shivar Abhiyan*.
2) To Study Constraints faced by beneficiary while participating in *Jalyukta Shivar Abhiyan*.

METHODOLOGY

The investigation was carried out in Latur district of Maharashtra state during 2017- 2019. For the study of *Jalyukta Shivar Abhiyan* exploratory research design was used. Out of ten talukas of the district under *Jalyukta Shivar Abhiyan*, three talukas namely Latur, Ausa and Renapur were selected for the study and four villages were selected from each selected talukas byproportionate random samplingmethod.

Thus a total of 12 villages were selected for study. In total a sample of 120 beneficiary farmers from selected villages was drawn with the help of proportionate random sampling method. The data were collected with the help of schedule developed for this purpose contained questions related to knowledge of beneficiary farmers about *Jalyukta Shivar Abhiyan* by personally interviewing them.

FINDINGS

It was evident from Table 1 that, per cent of beneficiary farmers had knowledge about villages with high scarcity of water are selected (100.00%), maximum rain water is harvested in surroundings of village itself (100.00%), outcomes of the Abhiyan (100.00%), followed by decentralized water bodies are created (72.50%), *Jalyukta Shivar Abhiyan* is five year plan (63.33%), funds are available under various schemes (60.00%), before implementation of activities water balance sheet of village is prepared (51.67%), whereas, majority of the respondents had no knowledge about implementation of ground water act is a part of Abhiyan (68.33%) and every year 5000 villageswill make free of water scarcity(51.67%).

In case of activities taken under *Jalyukta Shivar Abhiyan*, cent per cent of respondents had knowledge about watershed development work namely,

canal deepening (100.00%) and tree plantation (100.00%), followed by majority of the respondents had knowledge about watershed development work namely, farm pond (86.67%), extraction of sludge from various existing water bodies (86.67%), watershed development work like water absorption trenches (79.17%), repairing of existing micro irrigation structures (KT Weir/Storage dam) (77.50%), strengthening of drinking water sources (77.50%), chain cement concrete canal dam works (76.67%), resurrection of old water structures (72.50%), efficient use of available water (72.50%), small river/canal joining (70.83%), watershed development work namely, graded bunding (68.33%), well/bore well refilling (67.50%), and repairing, renovating and reinstating of percolation tank and micro irrigation tank (57.17%). While majority of the respondents had no knowledge about strengthening of water usage organizations (81.67%). Above findings regarding farm pond and tree plantation were in accordance with the findings of Kulshrestha*et al.,* (2015) and Rathod Trupti and Rathod(2016).

From above data it shows that, beneficiary farmers were very well known about *Jalyukta Shivar Abhiyan* activities, probable reason for this might be water is important factor in their personal life and for farming, also now-a- days state government creating awareness about various water conservation activities to overcome water scarcity problem of Maharashtra, as it is major trait to development ofstate.

The data in Table 2 indicates that, 63.34 per cent of the respondents were having high knowledge level followed by 30.83 per cent were having medium level knowledge and05.83 per cent were found in low level of knowledge.

It was observed from Table 3 that, majority of beneficiary farmers (60.83%) of *Jalyukta Shivar Abhiyan* faced major constraint soil material which hold and percolate water get scrapped, followed by procedural delays in approvals, sanctions and fund disbursal (56.67%) and activities not carried out timely (51.67%),respectively.

Table.1 Distribution of the respondents according to their knowledge about Jalyukta Shivar Abhiyan

Sr. No.	Statements	Knowledge	
		Yes	No
1	*Jalyukta Shivar Abhiyan* is five year plan.	76(63.33)	44(36.67)
2	Every year 5000 villages will make free of water scarcity.	58(48.33)	62(51.67)

3	Villages with high scarcity of water are selected.	120(100.00)	00(00.00)
4	Maximum rain water is harvested in surroundings of village itself.	120(100.00)	00(00.00)
5	Decentralized water bodies are created.	87(72.50)	33(27.50)
6	Implementation of groundwater act is a part of Abhiyan.	38(31.67)	82(68.33)
7	Before implementation of activities water balance sheet of village is prepared.	62(51.67)	58(48.33)
8	Funds are available under various schemes.	72(60.00)	48(40.00)
9	Outcomes of the Abhiyan.	120 (100.00)	00(00.00)
10	Activities taken up under the Abhiyan.		
	A) Watershed developmentworks	82(68.33)	38(31.67)
	a) Graded bunding	95(79.17)	25(20.83)
	b) Water absorbtiontrenches	104(86.67)	16(13.33)
	c) Farmpond	120(100.00)	00(00.00)
	d) Canaldeepening	92(76.67)	28(23.33)
	B) Chain cement concrete canal damworks	87(72.50)	33(27.50)
	C) Resurrection of old waterstructures	93(77.50)	27(22.50)
	D) Repairing of existingmicro irrigation structures (KTWeir/storage dam)	65(54.17)	55(45.83)
	E) Repairing, renovating and reinstating of percolationtank andmicro irrigation tank	104(86.67)	16(13.33)
	F) Extraction of sludge from various existing waterbodies	85(70.83)	35(29.17)
	G) Small river/canaljoining	81(67.50)	39(32.50)
	H) Well/bore wellrefilling	87(72.50)	33(27.50)
	I) Efficient use of availablewater	93(77.50)	27(22.50)
	J) Strengthening of drinking watersources	22(18.33)	98(81.67)
	K) Strengthening of water usageorganizations	120(100.00)	00(00.00)
	L) Treeplantation		

Table.2 Distribution of the respondents according to their overall knowledge about Jalyukta Shivar Abhiyan

Sr. No.	Knowledge index	Respondents (n=120)	
		Frequency	Percentage
1	Low (Up to 33.33)	07	05.83

2	Medium (33.34 to 66.67)	37	30.83
3	High (Above 66.67)	76	63.34
	Total	**120**	**100.00**

Table.3 Constraints faced by beneficiary farmers in implementation of *Jalyukta Shivar Abhiyan*

Sr. No.	Constraint	Respondent (n = 120) Frequency	Percentage (%)
1	Improper site selection	38	31.67
2	Beneficiaries were not taken in confidence before starting theProgramme	32	26.67
3	Unscientific implementation	46	38.33
4	Lack of transparency	45	37.50
5	Soil conservation key to ground water recharge but getNeglected	42	35.00
6	Abhiyan appeared to hold water but would not recharge it	48	40.00
7	Soil material which hold and percolate water get scrapped	73	60.83
8	High rate of evaporation in summer season	58	48.33
9	Productive land goes under the construction of farm pond	11	09.17
10	Activities not carried out timely	62	51.67
11	Procedural delays in approvals, sanctions and fund disbursal	68	56.67

The other constraints followed by the respondents were high rate of evaporation in summer season (48.33%), Abhiyan appeared to hold water but would not recharge it (40.00%), unscientific implementation (38.33%), lack of transparency (37.50%), soil conservation key to ground water recharge but get neglected (35.00%), improper site selection (31.67%), beneficiaries were nottaken in confidence before starting the programme (26.67%) and productive land goes under the construction of farm pond (09.17%),respectively.

The major constraint faced by beneficiary farmers of *Jalyukta Shivar Abhiyan*was soil material which hold and percolate water get scrapped which results in only holding of water not recharging of ground water table in some areas of study, followed by this contrading other

constraint were procedural delays in approvals, sanctions and fund disbursal and activities not carried out timely by concerning agencies. The findings were supported by Athare*et al.,* (2013) and Chavai*et al.,* (2015).

From the results of the present study it could be concluded that majority of the beneficiary farmers had high level of knowledge about *Jalyukta Shivar Abhiyan*, it was because of water nourish and support plant and animal life, also prosperity and welfare of humanity depends on water which is irreplaceable resource. Major constraint identified through study was soil material which hold and percolate water get scrapped therefore focus should be on scientific implementation of *Jalyukta Shivar Abhiyan*.

CONCLUSIONS

On the basis of above findings of the present study it could be conducted that the majority of farmers had show high level of knowledge about 63.34 per cent followed by medium level of knowledge about 30.83 per cent and low level of knowledge is 05.83 per centof *Jalyukta Shivar Abhiyan*.It is clear from the study that there is need to transfer the new technology and to increase the knowledge of respondents. It is thus suggested that the extension agencies of agriculture and related departments should provide necessary guidance in respect of *Jalyukta Shivar Abhiyan*.

REFERENCES

Athare, T., B. Singh., V. Gouda and B. K. Singh. 2013. A study on constraints in people's participation in integrated watershed development. *Indian J. of Extn.Edu.***49**(3&4): 149-153.

Chavai, A. M., U. V. Rakshe and S. B. Shinde. 2015. Impact of farm pond on the beneficiary farmers ofMaharashtra. *International J. of Trop. Agri.* **33**(4): 3525-3528.

Government of Maharashtra.Water Conservation Department. Government Resolution No.JaLaA-2014/Case No. 203/JaLa-**7** published on 5 December, 2014.

Kulshrestha A., S. Sen and Y. K. Singh. 2015. Study of technological knowledge level about watershed practices in Morena District of Madhya Pradesh, India. *Indian Res. J. Extn.Edu.***15**(1): 89-93.

Rathod Trupti and M. K. Rathod. 2016. Knowledge and adoption of watershed practices under Integrated Watershed Management Programme in Wardha District. *Technoframe - A J. of Multidisciplinary Advance Res.* **5**(1): 76-83.

RESEARCH ARTICLE

Transfer of Farm Technology through Training Programmes for Improving the Farmers Income

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ABSTRACT

There are 754 farm scientists working under the jurisdiction of the Mahatma Phule Krishi Vidyapeeth, Rahuri. With the help of the list so prepared thirty per cent farm scientists were selected on a random basis from each of the selected college/research station, thus, making the total number of respondents 226.It can be concluded from the study that the activity-wise nature of participation in training programmes majority of Assistant professors and Associate professors had always participated in planning, preparation, implementation and follow up.

Key words: Training programmes, Transfer, Farmers income

INTRODUCTION

A great deal of farm information is being generated by the Agricultural Universities and research institutes for large scale adoption by the farmers. The success or failure of an extension programme is largely dependent on the speed with which the information is disseminated to the farmers in a form acceptable to them. In this context, the job of farm scientists is most challenging and does not end with dissemination of knowledge alone he has to persuade, motivate and convince the farmers to accept his advice and act upon it. It is therefore imperative that the Farm Scientists should not have a sound knowledge of the subject matter but also conserving with various communication methods and media to pass on the information to the farmers for adoption under different situation. Training means the acquisition and development of those knowledge, skills, techniques, attitudes and experiences which enable and individual to make his most effective contribution to the combined effort of the team of which he is a member. This is an effective method for transfer of technology in a farming community keeping the above information in view, a research based study was undertaken to assess the nature of participation of farm scientists in transfer of technology through training programme.

The specific objectives of the study are;

1. To assess the activity wise nature of participation of farm scientists in transfer of technology through training programmes.
2. To study the constraints faced by the farm scientists in transfer of technology through training programmes.

METHODOLOGY

The farm scientist's *viz.,* Junior Research Assistants, Senior Research Assistants, Assistant Professors, Associate Professors and Professors working at the Central Campus of the University, Agricultural Colleges, N.A.R.P. headquarters and main research stations under the jurisdiction of the university was the universe of the investigation. At present, there are 754 farm scientists working under the jurisdiction of the University. With the help of the list so prepared thirty per cent farm scientists were selected on a random basis from each of the selected college/research station, thus, making the total number of respondents 226. Mahatma Phule Krishi Vidyapeeth, Rahuri has reorganized its Extension services by means of a novel approach for transfer of technologies with an innovative concept every research scientist should also be an extension worker, to bridge the gap between scientists and farmers and strengthen the State Department extension services. The data were collected with the help of a pre-tested questionnaire and farm scientists were contacted personally. Contribution Index was computed by using formula to find out the contribution of farm scientists in transfer of Technology.

$$\text{Contribution index} = \frac{\text{Actually obtained score}}{\text{Obtainable score}} \times 100$$

FINDINGS

The overall contribution of all the farm scientists was studied by considering the actual participation under planning, Preparation, implementation and follow up. So the observations pertaining to activity-wise nature of participation of the farm scientists in training programmes on are presented in Table 1.

Table 1 :Distribution of farm scientists according to activity -wise nature of participation in Training Programmes.

Sr. No.	Particular	JRA/SRA				AP				Asso./Prof.				Total			
		Always	Some time	Seldom	Total	Always	Some time	Seldom	Total	Always	Some time	Seldom	Total	Always	Some time	Seldom	Total
	Planning																
1.	Identifying a need based suitable technology	14 (46.67)	12 (40.00)	4 (13.33)	30 (100)	14 (42.42)	13 (39.40)	6 (18.18)	33 (100)	17 (80.95)	4 (19.05)	-	21 (100)	45 (47.87)	29 (30.85)	10 (10.64)	94 (100)
2.	Deciding the time and duration of the training	14 (46.67)	12 (40.00)	4 (13.33)	30 (100)	12 (37.50)	16 (50.00)	4 (12.50)	32 (100)	17 (70.83)	7 (29.17)	-	24 (100)	43 (50.00)	35 (40.70)	8 (9.30)	86 (100)
3.	Planning and preparation of training proposals and getting funds for training	11 (35.48)	13 (41.94)	7 (22.58)	31 (100)	16 (51.61)	11 (35.49)	4 (12.90)	31 (100)	20 (86.96)	3 (13.04)	-	23 (100)	47 (53.41)	30 (34.09)	11 (12.50)	88 (100)
4.	Deciding appropriate speakers and ensure their participation	12 (38.71)	12 (38.71)	7 (22.58)	31 (100)	15 (50.00)	9 (30.00)	6 (20.00)	30 (100)	20 (90.91)	2 (9.09)	-	22 (100)	47 (56.63)	23 (27.71)	13 (15.66)	83 (100)
	Preparation																
1.	Preparation of a written programme & allocating topics to different scientist	16 (45.71)	15 (42.86)	4 (11.43)	35 (100)	11 (36.67)	11 (36.67)	8 (26.66)	30 (100)	20 (86.95)	3 (13.05)	-	23 (100)	50 (56.82)	26 (29.54)	12 (13.64)	88 (100)
2.	Collecting relevant materials. publications and audio visual adis	15 (42.86)	16 (45.71)	4 (11.43)	35 (100)	12 (34.29)	14 (40.00)	9 (25.71)	35 (100)	20 (90.91)	2 (9.09)	-	22 (100)	47 (51.09)	32 (34.78)	13 (14.13)	92 (100)

3.	Informing all concerned participants in time	18 (51.43)	16 (45.71)	1 (2.86)	35 (100)	18 (62.07)	6 (20.69)	5 (17.24)	29 (100)	19 (86.36)	3 (13.64)	-	22 (100)	55 (63.95)	25 (20.07)	6 (6.98)	86 (100)
4.	Making arrangement for registration of the participants	19 (63.33)	10 (33.34)	1 (3.33)	30 (100)	14 (45.16)	11 (35.49)	6 (14.35)	31 (100)	16 (84.21)	3 (15.79)	-	19 (100)	49 (61.25)	24 (30.00)	7 (8.75)	80 (100)
	Implementation																
1.	Starting the training programme as per the schedule	19 (57.58)	12 (36.37)	2 (6.06)	33 (100)	19 (61.30)	6 (14.35)	6 (19.35)	31 (100)	20 (86.96)	3 (13.04)	-	23 (100)	58 (66.67)	21 (24.13)	8 (9.20)	87 (100)
2.	Registration of participants and distribution of training material	19 (57.58)	10 (30.30)	4 (12.12)	33 (100)	16 (51.61)	9 (29.03)	6 (19.36)	31 (100)	17 (77.27)	5 (22.73)	-	22 (100)	52 (60.47)	24 (27.90)	10 (11.63)	86 (100)
3.	Implementation of technical session of the training	19 (57.58)	10 (30.30)	4 (12.12)	33 (100)	17 (58.62)	6 (20.69)	6 (20.69)	29 (100)	18 (81.82)	4 (18.18)	-	22 (100)	54 (64.29)	20 (23.81)	10 (11.90)	84 (100)
4.	Arrangement of speakers for training	19 (57.58)	10 (30.30)	4 (12.12)	33 (100)	18 (62.06)	5 (17.25)	6 (20.69)	29 (100)	18 (81.82)	4 (18.18)	-	22 (100)	55 (64.48)	19 (22.62)	10 (11.90)	84 (100)
5.	Delivering lectures to participants	17 (54.84)	10 (32.26)	4 (12.90)	31 (100)	20 (52.63)	13 (34.21)	5 (13.16)	38 (100)	24 (88.89)	3 (11.11)	-	27 (100)	61 (63.54)	26 (27.08)	9 (4.38)	96 (100)
6.	Clarifying the doubts and querries of the participants	18 (56.25)	10 (31.25)	4 (12.50)	32 (100)	18 (48.65)	14 (17.84)	5 (13.51)	37 (100)	23 (88.46)	3 (11.54)	-	26 (100)	59 (62.10)	27 (28.43)	9 (9.47)	95 (100)
	Follow up																
1.	Preparation of news of training for publicity	16 (53.33)	8 (26.67)	6 (20.00)	30 (100)	18 (60.00)	5 (16.67)	7 (23.33)	30 (100)	13 (61.90)	8 (38.10)	-	21 (100)	47 (58.00)	21 (25.93)	13 (16.05)	81 (100)

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Planning

The data from Table 1indicate that in activities such as planning and preparation of training proposals and getting funds for training and deciding appropriate speakers and ensure their participation were always participated by large majority (90.00 per cent) of Asso. Prof./Profs. followed by 50.00 per cent of APs and sometimes participated by 40.00 per cent of JRA/SRAs for dissemination of technology. A large majority (70.00 per cent) of Associate. Prof./Profs. were always participated in identifying a need based suitable technology and deciding the time and duration of the training followed by 47.00 per cent of JRA/SRAs and (40.00 per cent) of APs in transfer of technology.

Preparation

In activities namely preparation of a written programme and allocating topics to different concerned scientists was always participated by large majority (87.00 per cent) Associate. Prof./Profs. followed by 46.00 per cent of JRA/SRAs and 37.00 per cent of APs. A large majority (86.00 per cent) of Associate. Prof./Profs. were always participated in informing all concerned participants in time followed by majority (62.00 per cent) of APs and 50.00 per cent of JRA/SRAs. In activity such as making arrangement for registration was always participated by large majority (84.00 per cent) of Associate. Prof./Profs. followed by nearly two-third (63.00 per cent) of JRA/SRAs and nearly half (50.00 per cent) of APs. The Associate. Prof./Profs. were

largely (91.00 per cent) participated in collecting relevant materials, publications and audio-visual aids and sometimes participated by 40.00 per cent of APs and JRA/SRAs for dissemination of technology.

Implementation

In activities namely starting the training programme as per the schedule and arrangement of speaker for training were always participated by large majority (82.00 per cent) of Associate. Prof./Profs. followed by majority (62.00 per cent) of APs and more than half (58.00 per cent) of JRA/SRAs in transfer of technology. The large majority (90.00 per cent) of Associate. Prof./Profs. were always participated in delivering lectures to participants and clarifying the doubts and queries of the participants followed by more than half (55.00 per cent) of JRA/SRAs and 50.00 per cent of APs. Large majority (80.00 per cent) of Associate. Prof./Profs. were always participated in registration of participants and distribution of training material and implementation of technical session of the training. It was followed by 59.00 per cent of JRA/SRAs and more than half (52.00 per cent) of APs for dissemination of technology.

Follow up

The majority (60.00 per cent) of APs and Associate. Prof./ Profs. were always participated in preparation of news of training for publicity followed by more than half (53.00 per cent) of JRA/SRAs for transfer of technology.

Table 2: Distribution of farm scientist according to constraints faced by them in transfer of technology through training Programmes

Sr. No.	Constraints	JRA/SRA				AP				Associate./Prof.				Total			
		Severe	Moderately severe	Least severe	Total	Severe	Moderately severe	Least severe	Total	Severe	Moderately severe	Least severe	Total	Severe	Moderately severe	Least severe	Total
1.	Lack of sufficient manpower to distribute the work	4 (10.26)	16 (41.03)	19 (48.71)	39 (100)	6 (21.43)	12 (42.86)	10 (35.71)	28 (100)	10 (32.26)	7 (22.58)	14 (45.16)	31 (100)	20 (20.41)	35 (35.71)	43 (43.88)	98 (100)
2.	Shortage of funds	12 (31.58)	14 (36.84)	12 (31.58)	38 (100)	9 (33.33)	13 (48.15)	5 (18.52)	27 (100)	17 (51.52)	10 (30.30)	6 (18.18)	33 (100)	38 (38.78)	37 (37.76)	23 (23.46)	98 (100)
3.	Lack of time	3 (8.57)	4 (11.43)	28 (80.00)	35 (100)	1 (4.55)	10 (45.45)	11 (50.00)	22 (100)	5 (16.13)	9 (29.03)	17 (54.84)	31 (100)	9 (10.23)	23 (26.14)	56 (63.63)	88 (100)
4.	No role to play in the activity	2 (6.45)	5 (16.13)	24 (77.42)	31 (100)	-	11 (52.38)	10 (47.62)	21 (100)	2 (9.09)	4 (18.18)	16 (72.73)	22 (100)	4 (5.41)	20 (27.03)	50 (67.56)	74 (100)
5.	Period of training inconvenient	8 (21.62)	8 (21.62)	21 (56.76)	37 (100)	1 (4.55)	12 (54.55)	9 (40.90)	22 (100)	4 (14.29)	13 (46.43)	11 (39.28)	28 (100)	13 (14.94)	33 (37.93)	41 (47.13)	87 (100)
6.	Lack of encouragement from the superiors	8 (22.86)	4 (11.43)	23 (65.71)	35 (100)	1 (4.76)	8 (38.10)	12 (57.14)	21 (100)	2 (9.09)	5 (22.73)	15 (68.18)	22 (100)	11 (14.10)	17 (21.79)	50 (64.11)	78 (100)
7.	Lack of co-operation from the colleagues	4 (10.81)	11 (29.73)	22 (59.46)	37 (100)	2 (10.53)	8 (42.11)	9 (47.36)	19 (100)	8 (33.33)	5 (20.83)	11 (45.83)	24 (100)	14 (17.50)	24 (30.00)	42 (52.50)	80 (100)
8.	Non-availability of transport facilities for field visits/ tours	7 (18.42)	12 (31.58)	19 (50.00)	38 (100)	7 (30.43)	10 (43.48)	6 (26.09)	23 (100)	7 (26.92)	11 (42.31)	8 (30.77)	26 (100)	21 (24.14)	33 (37.93)	33 (37.93)	87 (100)

The data from Table 2 indicate that the constraint shortage of funds was severely faced by 52.00 per cent Associate. Prof./Profs. and moderately faced by 40.00 per cent JRA/SRAs and APs. The 43.00 per cent of APs and Associate. Prof./Profs. were expressed non-availability of transport facilities for field visits/ tours was moderately severe constraint while it was least faced by JRA/SRAs. Period of training is inconvenient was moderately faced constraint by nearly half (50.00 per cent) of APs and Associate. Prof./Profs. and least faced by JRA/SRAs. The 43 per cent of APs were reported lack of sufficient manpower to distribute the work was moderately faced constraint while it was least faced by 45 per cent JRA/SRAs and Associate. Prof./Profs.

CONCLUSIONS

It can be concluded from this study that the activity-wise nature of participation in training programmes majority of APs and Associate. Prof. / Profs. had always participated in planning, preparation, implementation and follow up and sometimes participated by JRA / SRAs. The major constraints shortage of funds and non-availability of transport facilities were expressed by farm scientists.

REFERENCES

Veerasamy, S. Satapathy C. and Apparao G., 1992. Information input, processing and output behaviours of farm scientist. Indian J.Extn. Edn., 28 (3 & 4) : 67-71.

Ingale, P.O., Kude N.R. and Dhanorkar C.R., 1995. Use of educational technologies by agricultural university teachers and constraints faced by them. Maharashtra J. Extn. Edn. 14 : 161-165.

Kumar, Kanwal and Saini S.K., 1998. Problems faced by extension scientists. Agril. Extension Review, 10 (3) : 10-12.

Sangwan S.S., Narwal R.S. and Malik J.S., 2000. Constraints in mass media for transfer of farm technology. A research paper presented in National Seminar on farm communication through mass media in next millennium held at MPKV, Rahuri on Nov. 25-26, 2000, MPKV Res. Pub. No. 35: 42.

Abdullah, M.J., Shinde S.B. and Sawant G.K., 2002. A study of involvement of farm scientists in transfer of technology regarding various Agro based enterprises. Abstracts, National Seminar on Entrepreneurship Development in Agriculture, M.A.U., Parbhani- 4.

RESEARCH ARTICLE

Adoption Behaviour of Orange Growers towards Drip Irrigation in Nagpur District

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ABSTRACT

Present study was conducted in Nagpur district. Sample of 120 orange growers was selected and interviewed personally. Data was collected for knowledge, attitude and adoption of orange growers towards drip irrigation. It was observed that 64.17 per cent respondents had high level of knowledge of use of drip irrigation technology in orange, while 58.34 per cent respondents had high level of its adoption. Majority of respondents were moderately favourable towards use of drip irrigation in orange. In relational analysis land holding, area under orange crop, potential of irrigation source information sources and scientific orientation were found significantly correlated with knowledge and adoption of drip irrigation practices in orange crop.

INTRODUCTION

The citrus tree needs good amount of water for high production and it's affected under deficit irrigation. The total water requirement for orange crop is 1400 mm while daily water requirement was in 3.87 mm (Samudre and Sunny 2007). One of the reason for low yield is lack of concern towards irrigation management as the tree are sensitive to the availability of soil moisture status the growth of orange tree is influenced by soil moisture, nutrient, environment condition and management practices out of this factors of irrigation is great importance in case of orange orchard. In Maharashtra 215.62 lakh ha. of the land is under different crop only 14.52 per cent in Vidarbha out of the 59.89 lakh ha. cropped area is only 11.49 per cent under irrigation.

Drip irrigation is defined as application of small and preciously predetermined amount of water near the root zone of the plant at frequent intervals through emitting devices via a network of filtration unit through mains, sub-mains and laterals. Experiments on number of crops have shown that, in all cases, the yield under drip irrigation technology exceeded substantially. Irrigation efficiency in drip irrigation technology is adjusted to more than 90 per cent as compared to about 65 to 70 per cent in

case of sprinkler and about 50 to 60 per cent in case of surface methods of irrigation. This it indicates the quantum of saving water, which is valuable under the extreme water shortage conditions with no wastage through evaporation, percolation, leaching or runoff. Nagpur District is the prominent area of Nagpur Santra where irrigation potential is to be improved in the status of low availability of irrigation water. Drip irrigation can help the orange growers to increase the irrigation capacity in available situation. Drip irrigation technology has already been transferred in the area, but need to evaluate the farmer's behaviour towards. Hence, this study has been framed to know the adoption behaviour of orange growers towards the drip irrigation technology

METHODOLOGY

Nagpur itself by is name popular for the Nagpurisantra in the world. Hence, Nagpur district of Vidarbha region was purposively selected for the study. An exploratory research design of social research was used for the present study.In Nagpur district there are 13 tahsils, for the representative sampling one third tahsils i.e. five tahsils namely Savner, Katol, Kalameshwar, Narkhed and Ramtek were selected purposively on the basis of maximum crop area under orange cultivation.From each selected tahsil, 3 villages were selected purposively having

more crop area under orange cultivation, in all 15 villages were selected for present study. Eight farmers were selected randomly who were able to express their views on drip irrigation in orange crop, which comprising total sample of 120 respondents.The data for study were collected by personal interview of the respondents with the help of pre-tested schedule. The major theme of the study was adoption behaviour hence knowledge, attitude and adoption were the major variables. Knowledge and adoption were measured with the help of practices recommended for drip irrigation and index was developed for both. Attitude test was prepared for the present study and measured in five point continuum, further attitude index was developed. To know the relationship of socio-economic, situational, communicational and psychological variables with the adoption behaviour of orange growers toward drip irrigation technology, coefficient of correlation was statistically calculated.

RESULTS AND DISCUSSION

In present study there are three major components of behaviour i.e. knowledge, attitude and adoption which were studied and presented below.

1. **Knowledge of orange growers towards drip irrigation technology**

Many studies depicted that the level of adoption of any innovation is found to Associateciate with level of its

knowledge possessed by concern person. Hence, great emphasis is being paid by both the agricultural scientists and extension workers for high knowledge of drip irrigation technology in respect of their functioning, utilization pattern and getting higher and reliable knowledge from this modern innovation. The knowledge level of selected orange growers regarding drip irrigation technology was assessed and is presented in Table 1.

Table 1. Distribution of the respondents according to their extent of knowledge

Sr. No.	Knowledge index	Respondents (n=120)	
		Frequency	**Percentage**
1	Low(Up to 33.00)	00	00.00
2	Medium (33.01- 66.00)	43	35.84
3	High(above 66.00)	77	64.17
	Total	**120**	**100.00**
	Mean = 73.29		

The data of the Table 1 indicates that out of total 64.17 per cent respondents were having high knowledge level followed by 35.83 per cent were having medium level knowledge and no respondents were found in low level of knowledge. The average knowledge of orange growers regarding drip irrigation was 73.29 per cent in the study area.

Thus, it may be concluded that majority of respondents 64.17 per cent were having high knowledge level about drip irrigation in orange crop. These findings are similar the findings of Dhole (2006), Jadhao (2006) and Aundhakar*et al.*(2013).

2. Attitude of orange growers towards drip irrigation technology

A predisposition or a tendency to respond positively or negatively towards a certain idea, object and situation. Attitude influences an individual's choice of action and responses to challenges, incentives and rewards. As this study was framed around the attitude of adoption of drip irrigation by orange growers hence, studied it as dependent variable and presented in following tables.

Table 2. Distribution of the respondents according to their level of attitude towards drip irrigation technology in orange crop

The respondents are distributed according to their level of attitude and presented in Table 2.

Sr. No	Attitude index	Respondents (n=120)	
		Frequency	Percentage
1.	Unfavourable	00	00.00
2.	Less favourable	03	02.50
3.	Moderately Favourable	86	71.66
4.	Highly favourable	31	25.84
	Total	**120**	**100.00**

The above Table 2 shows that majority of respondents (71.66%) has moderately favourable attitude towards drip irrigation technology in orange crops, followed by 25.84 per cent respondents had highly favourable attitude towards drip irrigation technology in orange crops and only 02.50 per cent had less favourable attitude towards drip irrigation technology in orange crop.

From the above observations it may be concluded that orange growers were moderate to highly favourable attitude towards use of drip irrigation technology which may also improve to overcome the queries of farmers in maintenance and its optimum use. The similar findings found by Kausidikar*et al.* (2002) and Sharnagat (2008).

3. Adoption of orange growers towards drip irrigation technology in orange crop

Adoption shows state of actual use of drip irrigation practices by orange growers. The data is presented in Table 3.

Table 3. Distribution of the respondents according to their level of adoption

Sr. No.	Adoption index	Respondents (n=120)	
		Frequency	Percentage
1	Low (Up to 33.00)	02	01.66
2	Medium (33.01- 66.00)	48	40.00
3	High (above 66.00)	70	58.34
	Total	**120**	**100.00**
	Mean = 65.85		

The data presented in Table 3 indicates that more than half i.e. 58.34 per cent respondents had high level of adoption of drip irrigation practices, followed by 40.00 per cent respondents had medium level of adoption and only two respondents (1.66%) had found to have low level of adoption. The average adoption of drip irrigation practices in orange was 65.85 per cent.

Thus, it may be concluded that more than half of the respondents had

high adoption level of drip irrigation in orange crop. These findings are similar with the findings of Dhole (2006), Jadhao (2006) and Vermani *et al*. (2014).

4.1 Relation analysis

In order to find out the relationship between selected personal, socio-cultural, situational, communicational and psychological characteristics of respondents with adoption behaviour of orange growers towards drip irrigation was worked out. The results obtained from relational analysis have been presented in Table 4.

Table 4. Correlation coefficients of selected characteristics of the respondents with their dependent variable

Sr. No.	Independent Variables	Knowledge	Attitude	Adoption
1	Age	-0.0080	-0.0272	-0.0866
2	Education	-0.0293	-0.0474	0.0084
3	Land holding	0.2175 *	0.1451	0.1775 *
4	Area under orange crop	0.2493 **	0.0930	0.2083 *
5	Annual income	0.2415 **	0.0489	-0.1606
6	Experience of orange cultivation	-0.0756	-0.0417	-0.0473
7	Irrigation source	0.2199 *	-0.0493	-0.1215
8	Potential of irrigation source	0.2540 **	0.1082	0.2086 *
9	Training received	-0.0343	0.0609	-0.0876
10	Cosmopolitness	0.0982	0.0380	0.0059
11	Information sources	0.1744 *	0.1207	0.1856 *
12	Scientific orientation	0.3576 **	0.0443	0.1946 *
13	Risk preference	-0.0024	-0.0823	-0.0690

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

It is observed from Table 4 that the knowledge, area under orange crop, annual income, potential of irrigation source and scientific orientationwere found positively and significantly correlated with knowledge of drip irrigation technology by orange growers at 0.01 level of probability, while land holding, irrigation source and sources of information were positively significant with knowledge of drip irrigation technology by orange growers at 0.05 level of probability. In case of age, education, experience of orange cultivation, training received, cosmopolitness and risk preference

were found non-significant correlated with knowledge of drip irrigation technology by orange grower.

In case of attitude of drip irrigation technology age, education, land holding, annual income, experience of orange cultivation, area under orange crop, irrigation source, potential of irrigation source, source of information, training received, cosmopolitness, scientific orientation and risk preference were found non-significant with attitude of orange growers towards drip irrigation It clearly indicates that set of selected independent variables has no relationship with attitude of orange growers towards drip irrigation.

In case of adoption of drip irrigation technology, land holding,area under orange crop, potential of irrigation source, source of information andscientific orientation were found positively and significantly correlated with adoption of drip irrigation technology by orange grower at 0.05 level of probability Other variables likes age, education, annual income, experience of orange cultivation, irrigation source, training received, cosmopolitness and risk preference were found non-significant correlation with adoption of drip irrigation technology by orange grower.

It can be concluded from above results that, the independent variablesregarding knowledge of drip irrigation *viz*. area under orange crop,

annual income and scientific orientationwere found positively and significantly correlated with adoption behaviour of drip irrigation technology by orange grower at 0.01 level of probability and land holding, irrigation source, potential of irrigation source and sources of information were positively and significantly correlated with adoption behaviour of drip irrigation technology by orange grower at 0.05 level of probability. In case of adoption of drip irrigation land holding,area under orange crop, potential of irrigation source, source of information andscientific orientation were found positively and significantly correlated with adoption behaviour of drip irrigation technology by orange grower at 0.05 level of probability.

REFERENCES

Aundhakar, R. S., A. N. Deshmukh and S. G. Tale, 2013. Adoption of drip irrigation technology by the orange growers. *Agriculture update,* 8 (4): 620-622.

Dhole, M B. 2006. Adoption behaviour of orange growers under Employment Government Scheme. *M.Sc. Thesis (Unpub)*, Dr.PDKV, Akola.

Jadhao, R M. 2006. Knowledge and adoption of orange rootstock by orange growers*, M.Sc. Thesis (Unpub)*, Dr.PDKV, Akola.

Kausidikar, K. D., D. D. Suradkar, and G. S Narker, 2002. Determinants of attitude towards horticulture development program. *MaharashtraJ Extn. Educ.,* XXI (2): 121-124.

Samudre, A.S. and Sunny Raina, 2007.Assessment of lemon orchard growers for use ofMI in Balapur Taluka of Akola dist.*Tech.Thesis(Unpub)*,Dr.PDK V, Akola.

Sharnagat, P. M. 2008. Attitude of beneficiaries towards national horticulture mission. *M.Sc. Thesis (Unpub)*, Dr.PDKV, Akola.

Vermani, Savitha., Jatheshkathpali and Rashmi 2014. Adoption and impact of conservation agriculture technology with special reference to growing cotton crop with drip irrigation. *J. Cotton. Dev*. 28(1): 154-160.

RESEARCH ARTICLE

Women Empowerment - Initiatives by Government of India

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ABSTRACT

'Woman' is the leader planner of the family, first trainer, supplier of labour power and by playing focal role in the development of agriculture, industry, service sector etc. creates a civilized society. Empowerment of women is a multidimensional process that leads women to realise their full potential, their rights to have access to opportunities, resources and choices with the freedom of decision making. In the history of human development, woman has been as important as man. Women constitute half of the humanity, even contributing two-thirds of world's work hour she earns only one-third of the total income and owns less than one-tenth of the world's resources. This shows that the status of women is in pathetic condition and this is more so in a country like India. Among total Indian population of 1027.10 million, women constitute 495.73 million and perform two-thirds of the work and produce 50 per cent of food commodities consumed by the country. They earn one third of remuneration and own 10 per cent of the property or wealth of the country".Women contribute directly or indirectly for economic development. Her potential hidden power is to be utilized for which, her status in the society must be improved and economically she should be strengthened.For economic growth to be really inclusive, women empowerment is of utmost value. Government took various initiatives even before and after independence for raising the living standard of women and to make them empowered.Along with government, civil society organisations and all other stake holders must come forward and involve in the women empowerment process is the need of the hour.

Keywords: Women, Empowerment, Society.

Concept of Women Empowerment:

'Woman' is the leader planner of the family, the first trainer, supplier of labour power and by playing focal role in the development of agriculture, industry, service sector, socio-culture etc. creates a civilized society (Mishra, 2017).

'Power' is the key word of the term 'Empowerment'. Power means having the capacity and the means to direct one's life towards desired social, political and economic goals or status. The word 'Empower' means to make or cause power. Thus empowerment is a stage of acquiring power in order to understand one's rights and also to perform his/her responsibilities in most effective way (Singh *et al*., 2016).

Empowerment of women is a socio-political ideal envisioned in relation to wider framework of women's rights. It is a process that leads women to realise their full potential, their rights to have access to opportunities, resources and choices with the freedom of decision making both within and outside home. Empowerment would be achieved only when advancement in the condition of women is accompanied by their ability to influence the direction of social change gained through equal opportunities in economic, social and political spheres of life (National Policy for Women, 2016).

Definitions of Women Empowerment:

Pillai (1995) "Empowerment is an active multidimensional process which enables women to realize their full identity and powers in all spheres of life.

Hoshemi (1996) developed five indictors to measure women's empowerment: mobility, economic security, ability to make larger purchases, realize freedom from domination within the family and political and legal awareness and involvement in political campaigning and protests with this in mind.

Status of Women :

In the history of human development, woman has been as important as man. In fact, the status, employment and work performed by women in society is the indicator of a nation's overall progress. Women constitute half of the humanity, even contributing two-thirds of world's work hours she earns only one-third of the total income and owns less than one-tenth of the world's resources. This shows that the economic status of women is in pathetic condition and this is more so in a country like India. Among total Indian population of 1027.10 million, women constitute 495.73 million. Therefore, "women constitute nearly 50 per cent of population, perform two-thirds of the work and produce 50 per cent of food commodities consumed by the country. They earn one third of remuneration and own 10 per cent of the property or wealth of the country" (Chakravarty *et al*., 2013).Women contribute directly or indirectly for economic development. Her potential hidden power is to be utilized for which, her status in the society must be improved and economically she should be strengthened. Woman if is educated

and empowered, her potential power can be utilized for the economic development (Mishra, 2017).

Need for Women Empowerment : Women are deprived of

- Decision Making Power: It is the ability to influence decisions that affect one's life both private and public.
- Access to Education: It refers to the ability of all people to have equal opportunity in education.
- Access to Employment: It refers to the opportunity for a person to enter into employment.
- Exposure to Media: It defined as "the extent to which people have encountered specific messages or classes of messages/ media content".
- Domestic Violence: It defined as the violence or other abuse by one person against another in a domestic setting, such as in marriage or cohabitation.

Objectives of Women Empowerment:

- To create awareness among women to be truly ambitious and to dream for betterment.
- To improve access to sanitation, drinking water, fuel, wood and fodder for women.
- Supporting community activities package for women.

- To organise educational and empowerment programmes for girls and women's
- To increase awareness in women, for their development to use their talent optimally not only for themselves, but also for the society as a whole.
- To develop the skills for self-decision- taking capabilities in women and to allow them to present their point of view effectively in society.
- To integrate socio-economic activities with concern for health and environment protection in the light of the rural women culture (Subhashini, 2018).

Dimensions of Women Empowerment

- Educational Empowerment: Training, orientation and academic progress of women.
- Physical Empowerment: Food, Nutrition, Health, Sanitation, Life expectancy and Growth.
  Social Empowerment: Better status in the family, Freedom for marriage, social mobility, social freedom, family welfare, social transformation and gender equity.
- Economic Empowerment : Ownership and control of right to property, Employability, Improvement in the standard of living, Fulfilment of basic needs, Entrepreneurship development

and Improvement of bargaining power of women.

- Political Empowerment : Political reservation, Political participation and Political leadership development of women.

- Spiritual Empowerment : Emancipation from superstitions, misbelieves, customs, traditions and unhealthy practices that safeguard the interest of women (Amose*et al*., 2017)

Initiatives taken by Government for Empowerment of women before Independence:

As Indian government looking forward about society, has framed such acts which boosting the Indian women away from existing all social evils before independence 1947 are as follows,

- **Prohibiting the Practice of Sati Act-1850:** The practice followed by some Hindu communities by which a recently widowed women either voluntarily or by use of force or coercion commits suicide as a result of her husband's death, and this practice made illegal in all jurisdiction of British India by the then Governor-General Lord William Bentinck. (Wikipedia.org/prohibiting-practice-of-sati).

- **Cast Disabilities Removal Act – 1850**: This law was passed in British India under East India Company rule that abolished all laws affecting the rights of persons converting to another religion or caste. The new act allowed Indians who converted from one religion to another religion equal rights under the law, especially in the case of inheritance (Wikipedia.org/cast-disabilities-removal-act).

- **The Hindu Widow Remarriage Act-1856:** This act legalised the remarriage of Hindu widows in all jurisdictions of India under East India Company rule. It provided the legal safeguards against loss of certain forms of inheritance for remarrying a Hindu widow, though, under the act, the widow forsook any inheritance due her from her deceased husband (Wikipedia.org/hindu-widow-remarriage-act).

- **The Christian Marriage Act– 1872:** An act to consolidate and amend the law relating to the solemnization in India of the marriage of Christians, Every marriage between persons, one or both of whom are a Christian, shall be solemnized in accordance with the provisions under this act (https://indiacode.nic.in>acts>3.indian-cristian-marriage-act).

- **The Married Women's Property Act – 1874:**The wages and earning of any married woman acquired or gained by her after the passing of this act , in any employment, occupation or trade carried on by her and not by her husband , and

also any money or property so acquired by her through the exercise of any literary, artistic or scientific skill, and all savings from the investments of such wages, earnings, property shall be deemed to be her separate property, and her receipts alone shall be good discharges for such wages, earnings and property (www.indiankanoon.org/married-women-propert-act).

● **The Child Marriage Restrain Act – 1929:** This act was passed to eradicate the evil of child marriage with the objective to eliminate the special evil which had the potentialities of dangers to the life and health of a female child, who could not withstand the stress and strains of married life and to avoid early deaths of such minor mother The legal age for marriage under this act is 18 years for girls and 21 years for boys (www.wcd.nic.in/child-marriage-restrain-act).

● **The Hindu Women's Right to Property Act-1937:** It is expedient to amend the Hindu law to give better rights to women in respect of property, When a Hindu governed by the dayabhag school of Hindu laws dies intestate leaving any property , and when a Hindu governed by any other school of Hindu law or by customary law dies intestate leaving separate property , his widow , or if there is more than one widow all his widows together , shall , subject to be entitled in respect of property in respect of which he dies intestate to the same share as son (www.ilo.org/hindu-women-right-to-property-act).

●**The Dissolution of the Muslim Marriage Act-1939**: An act to clarify the provisions of Muslim law relating to suits for dissolution of marriage by women married under Muslim law and to remove doubts as to the effect of the renunciation of Islam by a married Muslim woman on her marriage tie. A woman married under Muslim law shall be entitled to obtain a decree for the dissolution of her marriage. This act extends to the whole India except the state of Jammu and Kashmir (www.chdslsa.gov.in/dissolution-of-muslim-marriage-act).

Initiatives taken by Government for Empowerment of women after Independence:

Schemes launched in between 1950-1960:

▶ **Condensed Courses of Education for women-1958:** The scheme was initiated by central social welfare board in 1958 to cater the needs of adult girls/ women who could not join mainstream education system or were school dropouts. The scheme aims to provide educational opportunities to girls/ women above the age of 15 years along with additional inputs of skill development

(www.wcd.nic.in/condensed-courses-of-education-for-women).

Schemes launched in between 1961-1970:

- **Short Stay Homes for Women and Girls – 1969:** The scheme was launched in 1969 and is presently operating in almost all the states and Union Territories. It provide temporary sanctuary to those women and girls, who are facing moral danger due to family problems, mental strains, violence at home, social ostracism, exploitation and other causes. The scheme provides a package of facilities of medical care, psychiatric treatment, case work services, occupational therapy, educational –cum-vocational training etc(www.wbsc.gov.in>schemes>ssh).

Schemes launched in between 1971-1980:

- ▶ **Working Women Hostels – 1972:** This scheme was launched in 1972 by Ministry of Women and Child Developmentand revamped in 6 April 2017. It aims to extend availability of safe and conveniently located accommodation for working women, with day care facility for their children in urban, semi urban, and rural areas where job and learning opportunity exists for women. The scheme extends safe and inexpensive accommodation which is a 'Home away from Home' for working women of lower income groups for a period of 5 year (Amose*et al*., 2017)

- ▶ **Integrated Child Development Scheme (ICDS) – 1975:** This scheme was launched in1975. This is one of the world's largest programme providing an integrated package of services for the holistic development of children's and women. Services under ICDS provides a package of six services viz. Immunization, Health check-up, Referral services and these three services are provided through National Health Mission & Public health infrastructure and the other three services- Nutrition & health education, Pre- schooling, Supplementary nutrition are provided at Anganwadi centres through Anganwadi workers (Mishra, 2017).

Schemes launched in between 1981-1990:

- ▶ **Development of Women and Child in Rural Areas (DWCRA):** This scheme was launched in 1982 as a sub component of Integrated Rural Development Programme (IRDP) by Department of Rural Development. DWCRA was merged in Swarnjayanti Gram SwarojgarYojana on 1 April 1999 to improve the living condition of women and child in rural area through the provision of opportunities for self- employment

(www.agropedia.iitk.ac.in>contents> DWCRA)

▶ **Swawlamban (Training-cum-Employment Programme for Women) – 1982-83:** The scheme was launched in 1982-83 with assistance from the Norwegian Agency for Development Corporation (NORAD). NORAD assistance was availed till 1996 – 97 after which the programme is being run with Government of India funds with the aim to provide skill training to women to facilitate them to obtain employment or self-employment on sustained basis in traditional and non- traditional trades.

In order to ensure more effective implementation and for better monitoring/evaluation of the scheme, it has been transferred to the State governments from 1st April 2006 with the approval of Planning Commission (Mishra, 2017)

▶ **Support to Training and Employment Programme for Women (STEP):** The scheme was launched in 1987 and relaunched in 2001 and then again revamped in 2014. This programme seeks to provide skills and new knowledge to poor women in the traditional sector. Under this programme, women beneficiaries are organized into viable and cohesive groups or cooperatives. A comprehensive package of services

such as health care, elementary education, crèche facility, market linkages, etc. is provided besides access to credit (Saini, 2017).

▶ **MahilaSamakhya (Education for women's equality) -1989:** The scheme was launched in 1989. The scheme was initially implemented in only 3 states (Uttar Pradesh, Gujarat, Karnataka) later extends to 9 states (Andhra Pradesh, Assam, Uttar Pradesh, Bihar, Gujarat, Jharkhand, Karnataka, Kerala, Uttaranchal. In 2006-07 the scheme was expand to two more states (Madhya Pradesh and Chhattisgarh), with the objective of enhancing the self-image and self-confidence of women and to create an environment where women can seek knowledge and information and empower them to play a positive role in their own development and that of society (Agnihotri *et al*., 2017a)

▶ **Priyadarshini Yojana -1989:** The scheme was launched in 1989. The Programme aims at holistic empowerment (economic and social) of vulnerable groups of women and adolescent girls in the project area through the formation of women's Self Help Groups (SHGs) and promotion of improved livelihood opportunities. Over 1,00,000 households are to be covered under the project and 7,200 SHGs will be formed during the project period

ending 2016-17. Though the focus of the project is on livelihood enhancement, the beneficiaries will be empowered to address their, political, legal and health problem issues through rigorous capacity building (Devi, 2013)

Schemes launched in between 1991-2000:

▶ **Stree Shakti Purushkar (Women Power Award**): This programme was started in 1991.This is a series of Indian National Honours for women for their exceptional achievements. The award is conferred by president on the occasion of international women's day to women, the award is named after eminent women in Indian history, and is given in the following categories:Devi Ahilya Bai Holkar award, Rani Lakshmi Bai award, Kannagi award, Rani GaidnliuZeliang award, Mata Jija Bai award, and Rani Rudrama Devi award, has been added from the year 2007 (www.wcd.nic.in/SSP)

▶ **The National Commission for women (NCW):** This was set up in 1992 and has a mandate to safeguard the rights and interests of women.
The commission takes suo-moto action in matters relating to

- Deprivation of women's rights.
- Non-implementation of laws.
- Non-compliance of policy decisions.

- Guidelines or instructions aimed at mitigating hardships to women.
- Taking up issues arising out of such matters with appropriate authorities(www.gktoday.in>NCW)

▶ **RashtriyaMahilaKosh (National Credit Fund for Women) -1993:** This is a national level organisation established in 1993 as an autonomous body for socio- economic empowerment of women through multi prolonged efforts. The micro finance services under RMK is provided through a client friendly and hasslefree loaning mechanism for livelihood activities, housing needs, family needs etc. with a motive to uplift the economic status of poor women. It is also known as National Credit Fund for Women as it provides financial assistance to poor women to meet their needs (Saini, 2017).

▶ **MahilaSamridhiYojana (MSY)-1993:** This scheme was launched on 2nd October 1993, under this scheme the rural women of 18 years or above age can open their saving account in the rural post office of their own area with a minimum 4 or its multiplier. On the amount not withdrawn for 1 year, 25 per cent of the deposited amount is given to the depositor by the government in the form of encouragement amount for empowering rural women through building thrift habit, self- reliance

and confidence (www.agriinfo.in/mahila-samridhi-yojna)

▶ **National Maternity Benefit Scheme (NMBS) -1995:** This scheme was launched in 1995 by Ministry of women and child development. In NMBS the pregnant women from poor family who are below poverty line are given financial assistance for pre and post pregnancy care. Every pregnant women will get 500 per pregnancy and for first two deliver women is eligible for the benefits of scheme (www.govinfo.me/national-maternity-benefit-scheme).

Indira MahilaYojana (IMY) -1995: The scheme was launched in 1995 and was recast as Swayamsidha in 2001 with the long term objective of the scheme is to achieve an all-round empowerment of women, especially socially and economically by ensuring their direct access to, and control over, resources through a sustained process of mobilization and convergence of all ongoing sectoral programmes (www.wcd.nic.in>schemes-listing)

▶ **BalikaSamriddhiYojna -1997:** The scheme was launched in 1997 and the scheme was revamped in 2000 for the survival of the girl child, her education and with a view to ensure that she is not married before the age of 18. The scheme visualizes a cash

deposit in the joint name of a girl child born in a BPL family and an ICDS functionary, as well as subsequent scholarships to be paid as the girl continues to receive her education (www.wcd.nic.in>schemes-listing).

▶ **Reproductive and Child Health Programme (RCH) – 1997:** This scheme was launched in October 1997. The main aim of the programme is to reduce infant, child and maternal mortality rates or to improve the implementation and management of policy by using a participatory planning approach and strengthening institutions to maximum utilization of the project resources (www.wcd.nic.in>schemes-listing).

▶ **Rural Women's Development and Empowerment Project (RWDEP):** The scheme was launched in 1997 for a period of five years (1997–2002) with assistance from IDA and IFAD in 6 states (Uttar Pradesh, Madhya Pradesh, Bihar, Haryana, Karnataka and Gujarat) with the objective of strengthening the processes for creating an enabling environment for empowerment of women through-

• Establishment of self-reliant women's Self-Help-Groups (SHGs) having 15-20 members each, which will improve the quality of their

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lives, through greater access to, and control over, resources.

- Sensitising and strengthening the institutional capacity of support agencies to pro-actively address women's needs.

▶ **Swa Shakti:** The project was launched in October, 1999 and culminated on 30th June, 2005. This is a jointly funded project by International Fund for Agriculture Development (IFAD), World Bank and the Government of India. The project was conceived as a Pilot Project implemented in 335 blocks of 57 districts in 9 states. The project established 17,647 SHGs covering about 2, 44,000 women to bring out socio-economic development and empowerment of women through promotion of women SHGs, micro credit and income generating activities (Agnihotri *et al*., 2017a).

Schemes launched in between 2001-2018:

▶ **Kishori Shakti Yojna (KSY)** – This scheme was launched in 2000-01 by ministry of women and child development.The scheme aims to empower adolescent girlsof 11-18 years of age with focus on out of school girls(www.wcd.nic.in/kishori-shakti-yojana).

▶ **SwadharGreh:** The scheme was launched in 2001,to provide temporary accommodation, maintenance and rehabilitative services to women and girls rendered homeless due to family discord, crime, violence, mental stress, social ostracism to enable them to start their life as fresh with dignity and conviction (Agnihotri *et al*., 2017a)

▶ **Swayamsidha:** The scheme was launched in February, 2001 and culminated in March, 2007. This was an integrated scheme for women empowerment through formation of Self Help Groups (SHGs). The programme was implemented in 650 blocks of the country and 67971 women SHGs have been formed benefiting 9, 89,485 beneficiaries.

Objective:

- Holistic empowerment of women through a sustained process of mobilization and convergence of all the ongoing sectoral programmes by improving access of women to micro-credit, economic resources, etc.

- The Scheme had been able to provide a forum for women empowerment, collective reflection and united action(Devi, 2013).

▶ **National Programme for Education of Girls at Elementary level (NPEGEL) -2003 :** The scheme was launched in 2003 as an integral but distinct component of

SarvShikshaAbhiyan by Department of Education, Ministry of Human Resource Development to reduce students dropouts by giving special attention to weak girls. Formed group from villages will be follow up/supervision on girl's enrolment, attendance. It provides additional provisions for enhancing the provisions of under-privileged/ disadvantaged girls at elementary level through more intense community mobilization, the development of model schools in clusters, gender sensitization of teachers, development of gender sensitive learning materials, early child care and education facilities and provisions of need based incentives like escorts, stationery, workbooks and uniform etc. for girls. For 2006-07coverage has been expanded to 38748 clusters in 3122 blocks. All educationally backward blocks have been included under the programme (National Report on "A World Fit for Children" 2007).

► **Kasturba Gandhi Balika Vidhyalaya:** This was launched in 2004 by Department of Education, Ministry of Human Resource Development designed to encourage greater participation of girls in education at upper primary level. Under the Scheme 1180 residential schools at upper primary level have been sanctioned for girls belonging predominantly to SC/ST /OBC and Minority communities in educationally backward blocks with higher gender gaps and low female literacy. A minimum of three -fourth of the seats are reserved providing uniforms for the girls from marginalized or minority communities and the remaining are for girls from families below the poverty line.(National Report on "A World Fit for Children" 2007)

► **Janani Suraksha Yojna (Mother Security Scheme) - 2005:** This scheme was launched on 12 April 2005 with the objective of reducing maternal and infant mortality by promoting institutional delivery among pregnant women (www.wcd.nic.in>schemes-listing).

► **Rajiv Gandhi National Crèche Scheme for Children's of Working Mothers** : This scheme was launched in 2006 for providing a nursery where babies and young children (0-6 Years) are cared for during the working day. Employment of women has resulted in increased opportunities for their employment and more women are now working within or outside their homes (www.wcd.nic.in>schemes-listing).

► **Ujjawala:** This scheme was launched on 4 December, 2007 and

is being implemented mainly through NGOs. "Comprehensive Scheme for Prevention of Trafficking for Rescue, Rehabilitation and Re-Integration of Victims of Trafficking for Commercial Sexual Exploitation-Ujjawala".

- The Scheme has five components—Prevention, Rescue, Rehabilitation, Re-Integration and Repatriation of trafficked victims for commercial sexual exploitation (www.wcd.nic.in> schemes-listing).

▶ **Dhanlakshmi - 2008 :** The ministry of women and child development launched Dhanlakshmi" a conditional cash transfer scheme for girl child with insurance cover on a pilot basis in march 2008 to reduce the amount of female infanticide cases in the country , offer insurance and an education incentive. Under this scheme, cash trasfers are made to the family of the girl childpreferably to the mother (www.eklavya.com/dhanlakshmi).

▶ **Mother and Child Tracking System (MCTS):** This project was first launched in 2009 and then relaunched in 29 June 2016 and currently covers all states of India. MCTS is a centralised web- based application that helps tracks beneficiaries (pregnant women and children up to 5 year of age) and

monitors maternal and child health service delivery (www.ijph.in> article)

▶ **National Mission for Empowerment of Women:** The mission was launched in 2010for empowering women holistically by coordinated assessment of current Government interventions and aligning future programmes so as to translate the National Policy on Empowerment of Women (NPEW) prescriptions into reality (Mokta, 2014).

▶ **Indira Gandhi Matritva Sahyog Yojana (Conditional Maternity Benefit Plan):** This scheme was launched on October 2010 by the Ministry of Women and Child Development and presently it is known as Pradhan Mantri Matru Vandana Yojana. It is a conditional cash transfer scheme for pregnant and lactating women's to contribute to the better environment by providing cash incentives for improved health and nutrition (www.wcd.nic.in>schemes-listing)

▶ **Rajiv Gandhi Scheme for Empowerment of Adolescent Girls (Sabla):**The Sabla scheme was launched in year 2011. It aims at covering all out-of-school Adolescent Girls in the age group of 11 to 18 years who would assemble at the Anganwadi Centre on a fixed

day at regular interval. The others, i.e., school-going girls, meet at the AWC at least twice a month, and more frequently (once a week) during vacations/holidays. Here they receive life skills education, nutrition and health education, awareness about socio-legal issues, etc. This provides an opportunity for mixed group interaction between school-going and out-of-school girls, motivating the latter to also join school and help the school going to receive the life skills. This scheme mainly aims at reducing the dropout rate of Adolescent Girls by increasing their literacy rate and work participation (Saini, 2017)

▶ **NaiRoshini-** for women empowerment Ministry of minority affairs started "NaiRoshini", a leadership development programme for minority women in 2012-113 to empower and instil confidence among minority women, including their neighbours from other communities living in the same village/ locality, by providing knowledge, tools and techniques for interacting with government systems, banks and other institutions at all levels (www.nairoshini-moma.gov.in)

▶ **Beti Bachao Beti Padhao (Save girl child, Educate girl child):** The scheme was launched on 22 January 2015. This was a tri-ministerial effort of Ministry of women and child development, Ministry of Health & Family welfare and Ministry of Human Resource Development to generate awareness and improve the efficiency of welfare services meant for girls also, it aims to celebrate the Girl Child & Enable her Education. This scheme is being implemented through a national campaign and focused multi-sectoral action in 100 selected districts low in CSR(child sex ratio), covering all States and UTs with the aim to prevent sex- selective abortion, to ensure survival and protection of girl child and to ensure education of the girl child (www.wcd.nic.in>schemes-listing)

▶ **One Stop Centre (Sakhi):** This scheme was launched on 1 April 2015. To provide support and assistance to women affected by violence both in private and public places within the family, community and at the workplace. This scheme facilitates access to an integrated range of services including medical, legal, and psychological support (www.wcd.nic.in>schemes-listing).

▶ **Women Helpline Scheme:** The scheme was launched on 1 April 2015, in order to provide toll free 24-hour telecom service to women affected by violence seeking support and information, to help crisis and non- crisis intervention through

referral to the appropriate agencies such as police/ hospitals/ ambulance services/ district legal service authority/ protection officer and to provide information about the appropriate support services, government schemes available to the women affected by violence (www.wcd.nic.in>schemes-listing).

▸ **Mahila-E- Haat:** This scheme was launched in 7 march 2016 to strengthen financial inclusion of women entrepreneurship the economy by providing continues sustenance and support to their creativity

Objective:

- This is an initiative for meeting needs of women entrepreneur.
- This startupRahtriyaMahilaKosh website leverages technology for showcasing products made/ manufactured/ sold by women entrepreneur.
- They can even show their services of their creative potential. This unique e-platform will strengthen the socio-economic empowerment of women.
- To act as a catalyst by providing a web based marketing platform to the women entrepreneurs to directly sell their products.
- To support "Make InIndia" through online marketing platform (www.wcd.nic.in/schemes/mahila-e-haat).

Issues to be Tackled for Women Empowerment: Majority of Women in India are poor, uneducated and insufficiently trained. They often end up in the daily struggle of managing an ill equipped family and are not in a position to propel out themselves of the oppressive and regressive socio-economic conditions. Although lots of things are happening and large amount of resources are being spent in the name of women empowerment in India, the actual situation however, just remains the same and in many instances worsens further. The following are some of the important issues to be tackled for women's empowerment and gender equality in India.

▸ Eliminating gender differences in access to education for attaining gender equality and reducing the disempowerment of women.

▸ Child marriage, which is still prevalent in our society, must be stopped. This is because an early age at marriage of women is an indicator of the low status of women in society.

▸ A woman needs to be physically healthy so that she is able to take challenges of equality. Women must have access to comprehensive, affordable and quality health care.

▸ Employment, particularly for cash and in the formal sector, can empower women by providing financial independence. Women should be provided with proper wages and work

at par with men so as to elevate their status in the society.

▶ Violence against women must be eradicated from the society. Apart from strict laws and legislations, the violence against women can only be tackled through a change in attitude that needs to take place in the family, in the society and the female members of the society as well.

▶ Women's political participation has been considered a major measure of women's empowerment. Women's representation in the legislature is very poor in India. Hence, necessary measures should be taken to increase women's representation in Lok Sabha, Rajya Sabha, State Assemblies and State Councils.

▶ Moreover, women's empowerment cannot take place unless women come together and decide to self-empower themselves. Women should come together as a unifying force and initiate self-empowering actions at the ground level (Devi, 2014).

Advantages of women empowerment are:

- Raising self-esteem and self-confidence of women.
- Elimination of discrimination and all forms of violence against women and girl child.

- Building and strengthening partnership with civil society particularly women's organisations.
- Enforcement of constitutional and legal provisions and safeguarding rights of women.
- Building a positive image of women in the society and recognising their contributions in social, economic and political sphere.
- Developing ability among women to think critically.
- Fostering decision-making and collective action.
- Enabling women to make informed choices.
- Ensuring women's participation in all walks of life.
- Providing information, knowledge, skills for self-employment (Mokta, 2014).

Constraints In women Empowerment:

- Lack of education.
- Lack of freedom to take decisions. Overburdened with dual responsibilities (household and economic activities).
- Lack of proper training.
- Lack of social mobility.
- Ego problems of men folk. Caste system in the village.
- Family restrictions- a) husband b) elder
- Doubts regarding the women's capabilities.

- Confining the role of women to household activities.
- Income derived is too little
- Lack of knowledge and skill (Devi, 2013)

REFERENCES:

Agnihotri, R. R. and Malipatil, K. S. 2017. A study on women empowerment schemes in India. *International Journal of Development Research* **7**(8): 14301-14308.a

Agnihotri, R. R., Malipatil, K. S. and Urukundappa, M. 2017. A study on women empowerment programmes in karnataka state- A Theoretical Overview. *International Journal of Scientific and Research Publications* **7**(1): 293-298.b

Amose, T. and Jeyakumar, K. R.2017 Outcome of schemes on women empowerment in India. *Imperial Journal of Interdisciplinary Research* **3**(2):435-442.

Chakravarty, S., Kumar, A. and Jha, A. N. 2013. Women's empowerment in India: Issues, Challenges and Future Directions. *International Review of Social Sciences and Humanities* **5**(1): 154-163.

Devi, R. U. 2013. An evaluative study on empowerment of women In India. *International Journal of Innovative Research and Development* **2**(8): 245-255.

Devi, T. R. 2014. Gender equality: women empowerment. *Global Journal for Research Analysis* **3**(11): 141-143.

Hoshemi, S. M., Schuler, S. R. and Riley, A. P. 1996. Rural credit programs and women's empowermentin Bangladesh. *World development* **24**(4): 635-653.

Mishra, K. N. 2017. Women empowerment through government policies and programmes: An Indian perspective. *National Journal of Multidisciplinary Research and Development* **2**(2): 164-167.

Mokta, M. 2014. Empowerment of women in India a critical analysis. *Indian Journal of Public Administration* **3**: 473-488

National Report on "A World Fit for Children". 2007. pp 1-24.

National Policy for Women .2016. Articulating a vision for empowerment of Women, Government of India, Ministry of women and child development.1-22.

Pillai, J. K.1995. Women and empowerment. Gyan Publishers House, New Delhi.

Saini, A. 2017. Women Empowerment. *International Journal of Scientific Research and Management* 5(9): 7154-7162.

Shettar, R. M. 2015. A study on Issues and Challenges of women empowerment in India. *IOSR Journal of Business and Management* **17**(4): 13-19.

Singh, A. K., Singh, L. and Burman, R. R. 2016. Dimensions of agricultural extension. pp-367.

Subhashini, S. 2018. A theoretical study on issues and challenges of women empowerment in India. *International Research Journal of Engineering and Technology* **5**(4): 2688-2691.

RESEARCH ARTICLE

Perception of Students about Agricultural School Level Education

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ABSTRACT

Lower agricultural education is imparting middle level agricultural education through Agriculture Technical Schools. In view to know perception of students towards agriculture school education, the study was undertaken in the Agriculture Technical schools, Sawangi, Dist-Nagpur. First and second year students were purposively selected for study, however 67 students responded. The findings of study revealed that 94.03 per cent respondents expressed their positive perception toward selecting this course, this is followed by to secure knowledge about improved agriculture technology, however majority of respondents 91.04 percent perceive to have strong foundation for higher education in agriculture, 'increasing scope for agriculture' (86.57%), 'secondary Agriculture Technical schools enables students develop skills necessary for self-reliance and self-employment' (85.07%), 'learning in agriculture helps students develop a positive attitude towards farming' (83.58%), 'liking for the subject' (80.60%), 'learning agriculture helps students to contribute to economic development in the community' (79.10%) , 'basic requirement for input dealers licenses' (77.61%), 'guarantee of job/ service' (61.19%), 'scope for direct third year admission to agriculture polytechnic' (58.21%), desire of parents' (55.22%), 'rural family background' (52.24%), farming is traditional occupation of family' (46.27%), 'other discipline do not have scope in future' (37.31%), 'no alternative for next education' (35.82%), 'poor economic condition' (29.85%), 'agriculture subject to easy to understand' (28.36%), 'availability of courses nearer to home (26.87%) and relatives are studying in agriculture colleges or are degree holder. The finding concluded that students undergoing agriculture course had selected this course out of conviction about its utility. Obviously these students could become the spokesmen of new agriculture technology for their respective village.

Keywords : Agricultural Technical School, Technology, Education, Entrepreneurand Input Dealers,

INTRODUCTION

The Indian economy largely depends upon the agriculture sector. Agriculture and its allied activities act as main source of livelihood for more than 80 percent population of rural India. It provides employment to approximately 52 percent of labour. Its contribution to Gross Domestic product (GDP) is between 14 to 15 percent. India today is self-sufficient in most of the food grain despite population increase. The food grain production in India increased from 51 million tons in 1950 to about 245 million tons in 2011-12. This growth in itself represents a remarkable achievement in the history of world agriculture. India has achieved significant growth in agriculture, milk, fish, oilseeds and fruits and vegetables owing to green, white, blue and yellow revolutions. All these revolutions have brought prosperity for the farmers. Many factors are responsible for these achievement viz. conducivegovernment policies, receptivity of the farmers and also establishment of higher agricultural education institutions.Agricultural human resource development is a continuous process undertaken by agricultural universities. The universities need to impart the need based and skill based education so that the well trained and educated human resources will be useful for the purpose of research and extension in this sector.

Dr. Panjabrao Deshmukh Krishi Vidyapeeth, Akola Agriculture University, located at Akola District of Maharashtra State. The University is entrusted with the responsibility of Agricultural Education, Research and Extension Education. TheUniversity impart Agricultural Education from the post matriculation diploma course to the doctor of philosophy level for the students. The post matriculation diploma course i.e. Lower Agricultural Education is the basic foundation course for the students of the rural or urban area, who are willing to grab knowledge about basic agriculture or who wanted to be an agriculturist. The course curriculum is designed with a view that admitted students will have through basic agricultural knowledge.InUniversity running this diploma course through its 9 Agricultural Technical Schools located in 11 districts of Vidarbha region. These students can also be good extension workers for their village, as these students can act as a bridge between the universities and the farming community. So it was felt necessary to study the profile of the agricultural students and to study the perception of these students towards the post matriculate diploma course.

METHODOLOGY:

The present study was undertaken at Agricultural Technical School, Sawangi of Nagpur, District during the year 2015-16.Overall 120 students were enrolled for the two year diploma course at the school. A total of 67 students randomly selected from the school. The data were collected with the help of well-structuredinterview schedule. Before actual investigation for data collection the interview schedule was pre-tested checkedtabulated and analysedwith the help of frequencies, percentage, mean and standard deviation.

RESULTS AND DISCUSSION:

Table 1: Socio-economic and personal characteristics

Sr. No.	Particulars	Frequency	Per cent [N=67]
Native			
1	Rural area	46	68.66
2	Urban area	6	08.96
3	Semi-urban	15	22.39
Gender			
1	Male	39	58.20
2	Female	28	41.80
Academic Performance			
1	75 per cent and above	37	55.22
2	60.00 to 74.99 per cent	20	29.85
3	Below 60.00 per cent	10	14.93
Age			
1	Up to 18	38	56.71
2	19 and above	29	43.29
Family Education			
A	**Father**		
1	Primary School	12	17.91
2	Middle School	4	05.97
3	High School	26	38.81
4	College	25	37.31
B	**Mother**		
1	Primary School	12	17.91
2	Middle School	7	10.45

3	High School	33	49.25
4	College	15	22.39
Family Type			
1	Joint	13	19.40
2	Nuclear	54	80.60
Land Holding			
1	Land Holding		
2	Marginal (Upto 1.00 ha)	10	14.93
3	Small (1.01 to 2.00 ha)	6	08.96
4	Medium (2.01 to 10 ha)	40	59.70
5	Large (Above 10.00 ha)	4	05.97

I.   Socio-economic and personal characteristics of the respondents:

It was observed from the Table, 1 that majority of the students i.e. 68.66 per cent were had rural background followed by 22.39 per cent respondents belonged to semi urban area while very few respondents i.e. 8.96 per cent represented urban area. It was evident from the Table, 1 that majority of the admitted students i.e. 58.20 per cent (39 from 67) were the male students while 41.80 per cent were the girl students, admitted for the two year diploma course. More than half of the students i.e. 55.22 per cent students represented more than 75.00 per cent marks category in Secondary School Certificate (SSC) examination followed by 29.85 per cent and 14.93 per cent students in 60.00 to 74.99per cent and below 60.00per cent marks in SSC examination respectively.The data given in Table, 1 revealed that more than half of the respondents i.e. 56.71 per cent

admitted students were from the below are group of 18 while remaining i.e. 43.29 per cent were above the 18 age group. This was observed may be due to majority of the admitted students were belong to rural area this students had may completed some other course earlier and joined the diploma course afterwards. Table,1 depicted the family educational level of the respondents.It was noticed from the Table,1 that Father and Mother of all the respondents were had minimum primary school level education and above, none of the respondent's parents was observed Illiterate. High School Level Education i.e. 38.81 per cent for Father and 49.25 per cent for Mother was noticed for the parents of the respondents. Majority i.e. 80.60 per cent respondents represented nuclear type family while remaining 19.40 were belonged to the joint type family. Majority of the respondents i.e. 59.70 per cent had medium land holding followed by 14.93

per cent respondents were had marginal land holding while 10.45 per cent of respondents were belonged to the landless category.These findings are in line with the results reported by Kulkarni et al. (2009) and Dhakre (2004).

Table 2.Distribution of Respondents according to reasons for selecting Agriculture Education

Sr. No.	Reasons	Frequency	Percent [N=67]
1	To gainknowledge about improved agriculture Technology	63	94.03
2	To have strong foundation for higher education in agriculture	62	92.54
3	Increasing scope for agriculture sector	58	86.57
4	Secondary school agriculture enables students develop skills necessary for self-reliance and self-employment	57	85.07
5	Learning agriculture helps students develop a positive attitude towards Farming	56	83.58
6	Liking for the subject	54	80.60
7	Basic requirement for input dealers licenses	52	77.61
8	Guarantee of job/service in agriculture education	41	61.19
9	Scope for direct third year admission to agriculture polytechnic	39	58.21
10	Desire of parents	37	55.22
11	Rural family background	35	52.24
12	Farming is traditional occupation of family	31	46.27
13	No Alternative for next education	24	35.82
14	Poor economic condition	20	29.85
15	Agriculture subject to easy to understand	19	28.36
16	Availability of course nearer to home	18	26.87
17	Relative are studying in agriculture college or are degree holder	18	26.87

II. Reasons narrated by admitted students behind their admission for the course curriculum:

Efforts were made to trace the reasons behind selecting the agricultural education by the admitted students. The reasons given by the students were depicted in the Table 2. Students were had varied reasons behind selecting this course curriculum 94.03 per cent students were reported that the aim behind selecting this course was to gain more

knowledge about the improved crop cultivation practices, and to get aware about the recent researches in the field of agriculture. 92.54 per cent of the students supposed that lower agriculture education was the foundation course to have higher education in the agriculture field. The 86.57 per cent students believed that agriculture sector had wide scope in future. These students had opinion that this sector provides them more opportunity for service in the future. 85.07 per cent of the students expressed that they can start small scale business enterprise, small scale cottage industry after completion of the course. 83.58 per cent students observed that this course curriculum developed positive attitude towards farming sector. Nearly 80.60 per cent students had interested towards agricultural education and this was the reason behind they had opted this course.

Government of India had made it compulsory to have agricultural education if someone one wants to set up Krishi Seva Kendra (Agricultural Input Dealer). The motive behind this move was the farmers could get proper information and quality seed and other material from these input dealers. 77.61 per cent students'secured admission to this course with aimed to have agricultural input dealer in near future 61.19 per cent student's feels that this sector has vast employment opportunities. This may be due to the grass root level extension

functionaries working in rural area.It may be GramSevak, Talathi, Patwari and Agricultural Assistant etc. all had agricultural background. These functionaries could have regular contact with the family member of the students or students themselves this could be created impact to have agricultural education.

All the four Agricultural Universities of Maharashtra had made decision those students who completed three year diploma course successfully will secure admission to direct B.Sc (Agri) 2nd year. This was expressed by 58.91 per cent students. While 55.22 per cent and 52.24 per cent students had choose this course due to their parents desire and they are belonging to rural background area respectively.29.85 per cent and 28.36 per cent students were had admission to lower agricultural education due to the poor economic condition of the family and this educational was comparatively easier to understand from the other courses respectively. The findings of Patil*et al* (2002), Sharma et al (2012) and Sonawane*et al* (2002) were in the same line of the present findings.

CONCLUSION

From the above discussions it is concluded that the majority of the students were from rural area, belonging to the male category and below the age group of 18 years. Parents of all the respondents had quite satisfactory

educational level none of the parent of the students were illiterate. Majority of the students wanted to gain more knowledge about improved technology they secure admission with an aim to have bright future in the government sector or have other opportunities in private sector or to have subsidiary business activities within village its leads to additional income generation.

REFERNCES

Dhakre D.S. (2014). Aspiration of Agriculture Students towards Agriculture Enterprise in West Bengal: A Case Study. *Indian Res. J. Ext. Edu.* 14 (1), 64-67

Kulkarni, M. V. and Katare, P. M. (2009).A Study on preferences towards Agri Enterprises of Agriculture School Students of Marathwada Region.*The Andhra Agric. J.,* 56 (2), 247-250.

Patil, R. P. and Palande, R. S. (2002). Training needs of farm women in Agri business management Abstract, National Seminar on "Entrepreneurship Development" in March 2-3, 2003, organized by Maharashtra Society of Extension Education at M.A.U. Parbhani.

Sharma, Ramakant; S.K. Sharma and A.K. Sharma (2012).Attitude of Farmers towards KisanMandals and KisanSeva Kendra.*Indian Res. J. Ext. Edu.* 12 (2) , 38-42.

Sonawane S. N., Mahale P. K. and et.al. (2002). Preferences of post graduate girl student of MPKV, Rahuri in Agri-Enterprises: Abstract, National Seminar on entreneurship development in agriculture, March 2-3, 2003 organized by Maharashtra Society of Extension Education at M.A.U. Parbhani. 47

RESEARCH ARTICLE

Association between Profile of Buffalo Owners with their level of Knowledge and extent of Adoption of Dairy Management Practices

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ABSTRACT

Gujarat has around 4.43 per cent of cattle and 9.09 per cent of buffalo population of the country. Gujarat is considered as pivotal state in milk production and marketing in India on co-operative dairy system. It contributed around 10.315 million tonnes (7.65 per cent) of milk to the total milk pool of India and during 2015-16 per capita milk availability was 545gms/day. The present study was conducted in surat district of south Gujarat. In all 60 buffalo owners will be selected as respondents. Ex-post facto research design was used. Thirteen independent and two dependent variables were chosen. In light of the objectives, the interview schedule was prepared and respondents were interviewed at their home and field. The collected data were analyzed by using percentage, mean, standard deviation, rank and correlation coefficient (*r*).

Keywords- Milk, Marketing, correlation coefficient and Ex-post facto research

INTRODUCTION

India is agrarian country and the livestock becomes a supportive enterprise to Agriculture. India contributes with 57.00 per cent World buffalo population and by milk is 55.00 per cent. Animal Husbandry plays a prominent role in supplementing the income of rural households; particularly the landless, small and marginal farmers.According to 19th livestock census, the livestock sector alone contributes nearly 25.60 per cent of value of output at current prices of total value of output in Agriculture, Fishing & Forestry sector. The overall contribution of Livestock Sector in total GDP is nearly 4.11 per cent. Livestock contribute 24.00 per cent to Agriculture GDP and the livestock population was about 3.69 crore and density was about 120/sq.km. Milk production in India was about 116.2 million tonnes. Milk production in India

during 2016-17 was 144.3 million tonnes and growth rate was 4.26 per cent. The buffalo's population contributes 21.23 per cent of the total livestock population and *i.e.* total number of female buffalo is 108.7 million numbers in 2012.Gujarat has around 4.43 per cent of cattle and 9.09 per cent of buffalo population of the country. Gujarat is considered as pivotal state in milk production and marketing in India on co-operative dairy system. It contributed around 10.315 million tonnes (7.65 per cent) of milk to the total milk pool of India and during 2015-16 per capita milk availability was 545gms/day.Surat district possesses nine talukas namely Choryasi, Palsana, Kamrej, Bardoli, Olpad, Mangrol, Mandvi, Mahuva and Umarpada. This district is spread over an area of 4327 sq. km and has 761 villages. In the year of 2016, cattle and buffalo population of Surat district was 268730 and 246600, respectively. This district contributed around 49, 56, 16,679 Kilo milk of milk during 2016-17. Due to the various schemes of Government of Gujarat for dairy development in rural area and subsidies extended for purchase of animals, rearing of crossbred heifers, conducting competition of crossbred heifers and distribution of fodder mini kits, etc., this district has taken stride in enhancing milk production.

METHODOLOGY

The south Gujarat region consists of seven District viz., Narmada, Bharuch, Surat, Tapi, Navsari, Valsad and The Dangs. Under this investigation Surat district was be selected for present investigation and from that two talukas will be selected on the highest of milk production. Five villages will be selected from each Taluka in this way ten village and ten buffalo owners will be randomly selected from those villages. The list of respondents will be obtained from respective milk cooperative society working under SUMUL Dairy. In all 100 buffalo owners will be selected as respondents. Ex-post facto research design was used. Thirteen independent and two dependent variables were chosen. In light of the objectives, the interview schedule was prepared and respondents were interviewed at their home and field. The collected data were analyzed by using percentage, mean, standard deviation, rank and correlation coefficient (*r*). **(Kumawat and Yadav, 2016).**

RESULTS AND DISCUSSION

Table: 1 Associateciation between personal profile of buffalo owners and their level of knowledge (n=60)

Sr.	Variables	'r' value
1	Age	-0.29173 NS
2	Education	0.54309 **
3	Occupation	0.13876 NS
4	Type of family	-0.06036 NS
5	Land holding	0.17869 NS
6	Marital status	-0.23785 NS
7	Annual income	0.41169 **
8	Social participation	0.49878 **
9	Extension contact	0.51593 **
10	Economic motivation	0.45365 **

NS= non-significant,   * = significant at 0.05 level,   **=significant at 0.01 level

Knowledge can be said as a product of education. Knowledge about subject is normally referred as an individual's "aware about or know how about". Considering the importance of level of knowledge the correlation coefficient were calculated with the personal profile of the buffalo owners and are furnished in table1

The data manifested in table 1 revealed that the education (0.54309**), annual income (0.41169**), social participation (0.49878**), extension contact (0.51593**) and economic motivation (0.45365**) were found positive and highly significant, while the age (-0.29173^{NS}), occupation (0.13876^{NS}), type of family (-0.06036^{NS}), land holding (0.17869^{NS}) and marital status (-0.23785^{NS}) were found found negative and non-significant relationship with level of knowledge.

Table 2 : Associateciation between personal profile of buffalo owners and their level of adoption (n=60)

Sr. no.	Variables	'r' value
1	Age	-0.08455 NS
2	Education	0.42564 **
3	Occupation	0.16410 NS
4	Type of family	0.15798 NS

5	Land holding	0.28106	**
6	Marital status	-0.09446	NS
7	Annual income	0.27542	**
8	Social participation	0.26790	**
9	Extension contact	0.43571	**
10	Economic motivation	0.45715	**

The data manifested in table 18 revealed that the education (0.42564**), Land holding (0.28106**), annual income (0.27542**), social participation (0.26790**), extension contact (0.43571**) and economic motivation (0.45715**) were found positive and highly significant, while the age (-0.08455[NS]), occupation (0.16410[NS]), type of family (0.15798[NS]) and marital status (-0.09446[NS]) were found found negative and non-significant relationship with level of adoption. **Panchbhai** *et al* **2017**

CONCLUSION

On the basis of findings of the study it may be concluded that the education, annual income , social participation , extension contact and economic motivation were found positive and highly significant with level of knowledge moreover the education, Land holding , annual income, social participation, extension contact and economic motivation were found positive and highly significant, while the age, occupation, type of family and marital status were found negative and non-significant relationship with level of adoption .

REFERENCES

Kumawat, R. and Yadav, J. P. (2016). Adoption of improved dairy husbandry practices by dairy farmers. *Indian Research Journal of Extension Education*, **12**(2): 225-228.

G.J. Panchbhai, M.F. Siddiqui2, M.N. Sawant, A.P. Verma and J. Parameswaranaik (2017) Correlation Analysis of Socio-Demographic Profile of Dairy Farmers with Knowledge and Adoption of Animal Husbandry Practices, *Int.J.Curr.Microbiol. App.Sci* (2017) 6(3): 1918-1925.

RESEARCH ARTICLE

Knowledge and Adoption of Organic Farming Practices Among the Farmers in Navsari District

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ABSTRACT

Organic farming system in India is not new and is being followed from ancient time. It is a method of farming system which primarily aimed at cultivating the land and raising crops in such a way, as to keep the soil alive and in good health by use of organic wastes (crop, animal and farm wastes, aquatic wastes) and other biological materials along with beneficial microbes (biofertilizers) to release nutrients to crops for increased sustainable production in an eco friendly pollution free environment. The present study was conducted in Navsari district of south Gujarat. In all 60 organic farmers was selected as respondents. Majority of the respondents (61.66 per cent) had medium knowledge level about organic farming and 21.67 and 16.66 per cent of them were found to have low and high knowledge level about organic farming and majority of the respondents (66.66 per cent) had medium adoption level about improved organic farming and 18.33 and 15.00 per cent of them were found to have high and low level of adoption about organic farming practices. Ex-post facto research design was used. In light of the objectives, the interview schedule was prepared and respondents were interviewed at their home and field. The collected data were analyzed by using percentage, mean, standard deviation, rank and correlation coefficient (r).

Keywords- Organic, bio-fertilizer, farming, correlation coefficient and Ex-post facto research

INTRODUCTION

Organic farming aims for human welfare without harming the environment and follows the principles of health, ecology, fairness and care for all including soil. The modern concept of organic farming combines the tradition, innovation and science. Although, history states that the movement for organic way of life recognized in 1905, it could gain

ground after realizing the ill effects of modern agriculture in the late 1990's. In 1905, the British botanist Sir Albert Howard, often referred to as the father of modern organic agriculture, documented traditional Indian farming practices and came to regard them as superior to conventional agriculture science.

The global concerns of safe foods have introduced the concept of organic farming. Badgley et al. (2006) showed organic food can fulfil the demands for food and sustain the environment. National Programme for Organic Production (NPOP) was launched in May 2000 with the objective of promoting organic farming in India leading to development of a movement among the farmers, agriculture experts and scientists in favour of organic farming.

India is one of the few geographical locations of the world where agriculture was initiated by aboriginals. Old farmers had developed understandings of natural laws, climate and available resources; India has great treasure of indigenous technological knowledge too. Organic farming has been designated for creating eco-friendly and pollution free environment. That creates ecological balance and microenvironment suitable for sound health and growth of soil micro flora, plants, animals and human beings who consume farm products (Fukuoka 1985, Thakur 1997 and Weekakoddy 1999). The principle of

organic cultivation is attracting farmer's world over due to its various advantages over modern agricultural practices. Essentially, it is a farming system which supports and strengthens biological processes without recourse to inorganic remedies such as chemicals or genetically modified organisms. Organic agriculture is productive and sustainable (Reganold et al., 1993; Letourneau and Goldstein, 2001; Mader et al., 2002). Many state-supported agencies, non-governmental organizations (NGOs) and individuals have started experimenting with organic methods of food production in the recent past

Organic farming is now a promising option due to the low external input cost forcultivation such as low fertilizer and low pesticide amounts by increasing the efficient use of farm resources (Ramesh, Singh & Subba, 2005). Knowledge has been found to be an important factor contributing to adoption of recommended practices by the farmers and farmers" attitude and skill also depend on knowledge. However, the empirical evidences on knowledge and attitude possessed on organic cultivation practices are much limited. Hence, assessment of farmer"s knowledge level, attitude and practices towards organic farming has become an important issue which needs to be explored.

METHODOLOGY

The south Gujarat region consists of seven District viz., Narmada, Bharuch, Surat, Tapi, Navsari, Valsad and The Dangs. Under this investigation Navsar district was selected for present investigation and from that three talukas namely Vansda, Chikhli and Jalalpore was selected on the highest number of individual organic farmer. Two villages were selected from each Taluka in this way six villages was randomly selected from those villages. In all 60 organic farmers was selected as respondents. Ex-post facto research design was used. Two variables were chosen. In light of the objectives, the interview schedule was prepared and respondents were interviewed at their home and field. The collected data were analyzed by using percentage, mean, standard deviation, rank and correlation coefficient (r).

RESULTS AND DISCUSSION

Table 1 Level of knowledge of organic farming practices (n=60)

Sr. No.	Categories	No.	Percentage
1	Low	10	16.66
2	Medium	37	61.66
3	High	13	21.67
	Total	**60**	**100**

Knowledge level of the respondents regarding organic farming practiceswas measured by asking various questions related to organic farming practicesViz., land preparation, crop rotation, use of organic input, green manuring, weed management, plant protection measure and storage and marketing. Then with the help of mean and standard deviation the respondents were categorized as low (Below X - S.D.), medium (X ± S.D.) and high (Above X + S.D.) with respect to their knowledge level for various practices of organic farming.

The data presented in Table 1 indicated that majority of the respondents (61.66 per cent) had medium knowledge level about organic farming and 21.67 and 16.66 per cent of them were found to have low and high knowledge level about organic farming, respectively.

Table: 2. Extent of adoption of organic farming practices (n=60)

Sr.No.	Categories	No.	Percentage
1	Low	09	15.00
2	Medium	40	66.66
3	High	11	18.33
	Total	**60**	**100**

The extent of adoption is the degree to which a respondent actually adopts a practice for the purpose of measurement of extent of adoption of organic farming. Level of adoption of the respondents regarding organic farming practicewas measured by asking various questions related to organic farming practicesViz, land preparation, crop rotation, use of organic input, green manuring, weed management, plant protection measure and storage and marketing. Then with the help of mean and standard deviation the respondents were categorized as low (Below X - S.D.), medium (X ± S.D.) and high (Above X + S.D.) with respect to their level of adoption for various practices.

The data presented in Table 2 indicated that majority of the respondents (66.66 per cent) had medium adoption level about improved organic farming and 18.33 and 15.00 per cent of them were found to have high and low level of adoption about organic farming practices respectively.

CONCLUSION

On the basis of findings of the study it may be concluded that majority of the respondents had medium adoption and knowledge level about organic farming practices moreover high and low level of adoption and knowledge level about organic farming practices

REFERENCES

Badgley C, Moghtader J, Quintero E, Zakem E, Chappe li K, AvilésVázquez MJ, Samulon A and Perfecto I (2006). Organic agriculture and the global food supply. Renewable Agricultural Food System. 22(2): 86–108.

Fukuko, M. (1985). The National way of organic farming. Theory and Practice of green Philosophy, Japan publications, Inc. Tokyo, Japan.

Letourneau, D.K. and Goldstein, B. (2001) Pest damage and arthropod community structure in organic vs conventional tomato production in California, Journal of Applied Ecology, 38(3):557-570

Mader, P., Fliefback, A., Dubois, D. Gunst, L., Fried, P. and Niggili, U. (2002) Soil fertility and biodiversity in organic farming. Science, 296 (5573): 1694-1697.

Ramesh P, Singh MA and Subba R (2005). Organic farming: Its relevance to the Indian context. Current Science. 88: 561 – 568.

Reganold, J.P., Palmer, A.S., Lockhart, J.C. and Macgregor, A.N. (1993) Soil quality and financial performance of biodynamic and conventional farms in New Zealand. Science, 260(5106):344-349.

Thakur, D. S. (1997). High-tech agriculture and organic farming in Himachal Pradesh for higher production, income, sustainable agriculture and Ever Green revolution. Indian farming. 47 (7), 7-10.

Weerakkody, P. R. (1999). Farming systems for sustainable development: A case study in organic farming in Srilanka. Paper presented at the APO seminar on farming system for sustainable development. Hector kobberkaduwa, Agrarian Research and Training Institute. Wigerama Mowatha, Srilanka, July, 12-19.

RESEARCH ARTICLE

Constraints Faced in Adoption of Improved Farm Implements in Sugarcane and Suggestions to Overcome the Constraints

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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 constraints in adoption of improved farm implementsnoticed were lack of knowledge, high initial cost, non availability, lack ofextension facilities, non-suitability of the implements, lack of loans andsubsidies.Suggestions of the farmers to overcome the constraints, it is implied that the extension agencies should have moreeffective and result oriented programmes to popularize the improved farmimplements and all the efforts from government, universities, cooperativeinstitutes should be done to improve utilization of improvedfarm implements.

Keywords: Constraints, Suggestions, Farm implements, Sugarcane, Farm mechanization.

INTRODUCTION

The area undersugarcane crop in Maharashtra is 10.49 lakh ha (20.36 per cent)and production is 785.68 lakh tones and productivity 74.9 t/ha.Maharashtra has average sugar recovery of 11.40 per cent withsugar production of 90.95 lakh tonnes (Anonymous, 2009).Maharashtra alone contributes about 30 per cent of nationalsugarcane production. The area under sugarcane in Kolhapurdistrict is 94,500 ha with production 72,

29,300tonne in the year2005-06. Total cultivable area in Kolhapur district is 4,76,000ha and under sugarcane is 1,03,000 ha in the year 2008-09.The technological improvements in Indian agriculturesince mid sixties have brought about revolutionaryincrease in agricultural production.It is true that farm mechanization has shown good results as of raising the agricultural production and improving the standard of living of cultivators within very short period. But a number of arguments have been advanced

against farm mechanization such as: Small size and scattered holdings of the farmers stand in the way of mechanization. After revolutionary transitions, now a day, agricultural machineries and improved farm implements havebeen recognized as an integral part of agricultural development for improving resource use efficiency and productivity inagriculture. The use of machinery helps in performing farmoperations speedily, efficiently, uniformly and relieving thefarmers from the drudgery of the physical work. It also helps in expeditious performance of farm operations during peak period.They offer the farmers more flexibility in their farming operationsand facilitate multiple and relay cropping to increase croppingintensity which increase crop production. Improved farm implements

and machinery are rightlycalled as 'input of inputs'. It has been recognized as an integralpart of agril. Development for improving resource use efficiencyand productivity in agriculture.

METHODOLOGY

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 DISCUSSION-

Table 1.Constraints faced by the respondents in utilization ofimproved bullock operated implements used bysugarcane grower respondents

Sr. No.	Constraints	Wooden plough (N = 41)	Iron plough (N = 49)	Interculturing and fertilizer application machine (n = 91)	Harrow (N = 59)	Ridger (n = 64)
1	Lack of knowledge	-	26 (57.14)	84 (92.30)	45 (76.27)	58 (90.62)
2	Non-availability in time	18 (43.90)	28 (57.14)	72 (79.12)	51 (86.44)	52 (81.25)
3	Lack of information about its utility	19 (46.34)	21 (42.85)	86 (94.50)	48 (81.35)	49 (76.56)

4	High initial cost	-	15 (30.61	88 (96.70)	45 (76.27)	54 (84.37)
5	Non-suitability of the implements	16 (39.02)	17 (34.69)	75 (82.41)	41 (69.49)	48 (75.00)
6	Small area of operation	14 (34.14)	29 (59.18)	78 (85.71)	36 (61.01)	50 (78.12)

CONSTRAINTS

Wooden plough-Out of 41non-utilizers of the wooden plough, 46.34 per centof therespondents were reported that lack of information about itsutility was the main constraint in its utilization followed by nonavailability in time(43.90 per cent).

Iron plough-In case of iron plough, 59.18 per cent of therespondents were reported about small area of operation was themain constraints in its utilization and 57.14 per cent of therespondents stated that it was not available in time 53.09 percent of the respondents had lack of knowledge about its working.

Sugarcane interculturing and fertilizer application machine- Out of 91 non-utilizers of sugarcane interculturingand fertilizer, 96.70 per cent respondentsstated that there was high initial cost of implement while 94.50per cent of the respondent stated that lack of information aboutit's utility, 92.30 per centof the respondents had lack ofknowledge about

it. 85.71 per cent respondents told that therewere small area of operation was main reason behind its nonutilization.

Bullock drawn harrow- In case of bullock drawn harrow, out of 59 nonutilizers of these implement, 86.44 per cent of the respondentssaid that non-availability in time was the constraint in itsutilization while 81.35 per cent and 76.27 per cent of therespondents said that lack of information about its utility andhigh initial cost were main constraint in its utilization.

Bullock drawn ridger- In case of bullock drawn ridger, out of 64 non utilizersof these implement, 90.62 per cent of the respondents had lackof knowledge while 84.37 per cent said that it had high initialcost. 81.25 per cent and 78.12 per cent of the respondentsreported that non-availability of implements in time and small larea of operation respectively were the main reasons behind itsnon-utilization.

Table 2. Constraints faced by the respondents in utilization of improved tractor operated implements used bysugarcane grower respondents

Sr. No.	Constraints	Sugarcane trash cutter N = 93	Sugarcane Planter N = 116	Sugarcane ratoon manager N = 112	Sugarcane sett cutter N = 108	Sugarcane top cutter N =118
1	High initial cost	79 (84.94)	102 (87.93)	98 (87.50)	96 (88.88)	111 (94.04)
2	Non-availability	63 (67.74)	105 (90.91)	-	-	-
3	Lack ofinformation about handleand operate	81 (87.09)	96 (82.75)	93 (83.03)	81 (75.00)	97 (82.20)
4	Non-availability Oftractor/powertiller	69 (74.19)	89 (76.72)	-	72 (66.66)	56 (47.45)
5	Difficult torepair and nonavailabilityof spore parts in village	64 (68.81)	-	-	-	-
6	Non-suitability of theimplements	51 (54.83)	41 (35.34)	-	41 (37.96)	-
7	Small and fragmented size of land holding	72 (77.41)	82 (70.68)	-	-	91 (77.11)
8	Nonavailabilities loans and subsidies	69 (74.19)	45 (38.79)	31 (27.67)	45 (41.66)	-
9	Non-availability of implement on hire basis	58 (62.36)	-	-	72 (66.66)	52 (44.06)

(Figures in the bracket are in percentage)

CONSTRAINTS

Sugarcane trash cutter- In case of sugarcane trash cutter, out of 93 non-adoptersor non-utilizers of the implements, 87.09 per cent ofthe respondents reported that lack of information about itshandling and operating, 84.94 per cent of the respondentreported that the high initial cost was main constraints. 77.41per cent of the respondent stated that fragment and small size ofland holding was the constraint in it's utilization.

Sugarcaneplanter- Out of 116 non-adopters or utilizers of the sugarcaneplanter, 90.91 per cent of the respondents reported that nonavailabilitywas the main constraint,

followed by 87.93 per centrespondents stated that high initial cost is the constraint in it'sutilization by the respondents.

Sugarcane ratoon manager- In case of sugarcane ratoon manager, out of 112respondent not utilizing this implement, 87.50 per cent of therespondents stated that high initial cost was the mainconstraint while 83.00 per cent of the respondents stated thatlack of information about it's handling and operation was maincause of its non utilization. Only 27.67 per cent of therespondents reported non-availabilities of loan and subsidieswas main constraint in its utilization.

Sugarcane sett cutter- In case of sugarcane sett cutter, out of 108

nonutilizers of this implement, 88.88 per cent of the respondentsreported that high initial cost and 75.00 per cent reported thatlack of information about it's handling and operation were mainconstraints in its utilization 66.66 per cent of the respondentsnon-availability and tractor/power tiller was main constraints inits utilization.

Sugarcane top cutter- Out of 118 non-adopters or utilizers sugarcane topcutter, 94.06 per cent respondents reported that high initial costof implement was the main constraint while 82.20 per centreported that lack of information about its handling andoperation and 77.11 per cent respondents stated that small andfragmented size and land holding were the main constraints inits utilization.

Table 3.Suggestions given by the respondents to overcome theconstraints in utilization of improved farmimplements

Sr. No.	Suggestions of the respondents	Frequency	Percentage
1	Sale price of the improved farmimplements should be reduced	62	51.66
2	Credit facilities needs to made availablethrough procedure of easy loan proposalsand subsidies should be awarded to fulfil capital requirement in improved farmimplements	55	45.83
3	Improved farm implements should make available on hire basis through village ooperative institutes	54	45.00
4	Extension education systems like method demonstrations and result demonstrationsbe conducted on farmers field	59	49.16

5	Advertisement of improved farmimplements should be done through newspaper, agricultural exhibitions andfarmers melas	52	43.33
6	Effective extension methods should beworked out for dissemination of theinformation about importance, need andutility of the improved farm implements	96	80.00
7	Repairing facilities be made available inthe village or in near side village withavailability of necessary spare parts	63	52.50

Suggestions to overcome constraints

Majority (80.00 per cent) of the respondents quotedthe suggestion that efficient extension methods should beworked out for dissemination of the information aboutimportance, need and utility of the improved farm implements.'Sale price of the improved farm implements to be reduced' and'repairing facilities be made available in the village or in near sidevillage with availability of the necessary spare parts' were thesuggestions given by 51.66 per cent and 52.50 per centrespondents respectively. Suggestions like 'Extension educationsystem like method demonstration and result demonstrationshould be conducted on farmer field' and 'Credit facilities need tomade available through procedure of the easy loan proposals andsubsidies should be awarded to fulfill capital requirement inimproved farm implements' were given by the 49.16 per cent and45.83 per cent respectively .45.00 per cent and 43.33 per cent ofthe respondents were suggested

that, 'improved farm implementsshould make available on hire basis through village co-operativeinstitute' and 'Advertisement of improved farm implementsshould be done through news paper, agricultural exhibitions andfarmers melas.Similar suggestions were expressed by therespondents in the findings of Singh (1983), Methi (1994),Salunke (1994) and Anonymous (1999) and Jalak (2003), etc.

CONCLUSION

Majority of the respondents expressed the constraintsabout tractor operated improved farm implements that, thisimplements had high initial cost, non-availability of loans of subsidiesat right time. While considerable number of respondents expressedconstraints about lack of knowledge, difficult to handle and operateand non-availability of implements on hire basis.Respondents have made various suggestions to overcomethe constraints, the suggestions were about to organization of resultdemonstration, organization of training to rural artisans, universitiesand companies should develop

improved farm implements withreasonable cost, village co-operative society should provideimplements on hire basis, reduce the sale price of the implements andadvertising to popularize the implements.

REFERENCES

Indra Mani, Srivastava, A.P., Panwar, J.S. and Manoj Kumar. 2004. Patterns of Sugarcane Mechanization andTransportation in Western U.P. AgriculturalEngineering Today. 28(1-2) : 39-46.

Manju Suman. 2004. Adoption and Constraints in FarmMachinery and Soil Conservation Practices in Tejpuraand Lakara Karari Watershed of India. AgriculturalEngineering Today. 28(1-2) : 59-64.

Meena, S.R. and Jamthani, A. 2000. Determinants of farmmechanization : Farmers perceptions. Indian J. Extn.Edn. 36(3 & 4) : 101-109.

RESEARCH ARTICLE

Correlates of Livelihood Change of Tribal Woman

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ABSTRACT

In case of change in employment, annual income bears positive and highly significant relationship whereas economic motivation positive and significant relationship. All other variables were found to have no significant relationship with change in employment. The variables understudy all together explained 3.70 % of total variation in the change in employment. Social participation and socio economic status bears positive and highly significant relation with change in income. All the remaining variables had non significant relationship with change in income. The total variation made by all the variables in change I income was 4.29 % and age and education contributed positively and significantly. To note, age was the only variable having no relationship with livelihood change and all other variables viz. education, annual income, land holding, social participation and socio economic motivation had positive and highly significant relationship with change in occupation. All the variables explained 52.37 % variation in the livelihood change and age showed highly significant contribution whereas social participation and socio economic status showed highly significant contribution in livelihood change. In case of livelihood change, social participation had maximum direct effect, sources of information had minimum direct effect and education exerted positive and maximum total indirect effect. Thus, social participation emerged as important determined of livelihood change,

Key Words : Determinants, livelihood change, correlates, Change in income, occupation, employment, path analysis

INTRODUCTION

What factor affect livelihood and what option are available for improvements livelihood of tribal women need to be investigated for upliftment of tribal women. In line, present research work was carried with the objectives to study the personal, socio economic, communicational, situational and psychological characters of the tribal women; to study present livelihood status

of tribal women and to study livelihood change in tribal women.

The findings of the study will serve as a guideline to policy maker, administrators, researcher and social worker to plan their strategies for promoting the use of tribal development scheme in agriculture and allied sector and scheme of tribal upliftment, Livelihood analysis helps to improve our understandings of what is really happening in people's lives, what enables some but not other to escape from poverty and people are afflicted by policy.

Economy is mainstay of social group. Livelihood research focuses first and foremost on villages and households. Conducting research on livelihood level of tribal women have some strong advantages. It is useful as it can highlight the importance of how tribal women make their living across season, sector, and space.

METHODOLOGY

The present study was based on experimental design of social research to measure the change occurred during last ten years in livelihood of tribal women. The resent study was contributed in Akot, Patur and Telharapanchyatsamities of Akola district of Vidarbha region of Maharashtra state as higher number of tribal population reside in these talukas and therefore, theses tahasils were purposively selected for the present study.

On the basis of maximum tribal population from each selected panchyatsamities, five villages were purposively selected and likewise fifteen villages from these selected panchyatsamities constituted respondents of the study. The list of tribal people of the selected panchyatsamities constituted respondents of the study. The list of tribal people of the selected villages was obtained from the concerned panchyatsamities. From these 20 tribal respondents from each village were randomly selected by using simple random sampling method. Thus in all 300 respondents were selected for this study. The data collected, was put to correlation, regression and path analysis.

RESULT AND DISCUSSION

Correlation and Multiple regression analysis of independent variables

1. Change in occupation

The finding with regards to relational analysis pertaining to the change in occupation could be observed in the table I. It is obvious from the data, the correlation coefficient, the education and sources of information were found to be positive and significant. The correlation between age, annual income, land holding occupation, social participation, social economic status and economic motivation with change in occupation was found to be no significant.

It shows that these variables have no influence over change in occupation of tribal significant. It shows that these variables have no influence over change in occupation of tribal women.

The results of regression analysis presented in table 2 indicated that the value of coefficient of determination R2 was 2.50 % the total variation in change in occupation was explained by selected nine variables. The unexplained variation of 97.5% may be attributed to the other factor. The results of regression analysis in table 2 indicate that none of the variables had significant contribution in change in occupation. The logical resoling behind such finding may occupation change by migration.

2. Change in employment

The findings of correlation analysis presented in table I indicate that, the annual income was positively and highly significant correlated a 0.01 level of probability with change in employment. The variables viz. socio economic status and economic motivation were positively and significantly correlate at 0.05 level of probability with change in employment. The variable age, education, land holding, occupation social participation and sources of information did not show any significantly correlation with change employment. The results of regression analysis presented n table 3 indicate that, the value coefficient of determination R2

was 0.0373 which means that 3.73 % of total variation of 96.27% may be attributed to the other factors.

The results of regression analysis presented in table 3 shows that out of nine variables only economic motivation has contributed significantly at 0.05 level of probability towards the change in employment. Remaining variables age, education annual income, land holding, occupation, social participation, source of information and socio economic status could not significantly influence the employment. Increased land holding, social participation, sources of information, socio economic status leads to generation of additional employment of tribal women and their family members as well as outsider.

3. Change in income

Relationship between personal, socio economic, situational psychological profiles with change in income of tribal women was also worked out and result has been presented in table I. It is observed that, the variables social participation and socio economic status were highly significant and positively correlated at 0.01 level if probability with change in income, The remaining variables viz. age, education, annual income, land holding, occupation, sources of information and economic motivation did not show any correlation with change in income.

The data in table 4 show that coefficient of determination R2 was 0.0429 which means that 4.29 % of total variation in change in income respondents was explained by selected nine variables. The unexplained variation of 95.71 % may be attributed to other factors. The results of regression analysis in table 4 indicate that the variables age and education had contributed positively and significantly at 0.01 level of probability towards the change in income. The other variables could not influence in change in income.

4. Livelihood change

Relationship between personal, socio economic, situational and psychological profile with livelihood change of tribal women was also worked out and results have been presented in table I. It is obvious from the data in the table I that the correlation coefficient between education, annual income, landholding, social participation, socio economic status, sources of information economic motivation were found to be positive and significant with livelihood change. Thus these variables are correlated to livelihood change of tribal women.

The correlation between age with livelihood change was found to be non significant It shows that age had no influence over livelihood change of tribal women. It is quite evident that education,

annual income, land holding and occupation and social participation have direct relationship with the livelihood change and information sources and economic motivation have also influenced the livelihood change of the tribal women. The results of regression analysis in Table 5 shows that, the value coefficient of determination R2 was 0.5237 which means that 52.37 % of total variation in the livelihood change was explained by selected nine variables. The unexplained variation 47.63 % may be attributed to other factor. The result of regression analysis presented in tables 5 shows that out of nine variables age contributed significantly at 0.05, social participation and socio economic status contributed significantly at 0.01 level of probability towards the change in livelihood. Remaining variables could not influence the livelihood changes. Thus, it could be concluded that age, social participation and socio economic status influenced the livelihood change positively.

CONCLUSION

Age was the only variable having no relationship with livelihood change and all other variables viz. education, annual income, land holding, social participation and socio economic motivation bears positive and highly significant relationship with livelihood change the occupation bears negative and highly significant relationship with

occupation. All variables explained 52.37 % variation is the livelihood change and age shoed highly significant contribution in livelihood change.

Social participation had maximum direct effect livelihood change

whereas occupation and source of information had minimum direct effect on livelihood change and remaining other variables exerted positive and maximum total indirect effect on livelihood change of tribal women.

Table 1 : Correlate of Livelihood change and its parameters

Sr. no	Variables	Co-efficient of correlation			
		Change in occupation	Change in employment	Change in income	Livelihood change
1	Age	0.0124	0.0101	0.0430	**0.0577**
2	Education	0.2860 **	0.0268	0.0485	**0.3193****
3	Annual Income	0.0631	0.4292**	0.00786	**0.2464****
4	Land holding	0.0267	0.0373	0.0555	**0.2530****
5	Occupation	0.0075	0.0358	0.00502	**-0.6422****
6	Social participation	0.0062	0.0053	0.0476**	**0.5084****
7	Socio Economic Status	0.0580	0.1280*	0.0488**	**0.2169****
8	Sources of Information	0.1178*	0.0583	0.0268	**0.2029****
9	Economic Motivation	0.0854	0.1442*	0.00594	**0.4242****

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

Table 2 : Multiple regression coefficient of independent variables withchange in occupation

Sr no	Variables	Partial reg. coefficient	S.E	T-value
1	Age	0.0714	1.1725	0.0609
2	Education	0.9447	3.3125	0.2852
3	Annual Income	0.0180	0.0025	0.7155
4	Land holding	7.7052	9.1721	0.8400
5	Occupation	1.0687	6.8604	0.1557
6	Social participation	6.6082	14.4812	0.4563
7	Socio Economic Status	5.5203	1.8624	0.2793
8	Sources of Information	9.2708	4.762	1.9468
9	Economic Motivation	3.429	1.982	1.9389

$R^2 = 0.0250$ F-Value = 0.8294

Table 3 : Multiple regression coefficient of independent variables with change in employment

Sr no	Variables	Partial reg. coefficient	S.E	T-value
1	Age	0.2158	0.8342	0.2587
2	Education	2.0182	2.3568	08563
3	Annual Income	0.00094	0.0017	0.5250
4	Land holding	2.8106	6.5260	0.4306
5	Occupation	2.4872	4.8812	0.50950
6	Social participation	0.9008	10.3036	0.0874
7	Socio Economic Status	0.3143	1.3251	0.2372
8	Sources of Information	0.3884	3.2049	1.9933
9	Economic Motivation	4.5249**	1.7212	2.6289**

R2 = 0.0373   F-Value = 1.2505

Table 4 : Multiple regression coefficient of independent variables withchange in income

Sr no	Variables	Partial reg. coefficient	S.E	T-value
1	Age	3.3408	1.3819	2.4175**
2	Education	9.6828	3.9041	2.4801*
3	Annual Income	0.00301	0.0029	1.0120
4	Land holding	19.7020	10.810	1.8225
5	Occupation	4.7808	8.0857	0.5850
6	Social participation	28.6097	17.067	1.6762
7	Socio Economic Status	3.1343	2.1950	1.4279
8	Sources of Information	1.7854	6.9900	0.2554
9	Economic Motivation	0.4833	2.8511	0.1695

R2 = 0.0429   F-Value = 1.4469

Table 5 : Multiple regression coefficient of independent variables with Livelihood change

Sr no	Variables	Partial reg. coefficient	S.E	T-value
1	Age	-0.0740	0.0326	2.2686*
2	Education	-0.6244	0.4029	1.5496
3	Annual Income	0.0002	0.0003	0.6150
4	Land holding	-1.2346	0.8436	1.4634
5	Occupation	-12.0356	1.0714	11.2330

6	Social participation	5.3090	1.4825	3.5810**
7	Socio Economic Status	1.3135	0.2908	4.5154**
8	Sources of Information	-1.6278	1.0781	1.5098
9	Economic Motivation	0.24021	0.4322	0.555

R2 = 0.5237   F-Value = 35.42

REFERENCES

Chari, M. S:V.Chari and M.S Gulnar (1993): Socio economic exploitation of tribal women. Tribal Res. Bull. XV (2) :44-46.

Enhnaces and Conway (1992): Livelihood option study. Livelihood option study. http://WWW/livelihood options .info/study

Kulkarbi, (1994): Tribal communication in Indiatoday and tomorrow, Tribal Res. Bull .XV I (1):I –II

PatilP.G, V.U . Bos and P.B Kharade (2000) : Socio Economic status of Konkani Tribal Dhule District. Tribal Res. Bull.XVII (1) :1-8

Rathod, m.K and S.R Khonde (2001) : Information seeking behavior of tribal farmer tribal girls at Nanded. Tribal Res. XXIV (1) :1-5

Rehna Merchant and FizaBasit (1999): Determinations in happiness in tribal life. Maharashtra J. Extn. XXVIII.192

RESEARCH ARTICLE

Performance of Paddy in Chandrapur District of Maharashtra

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ABSTRACT

The paddy is dominant foodgrain crop in eastern vidarbha zone in Maharashtra. The study is intended to examine the performance of paddy in Chandrapur district of Maharashtra state, as it is paddy belt area. Paddy is the most important crop not only of India but of Asia and other tropical and subtropical countries of the world. It is a staple food of more than 60 per cent of the world population. The secondary data on pertaining to area, production and productivity were collected from the various published sources i.e. Statistical of Maharashtra State, District Socio Economic Review etc. The results of the study were revealed that, at overall period, the growth rate of area was stagnant during the Period II in Chandrapur district. The growth rate of production and productivity was stagnant in overall period. In Chandrapur district, the growth rate of productivity was positive (0.28 per cent) during the Period-I, whereas productivity was negatively significant (-3.37 per cent) during Period II. In overall period productivity was stagnant (0.62 per cent). At the overall period the coefficient of variation was 25.94 per cent.. It could be concluded that, the less variation was seen in Period II than Period I. In case of productivity of paddy the variability during period-II was the highest as compared to the Period I and overall period.

Key words: Paddy, growth rate, coefficient of variation, percentage share, performance, Maharashtra state.

INTRODUCTION

Rice is the most important staple food for large part of the world human population especially in the East-South, South-East Asia, the middle East Latin America and West Indies. It is growing about 150 million hectares in the world with annual production of 573 million tones of paddy with an average

productivity of 3.83 million tonnes per hectare. India is the largest rice growing country 44.60 (million hectare) while China is the largest producer of rice in the world. Globally, rice is one of the most important food crop in the world which forms the staple diet of 2.7 billion people. It is growing in all the continent except Antarctica; occupying 150 million hectares, producing 573 million tonnes paddy with an average productivity of 3.83 million tonnes per hectare. Its cultivation is of immense importance to the food security of Asia, where more than 90 per cent of the global rice is produced and consumed. India is the largest rice growing country (44.6 million hectare), while china is the largest producer of rice in the world. It is a staple food of more than 60 per cent of the world population. The paddy is dominant foodgrain crop in eastern Vidarbha zone in Maharashtra By 2025 the world population is expected to rise to 8.35 billion requiring 60 per cent more rice production as compared to the current production in order to meet the demand created by increasing population. In India, it's accounts for more than 40 per cent foodgrain production, providing direct employment to 70 per cent people in rural area (Sharma *et al.,* 2007). Paddy (*Oryza sativa*) belongs to the genus Oryza and the family gramineae. It is one of the important cereal crop in the world after wheat In Maharashtra it is mainly cultivated in Konkan and Western Vidarbha region. Paddy is dominant crop in the Eastern Vidarbha Zone and is cultivated on 6.71 lakh hectares area and production is 9.65 lakh tonnes. It is need to study the performance of the paddy as it is dominant crop in the eastern vidarbha zone .The study was undertaken in Chandrapur district. The study was based on secondary data. Secondary data pertaining to the period 1980-81 to 2009-10 were collected from various Government publications. The specific objectives of the study were:(1) to study the percent area share of paddy in Chandrapur district (2) to estimate the growth rates of area, production and productivity of paddy in Chandrapur district (3) to study the variation in area, production and productivity of paddy in Chandrapur district.

METHODOLOGY

For the study, Secondary data pertaining to area, production and productivity of paddy were collected from the various Government published sources i.e. Statistical Abstract of Maharashtra State, District Socio-economic Review, District Statistical Office, Directorate of Economics and Statistics, Government of Maharashtra (Districtwise issue), Epitomes of Agriculture, Season and Crop Reports, etc. to study the performance of paddy in Chandrapur district.Chandrapur districts

in Eastern Vidarbha Zone were selected for the present study as it is paddy dominating belt. Secondary data pertains to the year 1980-81 to 2009-2010 was collected. The period was categories into sub-period Period I 1980-81 to 1994-95 and Period II 1995-96 to 2009-2010.

Analytical Tools

The per cent share of paddy in grossed cropped was worked out by the simple tabular analysis for the different time period. The performance of paddy was examined by studying ,Growth rates of area, production and productivity of paddy and variation in area, production and productivity of paddy in Chandrapur district.

a) Estimation of growth rate

The annual compound growth rates of area, production and productivity were estimated at different period. The overall period (1980-81 to 2009-2010) was categorized into two categories i.e. Period I Pre-WTO period and Period II was the Post-WTO period.

Growth rate is a value which shows an increase or decrease per unit of over the constant value. The growth rate of area, production and productivity were estimated by using exponential function i.e.

$$y = a.b^t$$

where,

y = Area / production/ productivity

a = Intercept

b = coefficient

t = Time variable

The above equation in linear form

i.e. $\log y = \log a + \log b$

From the estimated function the compound growth rate will be worked out by,

CGR (r) = [Antilog (log b) -1] x 100

where,

r = Compound growth rate

The significance of compound growth rate was tested by applying 't' test of significance.

b) Variation in area, production and productivity

The variation in area, production and productivity of paddy were estimated by using the coefficient of variation.

$$\text{Coefficient of variation (CV)} = \frac{\sigma}{\overline{X}} \times 100$$

where,

σ = Standard deviation

$$\sigma = \sqrt{\frac{\Sigma \ (X - \overline{X})^2}{n}}$$

where,

n = Number of observation

$\overline{X}$ = Arithmetic mean

RESULTS AND DISCUSSIONS

Area under paddy in selected district

The per cent share of area under paddy crop in grossed cropped area in Chandrapur district was calculated at different points of time by the simple tabular analysis and presented in the Table 1.

Table 1. Per cent share of area under paddy in gross cropped area in Eastern Vidarbha

Year	Chandrapur		
	Area under paddy crop (00 ha)	Gross cropped area (00 ha)	% to gross cropped paddy
1980-1981	2730	5190	52.60
1985-1986	1432	3569	40.12
1990-1991	1576	3344	47.13
1995-1996	1484	3786	39.20
2000-2001	1463	3357	43.58
2005-2006	1411	2772	50.90
2009-2010	1095	3351	32.68

Source : Epitomes of Agril., District Socio-Economics Review

It is revealed from Table 1 that in Chandrapur district, during the year 1980-81 the percentage of area under paddy to grossed cropped area was 52.60 per cent (23700 ha) under paddy. The percentage share of area under paddy to grossed cropped area has decreased to 47.13 per cent, 43.58 per cent and 32.68 per cent during the year 1990-91, 2000-01 and 2009-10, respectively. This shows the percent area under paddy cropdecreasing.

Performance of the Paddy

Growth rates of area, production and productivity of paddy

The compound growth rates of area, production and productivity of paddy were estimated by using exponential growth model and the results are presented in Table 2.

Table 2. Compound growth rates of area, production and productivity of paddy

Sr. No.	District	Particulars	Period I (1980-81 to 1994-95)	Period II (1995-96 to 2009-10)	Overall period (1980-81 to 2009-10)
2.	Chandrapur	Area	1.60***	-0.28	0.23
		Production	1.77	-3.85*	-0.57
		Productivity	0.28	-3.37*	0.62

***, ** and * indicate 1%, 5% and 10% level of significance

At overall period, the growth rate of area was positively significant at 1 per cent level of significance and found significantly increased in Chandrapur. George and Mukherje (1986) reported that annual compound growth rate of rice area between 1960-61 and 1983-84 was only 0.15 per cent while the annual growth rate of area was (1.14 per cent) for the first period. The growth rate of paddy production was 1.77 per cent during Period I and during the Period II growth rates was negatively significant (-3.85 per cent). In Chandrapur district, the growth rate of productivity was positive (0.28 per cent) during the Period-I, whereas productivity was negatively significant (-3.37 per cent) during Period II. In overall period productivity was stagnant (0.62 per cent).

Variation in area, production and productivity of paddy

Coefficient of variation refers to statistical measures of distribution of data point in a data series around the mean. It represents the ratio of standard deviation to mean. It is a helpful statistic in comparing the degree of variation from one data series to the other, although the means are considerable different from each other.

Table 3. Coefficient of variation in area, production and productivity of paddy

Sr. No.	District	Particulars	Period I (1980-81 to 1994-95)	Period II (1995-96 to 2009-10)	Overall period (1980-81 to 2009-10)
2.	**Chandrapur**	Area	8.31	24.38	22.37
		Production	8.44	33.01	29.99
		Productivity	8.26	28.44	25.94

From Table 3, it could be seen that the variability in area under paddy. In Chandrapur district, coefficient of variation of area was highest in Period II (24.38 per cent) than Period I (8.31 per cent). In general coefficient of variation of area was low during Period I (8.31 per cent) as compared to Period II (24.38 per cent) and for overall period (22.37 per cent).

In Chandrapur district, coefficient of variation was the highest in Period II (33.01 per cent) as compared to Period I (8.44 per cent). The coefficient of variation in overall period was 29.99 per cent. In Chandrapur district variation in the productivity was the highest in Period II (28.44 per cent) as compared to the Period I (8.26 per cent). At the overall period the coefficient of variation was 25.94 per cent.. It could be concluded

that, the less variation was seen in Period II than Period I.

CONCLUSIONS

The percent share area under paddy crop was decreasing. The growth rate of area under paddy was significantly increasing, whereas the growth rates of production and productivity were found stagnant in Chandrapur district. The coefficient of variation of productivity was found (25.94 per cent) districts in Chandrapur. Coefficient of variation in area, production and productivity was stagnant in overall period in Chandrapur district. It means there was less variation in area, production and productivity of paddy.

REFERENCES

Abrahum, T. P. and S. K. Raheja, 1967. An analysis of growth of rice and wheat crops in India, Indian J. Agril. Econ., XXII(3) : 1-15.

Anonymous, 2011. Status paper on rice in Maharashtra, http://www.rkmp.co.in

Gajja, B. L., Chand and Singh, 2008. Growth, instability and supply response of wheat in arid Rajasthan Indian Journal Agricultural Marketing, 22(3) : 47-58.

George, P. S. and C. Mukharjee, 1986. A disaggregate analysis of the growth performance of rice in Kerala. Indian J. Agri. Econ., 41(1) : 1-15.

Hassan, M. N., M. S. Islam., Q.M. Alam and M.I. Hussain, 2008. Change and instability in area and production of wheat and maize in Bangladesh. Bangladesh Journal of Agricultural Research, 33(3) : 409-417.

Kainth, G. S. and P. L. Mehra, 1985. Rice production : Potential and constraints : A case study of productivity backward region. Inter-India Publications, New Delhi, pp 95-96.

Kaul, S., R. Ghasi and P. Sanjeev, 2006. Economic analysis of productivity and profitability in rice production in India. Agricultural Situation in India, XLIII(5) : 295-299. Leela, P., R. Kumari and K. Ratna, 1994. Rice in Agricultural Economy of Andhra Pradesh. Agricultural Situation in India, 40(12) : 865-873.

Pillai, R., 2001. An analysis of paddy productivity growth in West Bengal and Orrisa. Indian J. Agri. Econ., 56(4): 613-628.

RESEARCH ARTICLE

Adoption of Recommended Practices of Tomato Crop by the Tomato Growers in Maharashtra

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ABSTRACT

Tomato crop is grown on large scale in the state of Maharashtra. To obtain good yield from this crop, Mahatma Phule Krishi Vidyapeeth, Rahuri has made different recommendations regarding cultivation of this crop for the farmers. The study was undertaken to find out the adoption of these recommended practices by the tomato growers. The data was collected from 120 tomato growers from Purandar tehsil in Pune district of Maharashtra state. It was observed that more than half of them were following sowing in kharif season (55.00 per cent) and using recommended doses of fertilizer for hybrid varieties (55.83 per cent). Majority of them followed the practices which includes preparation of land (91.67 per cent), irrigation during transplanting (85.83 per cent), replacement of dead Plants (80.83 per cent) during transplanting, water management in rabi season (82.50 per cent) and at flowering and fruiting stage (78.33 per cent), earthing up, support to plants (95.00 per cent) and weeding (90.00 per cent). Majority of them had not adopted most of the recommended practices to be followed under nursery management and had less adoption of control measures for shading of flowers. Most of the respondents had adopted recommended practices related to harvesting.

Keywords: Tomato growers, adoption, recommended practices of tomato crop

INTRODUCTION

Tomato is the world's largest vegetable crop. It has a special nutritive value. It is short duration crop which gives higher yield. Hence, it is important from economic point view. Tomato crop is cultivated under indoor as well as outdoor conditions. Previously it was grown season wise but now days it is grown round the year. The area under this crop is increasing day by day. China, India and USA are the three leading countries in the world in tomato production. Although India is second largest producer of tomato with the production of 18.74 million tones, productivity is the major concern as in

India the productivity is 21.24 tonnes/ha against the world's average productivity of 33.99 tonnes/ha.. Different varieties and practices have been recommended by various agricultural universities and the research stations for tomato crop to have good quality and yield. Mahatma Phule Krishi Vidyapeeth, Rahuri also has made recommendations regarding cultivation of this crop for the farmers from Maharashtra state. Hence, the present research project was conducted with the objective to know the adoption of MPKV recommended practices by the tomato growers.

METHODOLOGY

Present research project was conducted in Pune district from Maharashtra State. As Purandar tehsil has cultivation of tomato crop on large scale in both Kharif and Rabi season compared to other tehsils in Pune district, it was selected for the study. On the basis of highest area under tomato cultivation, eight villages from the jurisdiction of four *mandals* were selected and from each village 15 tomato growers were selected randomly to form the sample size of 120 respondents. The data was collected from the respondents with the help of interview schedule and analyzed to know the adoption of recommended practices by the tomato growers.

FINDINGS AND DISCUSSION

Adoption of recommended practices of tomato crop by the respondents

Data in relation to adoption of recommended practices by the tomato growers was collected and the results obtained after analysis of data are presented in Table given below.

Table 1. Classification of respondents according to adoption of MPKV recommended practices of tomato crop

Sr. No.	Recommended practice	Adoption	
		Adoption	No Adoption
1.	Seedrate		
a.	Straight variety - 400 grams	16(13.33)	104(86.67)
b.	Hybrid variety − 125 grams	67(55.83)	53(44.17)
2.	Season	-	-
a.	Kharif –May - June	66(55.00)	54(45.00)
b.	Rabi-September - October	53(44.17)	67(55.83)
c.	Summer-January - February	64(53.33)	56(46.67)
3.	Nursery– 3 R area for 1 ha	30(25.00)	90(75.00)
a.	Land preparation for nursery − 2 ploughings and 1 harrowing	84(70.00)	36(30.00)

b.	Size of raised beds −3 m long ,1 m wideand 15 cm in height	44(36.67)	76(63.33)
c.	5 kg FYMFYM ,80 grams19:19:19or100 grams15:15:15per bed	34(28.33)	86(71.67)
d.	Seed treatment −Thirum / Captan 3 gram or trichoderma2.5 grams per kg of seed	36(30.00)	84(70.00)
e.	Seed sowing with 10 cm spacing in line & mulching of beds, Removal of mulch after seed germination	64(53.33)	56(46.67)
f.	Use 40-50 mesh nylon net or white cloth at 2m height from bed for protection from insect pest	24(20.00)	96(80.00)
g.	12 days after planting apply 25 to 30 gram phorate per bed	36(30.00)	84(70.00)
h.	Use Carbendazim(Bavistin)1 gram for drenching in soil	34(28.33)	86(71.67)
i.	Transplanting -After 25 to 30 days, age of seedling 4 to 6 leaves	120(100.00)	00 (00.00)
k.	Watering of seedlings one day before transplanting	98(81.67)	22(18.33)
4.	Seedling preparation with pro- trays method	3(2.50)	117(97.50)
5.	Transplanting	-	-
a.	Preparation of land for transplanting -2 ploughings and 1 harrowing	110 (91.67)	10 (8.33)
b.	Application of 20 tonnes of FYM before planting	45 (37.50)	75 (62.50)
c.	Dipping of plants in 10 ml of cabosulphan & 10 gm bavistin per 10 lit. of water	36 (30.00)	84 (70.00)
d.	Irrigation after planting on second and third day	103(85.83)	17(14.17)
e.	Replacement of dead plants with new plants within 10 days	97(80.83)	23(19.17)
6.	Integrated nutrient management		
a.	Organic Fertilizer − 20 tonnes of FYM	45(37.50)	75(62.50)

	per ha		
b.	Chemical fertilizer		
i.	Straight varieties (Kg/ha) 200 kg nitrogen, 100 kg phosphate, 100 kg potash	15(12.50)	105(87.50)
ii.	Hybrid varities 300 kg nitrogen, 150 kg phosphorus, 150 kg potash	61(50.83)	59(49.17)
iii.	Application of half nitrogen & whole phosphorus & potash at the time of transplanting Application of remaining nitrogen in 3 equal doses at 20 days interval	72(60.00)	38(40.00)
C	Biofertilizer –Application of 6 kg Azatobactor, 6 kg phosphate solubilizing bacteria mixed with 1 tonne of FYM	22(18.33)	98(81.67)
7.	Water management		
a.	Rabi season − At 8 - 10 days interval	99(82.50)	21(17.50)
b.	Summer season −At 6 - 8 days interval	83(69.17)	37(30.83)
c.	Kharif season −As per the requirement	78(65.00)	42(35.00)
d.	At flowering and fruiting stage sufficient availability of water is necessary	94(78.33)	26(21.67)
8.	Earthing up − After 30 to 45 days	114(95.00)	6(5.00)
9.	Support to plants - After 30 to 35 days	114(95.00)	6(5.00)
10.	Shading of flowers – Control measures	-	-
a.	Proper management & disease - pest control	47(39.17)	73(60.83)
b.	At the flowering stage application of NAA @ 20 milligram / litre of water (with the advice of specialist)	14(11.67)	106(88.33)
11.	Weed management	-	-
	Weeding as per the requirement)Weeding- 3 to 4 times (	108(90.00)	12(10.00)

	Weedicide - Application of Stomp or Basilin @ 2 lit/ha before 8 to 10 days of planting	40(33.33)	80(66.67)
	Metribenzene 0.35 kg active ingredient / ha after 16-20 days of planting	34(28.33)	86(71.67)
12.	Harvesting of fruits		
	Harvesting of fruits-65 to 70 days after planting	120(100.00)	00(00.00)
	Harvesting – In the morning or evening	96(80.00)	24(20.00)
	Long distance market - Colour changing from green to yellow	99(82.50)	21(17.50)
	Medium distance market – Pinkish or red in colour	90(75.00)	30(25.00)
	Local market/processing industry – Fully ripen fruits	120(100.00)	00(00.00)
	Avoid Spraying of insecticide/ pesticide 3 to 4 days before harvesting	78(65.00)	42(35.00)

The perusal of data from Table 1 reveals that very less per cent (13.33 per cent) of the respondents were using the recommended seed rate for the straight varieties, while more than one-half (55.83 per cent) of them were using the recommended seed rate for the hybrid varieties. It was observed that more than half of the respondents were cultivating the tomato crop in Kharif (55.00 per cent) and summer season (53.33 per cent) while 44.17 per cent of them were cultivating tomato crop in rabi season.

In respect of nursery managementit was found that only one-fourth (25.00 per cent) of the respondents were using the nursery area as per the recommendation. Majority (70.00 per cent) of them had adopted 2 ploughings and one harrowing for preparation of land for nursery. 36.67 per cent, 28.33 per cent and 30.00 of the respondents had adopted the recommended size of raised bed, application of fertilizer in the seed bed and seed treatment, respectively. More than half (53.33 per cent) of the respondents had adopted the seed sowing as per the recommendation. For control of insect- pest in nursery very less per cent of them were using nylon net (20.00 per cent), Phorate application (30.00 per cent) and drenching of Carbendizm (28.33 per cent). Only 2.50 per cent of them had adopted portrays method for seedling preparation.

Table 1further show that all respondents (100.00 per cent) had adopted the transplanting after 25 to 30 days of

sowing while majority of them followed the practice of watering of seedlings one day before transplanting (81.67 per cent) and preparation of land for transplanting (91.67 per cent). Less than two-fifth (37.50 per cent) of them was using FYM as per the recommendation while 30.00 per cent of them were following the practice of dipping the plants in Carbosulphan and Bavistin before planting. Majority of them had adopted the practice of irrigation on second and third day of planting (85.83 per cent) and replacement of dead plants (80.83 per cent) with new seedlings.

With regard to fertilizer management it was observed that 12.50 per cent and 50.83 per cent of the respondents were applying recommended doses of chemical fertilizer to the straight and hybrid varieties, respectively. Three-fifth of them (60.00 per cent) followed the application of half dose after planting while only 18.33 per cent of them were applying the biofertilizers to the tomato crop. Majority of them were irrigating tomato crop at regular interval as recommended in rabi (82.50 per cent), summer (69.17 per cent) and kharif (65.00 per cent). Majority (78.33) per cent of them followed the irrigation at flowering and fruiting stage.

The data from Table 1 further indicates that very large per cent of the respondents followed the practice of earthing up (95.00 per cent), support to the plants (95.00 per cent) and weeding of crop (90.00 per cent). To avoid shading of flowers, 39.17 per cent and 11.67 per cent of the respondents followed the proper management and disease- pest control and application of NAA, respectively. 33.33 per cent and 28.33 per cent of them were using stomp or Basilin and Metribenzene as weedicide.

All the respondents were harvesting the fruits 65 to 70 days after planting while majority of them adopted the different recommended practices under harvesting which includes harvesting the fruits in morning/ evening (80.00 per cent), stage or colour of fruit at the time of harvesting for long distance market (82.50 per cent), for medium distance market (75.00 per cent) and for local market (100.00 per cent) and avoidance of spraying of insecticide or pesticide 3 to 4 days before harvesting (65.00 per cent) as per the recommendation.

CONCLUSION

It was observed that majority of the respondents had followed the recommended cultivation practices under transplanting, intercultural operations like earthing up, weeding etc and harvesting of tomato fruits. However, tomato growers had very less adoption of recommended practices to be followed under nursery management, fertilizer management and control measures for

shading of flowers. This indicates the need for transfer of production technology to the tomato growers. Hence it is recommended that result demonstrations on fertilizer management should be organized for the tomato growers by the Department of Agriculture in collaboration with the university experts. Also the visits of the tomato growers to the vegetable nurseries from research stations and agricultural institutions will be helpful in adopting the practices to have good quality tomato seedlings and guidance on control of shading of flowers should be provided by the experts as it affects the production.

REFERENCES

Choudhary, M.K., Patel, P.C., Sharma, P.K. and Patel, J.B. 2016. Extent of Knowledge and Adoption of tomato growers about tomato production technology. International Journal of Agriculture Sciences. 8(25): 1521-1523

Gandhi, R.V., Hanchinal, S.N., Shivamurthy, M. and ShailajaH. 2008. Adoption of integrated pest management practices among tomato growers. Karnataka J. Agric. Sci., 21 (1), (17-19).

Sharma, M. and Singh, L.D. 2013. Adoption of improved tomato cultivation practices. Indian Journal of Extension Education. 49(1&2):62-66.

Horticulture Statistics Division, Department of Agriculture, co-operation and Farmers welfare.2017.Horiculture Statistics at a glance: pg. 453.

Sunilkumar, G.M., Angadi, J.G. and Hirevenkanagoudar, L.V. 2006. Adoption of Cultivation and Post-Harvest Technology of Tomato by Farmers. Karnataka J. Agric. Sci.,19 (1): (76-79)

Tinde, L.K., Sai,A.K., Doharey, R.K. and Kushwaha, R.K. 2018. Associateciation between Personal Attributes of Farmers with their Adoption of Tomato Production Technology in Jashpur District, Chhattisgarh (India). Int. J. Curr .Microbiol .App.Sci. 7(04): 3394-3398.

RESEARCH ARTICLE

Constraints Faced and Suggestion Provided by the Tribal Rice Farmers in Adoption of NFSM Intervention in Kandhamal District of Odisha

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ABSTRACT

In viewing the stagnating in food grain production and increasing the consumption need of the growing population Government of India has launched centrally sponsored scheme, 'National Food Security Mission' in October 2007. The mission is continuing in the 12th five-year plan with a target of 25 million tonnes of food grains comprising of 10 million tonnes rice, 8 million tonnes of wheat, 4 million tonnes of pulses and 3 million tonnes of coarse cereals. The present study was conducted tribal prominent Kandhamal district of Odisha, by taking rice component of the NFSM programme in four randomly selected blocks. From the eight randomly selected villages (four beneficiary and four non-beneficiary) total 120 respondents were selected (sixty beneficiaries and sixty non-beneficiaries) for the study. From the study it was found that un availability of bio-fertilizers was the major constraints as the farmers of this district had negative behavior towards the application chemical fertilizer and more concerned towards organic fertilizers, followed by high cost of machinery and marketing constraints etc. The farmers also suggest for the development of vermicomposting units, proper irrigation facility, provision of power tillage facility and other low cost implements etc. for the improvement of the programme.

Keywords- Beneficiary; Non-beneficiary; Bio-fertilizers; vermicomposting; low cost implements

INTRODUCTION

Food security is the imperative prerequisite for economics and social stability of the country. The food security primarily has three objectives i.e. ensuring production of adequate food

supplies, maximizing stability in the flow of supplies and securing access to available supplies on part of those who need them to meet this food security National Food Security Mission (NFSM) was launched in the year 2007-08. It aims to increase the production of food grains by 25 million tons, comprising of 10 million tons of Rice, 8 million tons of Wheat, 4 million tons of Pulses and 3 million tons of coarse cereals. In India NFSM programme on rice implemented in 194 districts of 25 states (2015-16). In Odisha NFSM programme on rice implemented in 8 districts, which covers 3.94 million ha. area, 6.83-million-ton production, and 1616 kg/ ha productivity (2015-16).Kandhamal district of Odisha is a tribal prominent district, mostly depends on forest for their livelihood and to some extent on subsistence type of farming. The productivity of rice in this district is 1211 kg per hectare (2015), which is far below state average yield. Although there is lots of efforts and technologies provided by the government through several programmes to increase the productivity of rice, it has not improved up to the desired level. The gap in the productivity is due to constraints Associateciated with the farmers, ecological situation, local situation,and with the proper implementation of the programme. Some identifiable problems encountered by the farmers like inadequate skilled labour, high cost of machinery, lack of processing facility, increasing processing cost, lack of awareness about various departmental subsidies, lack of storage facility (Narayan N.S. 2013), some other problems like lack of irrigation facility, lack of bio fertilizers (Pardhi R. M.2012)etc. Keeping this in view to know the constraints perceived and suggestion of the farmers the present study was undertaken with the objective of identifying the constraints faced and suggestion provided by the tribal rice farmer during the adoption of NFSM interventions.

METHODOLOGY

The present study was conducted in tribal dominant (53.58 per cent tribal population 2011 census) Kandhamal district of Odisha state. Out of 12 blocks, 4 blocks G. Udayagiri, Tikabali, Nuagao, Phiringiawere selected randomly. From each selected block, one NFSM-Rice implemented village and another non-NFSM-Rice village from the same location was selected for investigation. In this way total 8 villages (4 beneficiaries and 4 non-beneficiaries) were selected for the investigation. From each beneficiary village, 15 tribal farmers Associateciated with NFSM-Rice programme were selected randomly. Similarly, from non-beneficiary villages 15 tribal farmers were selected randomly as respondents. Thus, total 120 farmers (60 beneficiaries and 60

non-beneficiaries) were selected for this study as respondents. The data were collected through a well-structured interview schedule. To find out the constraints as perceived by the farmers in adoption of rice interventions, a suitable schedule containing 12 possible constraints was constructed. To assess the constraints faced by the respondents, the responses of respondents were recorded on four-point continuum viz., not at all, low, moderate and high which were assigned 1, 2, 3 and 4 score respectively. The recorded responses were counted and were ranked accordingly. The recorded responses were counted and converted into mean per cent score for each constraint by using Garrett's Ranking Technique. Garret's formula for converting ranks into percent was given by Percent position= $100*(R_{ij}-0.5)/N_j$

Where, R_{ij}= rank given for ith factor by jth individual

N_j= number of factors ranked by jth individual

Farmers were asked to give their valuable suggestions to overcome the constraints faced by them in the adoption of NFSM interventions. The suggestions offered were summarized on the basis of the number and per cent of respondents who reported for the respective suggestions.

RESULT AND DISCUSSION

Constraints faced by farmers in during cultivation of rice

It is important to understand the constraints faced by the farmers in order to increase their effectiveness and also to give suggestion to the policy makers. Constraints can give us the way we can plan our policy for betterment of the farmers. The ranking of constraints as perceived by beneficiary and non-beneficiary farmers have been presented in the table 1. Table 1 revealed that in case of beneficiary farmers, un availability of biofertilizer was the major constraints with per cent position 4.1 as beneficiary farmers had negative behaviour towards the application chemical fertilizer, followed by high cost of new machine (per cent position 12.5), then inadequate marketing facilities (per cent position 20.8) like lack of mandies in nearby places, more no of middleman, and also lack of MSP approved procurement facilities. Other constraints faced by the beneficiary farmers were lack of irrigation facility (per cent position 29.2), low education status of the farmers (per cent position 37.5), un availability of credit in proper time (per cent position 45.8), un availability of input in proper time (per cent position 54.2), lack of timely availability of labour (per cent position 62.5), low benefit from rice cultivation (per cent position 70.8),

lack of confidence in rice cultivation (per cent position 79.2), lack of departmental guidance (per cent position 87.5) and at last un availability / timely availability of quality seed (per cent position 95.8). However, for the non-beneficiary farmers un availability of bio fertilizer also the measure constraints with per cent position 4.1 followed by lack of irrigation facility (per cent position 12.5) then high cost of machineries (per cent position 20.8). The other constraints were marketing constraints (per cent position 29.2), lack of departmental guidance (per cent position 37.5), unavailability / timely availability of quality seed (per cent position 45.8), un availability of input in proper time (per cent position 54.2),low education status (per cent position 62.5), un availability of credit in proper time (per cent position 70.8), low benefit from rice cultivation (per cent position 79.2), lack of confidence in rice cultivation (per cent position 87.5) and lack of timely availability of labour (per cent position 95.8).

Suggestions given by the beneficiary farmers to overcome the constraints faced by them and for further improvement of NFSM programme.

It was necessary to get knowledge of how beneficiary farmers want these constraints to be sorted out. So, it is required to understand the view points of the beneficiary farmers to overcome

several constraints faced during the cultivation of rice under NFSM programme. For the evaluation or improvement of any programme, suggestion should always be taken from the beneficiary respondents and also from the implementing extension agencies working at the grass root level. Based on the perception of the beneficiary farmers several suggestions were ranked and presented in the table 2

It was observed from Table2 that majority (83.33%) of the farmers reported that vermicomposting facilities should be provided as soon as possible because, majority of the farmers of this tribal area perceived that chemical fertilizer and pesticide reduce the fertility of the soil so, they want some organic measures to meet the fertilizer and pesticide requirement. Mostly they want vermicomposting facility as this practice require less cost and farm and kitchen waste were easily utilized as raw material and also marginal farmers can get additional source of income by selling it in the market.

After vermicomposting efficient irrigation facility was found the next priority by the 75 per cent of the beneficiary farmers. Though NFSM programme provide better technology but due to lack of proper irrigation facilities farmers could not get proper yield. As some of the selected villages situated in the hills, slope of the land was found very high so farmers face problem to meet the

irrigation need for the cultivation of rice as runoff of the water was maximum. So, farmers reported for efficient irrigation facility and also with proper technique.

About 61.67 per cent farmers suggested that provision of adequate amount of power tillage facility and other low cost implements to increase the efficiency in farm operation and also to avoid labour problem. After this about 53.33 per cent farmers suggested for the development mandies in the nearby places followed by 50 per cent farmer reported for shorting out the marketing problems and problems in selling of paddy. About 46.67 per cent farmer suggested for the fixing of proper price of rice for each year.

The next suggestion was the development of proper storage warehouse facility. About 31.67 per cent farmers suggested for the development of proper storage warehouse structure by the government. Provision of more no of threshing floor facility was suggested by 26.67 per cent farmers. About 21.67 per cent farmer suggested for timely availability of good quality seed and other inputs and about 18.33 per cent farmers suggested for conducting adequate number of kisanmela, field day, and demonstration campaigns.

CONCLUSION

From the above study it was concluded that there are several constraints faced by the farmers but among these unavailability of bio-fertilizers was the major constraints as all most all the farmers had negative behavior towards the application chemical fertilizer and more concern towards organic fertilizers, followed by high cost of new machinery and marketing constraints. The study also revealed some suggestions like provision of vermicomposting facilities, efficient irrigation facility, provision of adequate number of power tiller facilities and other low cost implements, development of mandies and provision of warehouse facility etc. as perceived by the farmers of this district.

REFERENCES

Narayan NS (2013). Constraint analysis of rice farmers of Nellore district of Andhra Pradesh. M.Sc Thesis, Acharya N.G. Ranga Agricultural University, Rajendra Nagar, Hyderabad.

Pardhi RM (2012). Impact assessment of National Food Security Mission on paddy production in Bhandara district of Maharashtra, Jawaharlal Nehru KrishiVishwaVidyalaya, Jabalpur.

Scribdhttps://www.scribd.com/doc/47487605/Henry-Garrett-Ranking-Techniques

ScribdKandhamal district profile, http://kandhamal.nic.in/

Scribd NFSM online available at http://www.nfsm.gov.in/

Table 1 Constraints as expressed by the beneficiary and non-beneficiary farmers during rice cultivation

Sl. No.	Constraints faced by the farmers	Percent position		Rank	
		BF	NBF	BF	NBF
1	Un availability of bio-fertilizer	4.1	4.1	I	I
2	High cost of machinery	12.5	20.8	II	III
3	Marketing constraints	20.8	29.2	III	IV
4	Lack of irrigation facility	29.2	12.5	IV	II
5	Low education status of farmers	37.5	62.5	V	VIII
6	Un availability of credit in proper time	45.8	70.8	VI	IX
7	Un availability of input in time	54.2	54.2	VII	VII
8	Lack of timely availability of labour	62.5	95.8	VIII	XII
9	Low benefit from rice cultivation	70.8	79.2	IX	X
10	Lack of confidence in rice cultivation	79.2	87.5	X	XI
11	Lack of departmental guidance	87.5	37.5	XI	V
12	Un availability/ timely availability of quality seed	95.8	45.8	XII	VI

BF= Beneficiary, NBF = Non-beneficiary

Table 2 Suggestion of beneficiary farmers for further improvement of NFSM programme ($n_1 = 60$)

Sl. No.	Suggestions of farmers for improvement	F	%	Rank
1	Provision of vermicomposting facility	50	83.33	I
2	Efficient irrigation facility and technique should be provided	45	75.00	II
3	Provision of adequate quantities of power tillage facility and other low-cost implements	37	61.67	III
4	Development of mandies nearby places	32	53.33	IV
5	Marketing problems and problems for selling of paddy should be shorted out soon as possible	30	50.00	V
6	Fixed price should be maintained	28	46.67	VI
7	Storage warehouse structure should be created by the government	19	31.67	VII
8	Provision of more no. threshing floor facility	16	26.67	VIII
9	Timely availability of good quality seed and other inputs	13	21.67	IX
10	Organization of Kisanmela , Field day and demonstration campaigns adequately.	11	18.33	X

F = Frequency   % = Percentage

RESEARCH ARTICLE

Utilization of Dryland Agricultural Technologies Recommended by MPKV, Rahuri

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ABSTRACT

The study was conducted in Sangli district. The research findings indicated that there was a medium level of utilization of dryland agricultural technologies recommended by MPKV, Rahuri which resulted in its incomplete and poor utilization. Therefore, the extension agencies need to organize training programmes for increasing the farmer's knowledge and ultimately utilization of these technologies.

Key Words : Dryland,Utilization,MPKV, Rahuri .

INTRODUCTION

Agriculture forms the backbone of the Indian economy. India achieved spectacular agricultural growth since 1966. The foodgrain increased from 52 mill. tons in 1950-51 to 259.32 mill. tons in 2015-16 (Economic survey of India, 2016-17). But still productivity of rainfed agriculture is very low and need to be given more emphasis on it. Out of 192.2 mill. ha. of gross cropped area in 2012-13 in India, 86.42 mill. ha. (45 %) area is irrigated. It indicates that in India 55 per cent of the farming depends on seasonal rainfall (Economic survey of India, 2016-17). Rainfed agriculture accounts for more than 40 per cent of total food grain production, 75 per cent of oilseed and 90 per cent of pulses in India (Roy *et al.* 2010).

In Maharashtra, the fortune of agriculture on a large chunk of area depends on temporal and spatial distribution of south-west monsoon rains. Out of 22.61 mill. ha. gross cropped area in 2012-13 in Maharashtra only 4.05 mill. ha. (17.9 %) is irrigated and remaining 82.1 per cent area comes under dryland agriculture (Economic survey of Maharashtra, 2016-17). In 2016, the Government of Maharashtra has declared 15 districts comprising 11,801 villages as drought affected (www.reliefweb.net).

The State had made pioneering efforts in evolving improved dry farming technologies or practices at Dryland

Farming Research Station, Solapur since 1933 and has advocated many improved dryland technologies for the farmers which are recommended by MPKV, Rahuri. The Zonal Agricultural Research Station (ZARS), Solapur has released several crop varieties and recommendations for dryland agriculture from 1933 to 2016. These technologies have contributed towards increasing and stabilizing crop production in dryland area. It is essential to adopt these technologies by the farmers to increase the production and productivity of various crops in dryland areas.

After going through various publications on dryland agriculture and discussion with scientists of ZARS, Solapur the following dryland agricultural technologies have been identified *viz*., Soil and water conservation technologies, Cropping system, Alternate land use system, Crop management technologies, Use of agricultural implements, Special cultivation practices for pigeon pea and Contingent cropping. The present study was purposefully undertaken to know as to what extent the recommended dryland agricultural technologies of the university have been utilized by the farmers.

METHODOLOGY

The study was purposively conducted in Sangli district. The Kavathemahankal and Jat tahsils were selected for the study on the basis of highest area under dryland agriculture. Five villages from each tahsil were selected for the study on the basis of maximum dryland area. Twelve dryland farmers were selected by simple random sampling method from each village, thus, forming a sample of 120 respondents. The Ex-post-facto research design of social research was used for the present study. Operationally; the utilization was defined as the extent of adoption of different improved recommended dryland agricultural technologies related to soil and water conservation, cultivation practices and varieties. One score was assigned for utilization of new technology and zero for non-utilization. A schedule was further developed in consultation with the ZARS scientists for knowing the utilization of dryland technologies. 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

Overall utilization of dryland agricultural technologies: The data regarding the overall utilization of dryland agricultural technologies are presented in Table 1.

Table 1 Distribution of the respondents according to their level of utilization of dryland agricultural technologies

Sr. No.	Utilization of technology	Respondents (N=120)	
		Frequency	Per cent
1.	Low (upto 9 score)	27	22.50
2.	Medium (10 to 16 score)	76	63.33
3.	High (17 and above score)	17	14.17
	Total	120	100.00
		Mean=12.40	S.D=3.64

It was observed from Table 1 that 63.33 per cent of the respondents had medium utilization ofdryland agriculturaltechnologies, whereas, 22.50 per cent and 14.17 per cent of them had used low and high utilization of dryland agricultural technologies, respectively.

This finding is in line with the findings of Malathesh *et al.* (2009) and Nenna and Ugwumba (2014).

Utilization of different dryland recommended agricultural technologies: The results about theactual utilization of different dryland recommended agricultural technologies are presented in Table 2.

Table 2 Distribution of the respondents by their utilization of the dryland agricultural technologies recommended by MPKV, Rahuri

Sr.No.	Name of technology	Utilization	
		Frequency (N=120)	Per cent
A)	**Soil and water conservation technologies**		
1	Compartmental bunding	63	52.50
2	Mulching	50	41.67
3	Ridges and furrows	120	100.00
4	Farm pond	48	40.00
B)	**Cropping system**		
1	Sequence cropping	120	100.00
2	Crop rotation	112	93.33
3	Intercropping	118	98.33
4	Double cropping	106	88.33
5	Strip cropping	93	77.50
C)	**Alternate land use system**		
1	Agri-horticultural system	88	73.33

2	Agri-silvicultural system	01	00.83
3	Silvi-pastural system	01	00.83
4	Horti-pastural system	61	50.83
5	Alley cropping	7	05.83
D)	**Crop management technologies**		
1	Crop planning according to depth and use of improved recommended varieties of *kharif* and *rabi* crops	46	38.33
2	Interculturing	60	50.00
3	Nutrient management	99	82.50
4	Integrated nutrient management	36	30.00
E)	**Use of agricultural implements**		
1	Two bowl ferti-seed drill	120	100.00
2	Jyoti planter	01	00.83
3	Bullock drawn multipurpose Phule Sheti Yantra	118	98.33
F)	**Special cultivation practices for Pigeon pea**		
	In dryland region at the time of delayed rainfall prepare seedlings in plastic bags and transplanting after 21 to 28 days on 90 x30 cm spacing.	01	00.83
G)	**Contingent cropping**		
	Second fortnight of July — Sunflower, pigeonpea, horsegram, castor, sunflower + pigeonpea(2:1), pearlmillet (ergot resistant varieties), pearlmillet + horsegram (2:1), pearlmillet + pigeonpea (2:1), setaria	50	41.67
	First fortnight of August — Sunflower, pigeonpea, castor, sunflower + pigeonpea (2:1), horsegram		
	Second fortnight of August — Sunflower, pigeonpea, castor, sunflower + pigeonpea (2:1)		
	First fortnight of September — Rabi sorghum for fodder (Sorghum varieties resistant to shootfly)		

A) Soil and water conservation technologies

It was observed from Table 2 that in soil and water conservation technologies, cent per cent respondents had utilized ridges and furrows, 52.50 per cent respondents had utilized compartment bunding, 41.67 per cent and 40.00 per cent respondents utilized mulching and farm pond, respectively.

B) Cropping system

The data further revealed that cent per cent respondents had utilized sequence cropping system. 98.33 per cent and 93.33 per cent of respondents utilized intercropping and crop rotation, respectively. It was found that 88.33 per cent and 77.50 per cent respondents had utilized double cropping and strip cropping, respectively.

C) Alternate land use system

Regarding alternate land use system it was observed that 73.33 per cent and 50.83 per cent respondents had utilized agri-horticultural system and horti-pastural system. However, alley cropping agri-silvicultural and silvi-pastural systems was utilized by meagre proportion .of respondents i.e. 5.83 per cent and 0.83 per cent each, respectively.

D) Crop management technologies

With reference to crop management technologies, it was observed that a large majority (82.50 %) of the respondents had utilized the nutrient management followed by interculturing (50.00 %), crop planning according to depth and use of recommended varieties (38.33 %) and integrated nutrient management (30.00 %).

E) Use of agricultural implements

As regards to the utilization of agricultural implements, it was observed from Table 2 that cent per cent of the respondents had utilized the Two bowl fert-seed drill and Bullock drawn multipurpose *Phule Sheti Yantra* (98.33 %), while, only 0.83 per cent respondents utilized the *Jyoti planter*.

F) Special cultivation practices for pigeon pea

It was observed from Table 2 that only 0.83 per cent of respondents had utilized this practice of preparing seedling in plastic bags at the time of delayed rainfall.

G) Contingent cropping

The data indicated that 41.67 per cent of the respondents had utilized the practice of contingent cropping in dryland area.

All above findings are in line with the findings of Wankhede (2004), Deshmukh *et al.* (2007), Chopade (2013), Nenna and Ugwumba (2014) and Romade (2016).

IMPLICATIONS

The research findings indicated that there was a medium level of utilization of dryland agricultural technologies recommended by MPKV, Rahuri which resulted in its incomplete and poor utilization. Therefore, the extension agencies need to organize training programmes for increasing the farmers' knowledge and ultimately utilization of these technologies. In addition to this result demonstrations need to be organized in cluster approach, especially in dryland farming tract of the

state for popularizing the recommended dryland agricultural technologies among the farmers. Further, the data revealed very less utilization of dryland agricultural technologies like mulching, cultivation of agri-silvicultural system, silvi-pastural system, alley cropping, integrated nutrient management, use of *Jyoti planter*, utilization of special cultivation practices for pigeon pea and contingent cropping. Thus, awareness of these technologies needs to be increased among farmers through mass media.

REFERENCES

Chopade, P.S. 2013. Adoption of dryland farming technologies. Unpublished M.Sc. (Agri.) thesis, MPKV, Rahuri.

Deshmukh, P.R.; Kadam, R.P. and Shinde, V.N. 2007. Knowledge and adoption of agricultural technologies in Marathwada. *Indian Research J. Extn. Edu.* 7(1): pp : 41-43.

Malathesh, G.B.; Shivamurthy, M. and Lakshman Reddy, B.S. 2009. Factors contributing towards socio-economic performance among the farmers on selected farming system in eastern dry zone of Karnataka. *Mysore J. Agricultural Sciences.* 43(3):53-536.

Nenna, M.G. and Ugwumba, C.O. 2014. Utilization of Organic Farming Technologies among Small-Scale Farmers in Anambra State, Nigeria. *International J. of Agriculture Innovations and Research*. Vol. 3, 2319-1473.

Romade, B.D. 2016. Constraints in adoption of dryland technologies. Unpublished Ph.D. (Agri.) thesis, MPKV, Rahuri.

Roy Burman; Singh, S.K. and Singh, A.K. 2010. Gap in adoption of improved pulse production technologies in Uttar Pradesh. *Indian Research J. Extn. Edu.* 10(1):99-104.

Wankhede, R.P. 2004. Adoption behavior of farmers with reference to selected dryland cultivation practices in Washim district. Unpublished M.Sc. (Agri.) thesis, MPKV, Rahuri.

Web references: www.reliefweb.net

RESEARCH ARTICLE

Innovation in Extension Methodology for Reaching to Unreached

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ABSTRACT

In the background of the evolution and the growth of the innovative extension methodology for reaching to unreached this paper has discussed various methodology which can be used to access large number of the farmers in better way including their betterment with minimum costs and fruitful results. Krishi Vigyan Kendra, Baramati has taken various initiatives for Reaching to Unreached and developed various innovative methodologies such as Use of ICT in Agriculture,Mobile SMS (K-MAS),KVK Website,Community Radio Station (CRS), aAQUA,*WhatsApp*Groups,Facebook etc.It is hoped if we can utilized the innovative extension methodology, the unreached farmers can be connected to mainstream for their betterment and extension could retain its due place as a vibrant scientific discipline in the country.

INTRODUCTION

Agriculture, being the backbone of 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 and cut down on costs by improving efficiency.There is, therefore, an urgent need to provide package of initiatives for transfer of technology, improving input use efficiency, promoting investments in agriculture both in private and in public sectors and creating a favorable and enabling economic environment. The emerging needs in agriculture sector now are adoption of location specific skill and knowledge based technologies, promote greater value addition to agriculture produce, forge new partnerships between public institutions, technology users and the corporate sector, harness IT more effectively to realize financial sustainability and compete in the international market.For transmitting the latest agriculture techniques to the Farmers' field, orienting them to establish better relationship with banks, adoption of latest post-harvest handling technology, value addition, etc. and enjoy the benefits

of collective bargaining power both for procuring inputs and select their produce, there is a need for integrated approach both for the introduction of the technology and increasing the adoption level. Extension system of Ministry of Agriculture, Government of India is working for the transfer of technology through various line departments and KVK system. Even though, all the stakeholders are working, but there is possibility of reaching to unreached through different extension methodologies.

Krishi Vigyan Kendra, Baramati has taken various initiatives for Reaching to Unreached and developed various innovative methodologies as follows:

1. Use of ICT in Agriculture
a) Mobile SMS (K-MAS)
b) KVK Website
c) Community Radio Station (CRS)
d) aAQUA
e) *WhatsApp G*roups
f) Facebook
g) Touch Screen Kiosk
h) V-ATIC: Village Level Agriculture Technology Information Centre
i) Development & Utilization of Mobile Apps
2. Centre of Excellence for Vegetables (An Indo Dutch Project)
3. HTA: Honorary Training Associateciate
4. Custom Hiring Centre
5. KRUSHIK – Live Demonstration cum Agri Expo
6. Farmer Producer Organization (FPO)
7. Utilization of Indian Postal Services for Soil Testing
8. Soil Testing Services through Mobile Lab
9. Farmer's Club
10. Self Help Group (SHG)
11. Commodity Interest Group (CIG)
12. Campaigns & Projects via Public Private Partnership (PPP)
13. Convergence
14. Grain Festival
15. ChaitraPalavi (State Level Workshop of Leader Farmers)
16. Skill Development Programmes
17. Plant Health Clinic
18. Pollination Services

1. Use of ICT in agriculture:

a) Mobile SMS (K-MAS): Kisan Mobile Advisory Services: Information Technology offers immense potential in enhancing the efficiency and effectiveness of agricultural extension programs and dissemination of the best practices. However, it is to be taken care that we have low internet penetration and as a matter of fact, the rural internet penetration is restricted to only few states and regions. The mobile based farmer advisory system is the best alternative solution. For instance, with the help of ICT tools, Kisan Mobile Advisory Services has been

introduced by KVK Baramati since 2004. As many farmers even in rural parts possess mobile phones, communicating to them through mobile SMS (Short Messaging Services) is very fast & accurate, less time consuming & cheaper. In collaboration with IMD &MPKV, Rahuri University, the messages in local language has been sent to the farmerswhich incorporates weather alerts, market information, technical advisory and consultancy. The market & weather information is sourced from APMC &IMD, interpreted & broadcast according to the varying needs of the farming community.

b) **KVK Website:** A website, also written as web site or simply site is a set of related web pages typically served from a single web domain. A website is hosted on at least one web server, accessible via a network such as the internet or a private local area network through an internet address known as the Uniform Resource Locator (URL). All publicly accessible websites collectively constitutes the World Wide Web (www). KVK Baramati have started website www.kvkbaramati.com to provide the information to the farmers as well as the extension officials. KVK also published their success stories, newsletters, articles, brochures, folders, and leaflets in the

form of hard & soft copy. The hard copies are sent mostly to the farmers and other stakeholders not able to access internet services. While, e-articles, newsletters, brochures, folders, leaflets are loaded on the KVK website & copy of the same are sent via emails to the partners & stakeholders regularly.

c) **Community Radio Center -Sharada Krishi Vahini 90.8MHz**: Community Radio Station is an attempt to make best use fo the most widely available but least explored communication technology, The Radio. KVK Baramati offers Sharada Krishi Vahini Radio (90.8 MHz) for broadcasting services for farming community to encourage farmers to listen & provide their feedback on the agricultural broadcasts. CRS reaches out to various people simultaneously in diverse locations such as farms, at local shops, public places, as long as radio is within the reception range. The end users just needs to have an FM radio to listen to the broadcast. Radio as an affordable and sustainable ICT technology, will not only supplement the information dissemination processes of KVK, but will also offer a platform of "accessible" media to the farming community who can share their experiences with wider audience on

all agriculture related issues, can help to reach the unreached.

d) **aAQUA** (Almost All Questions Answered) is a multilingual Expert advisory service that has been designed jointly by IIT Mumbai & KVK Baramati, providing answers to agriculture related questions asked over the internet. The portal can be viewed on www.aaqua.org.The aAQUAeAgri Service is a problem-solving system dedicated to find solutions to problems posted by Indian farmers - small and large. Answers to agri-related queries are sent in 24X7 hours depending on the difficulty. Almost all of the questions have been answered in the local language (Marathi) with English answers given to people posting from outside the state. Local farmers trust the aAQUA service and are sensitive to the time it takes for the answers to arrive (current average is 1-2 days). The key to our success is that our technology enables consultancy services with people residing where they are.

e) *WhatsApp Groups:* WhatsApp messenger is a cross-platform instant mobile messaging app which allows you to exchange messages without having to pay for SMS. WhatsApp messenger is available for iPhone, Blackberry, Android & Windows phone because WhatsApp messenger uses the same internet data plan that is used for email & web browsing. So, there is no cost to message sent or received. In addition to basic messaging, WhatsApp user can create groups,send each other unlimited images, video & audio media messages. KVK Baramati has developed various commodity interest groups on WhatsApp, i.e. different crop based. Any information related to particular subject has been forwarded in the form of Message, Photo, audio/video clip etc. If farmers in a group want any information regarding Pest diseases & recommendation they are sending their problems on these groups & within 24 hrs identification of the problem & its recommendation will be send to the concerned farmer for its final utilization. Likewise, this information can be also useful to other member of the same group. Now this technology has become a very easy mode of transferring the technology to commodity wise group.

f) **Facebook:** With over one billion profiles globally, Facebook enables its exceptionally active users base to freely share information about their lives particularly through pictures & videos. Users access a wide array of functions, including phone, chat, payment, and login, 17 to meaningfully connect both through

Facebook's website and across the internet via plug inns on other websites. KVK Baramati also taken effort to link the people around the world to know and get feedback on KVK activities for which KVK is also active in social networking sites- "Facebook". This helps the unreached to reach KVK by giving their feedbacks & asking their problems for getting final solutions.

g) **YouTube:** You Tube is a video sharing website. This service was created by three former PayPal employees in February 2005. In November 2006, it was bought by Google. YouTube now operates as one of the Google subsidiaries. ADT's KVK Baramati is working in collaboration with Google since 2015 and as such through the KVK website, various contents available which includes video clips, TV clips, music videos, short original videos and educational videos. Most of the content on YouTube has been linked by KVK Baramati on their website, so that the unregistered user can also watch videos and registered user can upload videos to the channel.

h) **Touch Screen Kiosk:** An interactive kiosk is a computer terminal featuring specialized hardware and software that provides access to information and applications for communication, commerce, entertainment, and education. Integration of technology allows kiosks to perform a wide range of functions, evolving into self-service kiosks. ADT's KVK Baramati has installed a Touch Screen Kiosk. Any one by just pressing the keys can access the information. Information related to Crop Doctor, Crop Recommendation, Weather & Agro advisory, Training schedule, KVK products is made available in local *Marathi* language. Also it can be connected to the internet & access by the farmers through V-ATIC.

i) **V-ATIC: Village Level Agriculture Technology Information Centre:** ATIC (Agricultural Technology Information Centre is available in all universities & KVK for accessing various technology & material to display & demonstrations. Likewise, KVK Baramati had started the same concept in cluster of villages viz, V-ATIC. In this V-ATIC, location specific technology is displayed in this center related to the crops & other enterprises available in the area. Likewise, Custom hiring center, Market information centre, various product of KVK is also available through this center.

j) **Development & Utilization of Mobile Apps:** KVK has developed two Mobile Applications. One is developed under PPP Grape Project which provides weather information

as well as precaution/measures needs to be taken for diseases& pests.KVK Baramati also working on Honey Bee Project withCropLife Asia, in which an android app 'MadhuSandesh' has been developed. This enables a two way connect between bee keepers and farmers. This facilitate farmer participant to enjoy improvement in crop yields and quality from pollination services.

2. **Centre of Excellence for Vegetables (An Indo Dutch Project):** In May 2012, an overall MOU was signed between the Dutch and Indian Agricultural ministries and work plans were defined. In these work plans, India and the Netherlands agreed to make available Dutch agro-knowledge, technology, research and education for the Indian food production and processing sectors. Furthermore, the governments agreed to support public-private collaborative projects between the two countries. The concept of a Centre of Excellence as proposed in the Action Plan is a showcase and knowledge repository of the best-in-class Netherlands technical practices in the product/ area in focus, as relevant to the Indian context. The CoE are structures in which various development projects implemented by the State Governments can be captured. Under Indo-Dutch Action plan it is proposed that 4 Centre of excellence will be done in states of Maharashtra, Kerala, Punjab and Karnataka. The approval of competent authority for establishment of centre of excellence for vegetable production, at KVK Baramati, Maharashtra is given in Sep 2014 and by State it has been given on 12[th]Jan 2015.It is first of its kind under Indo-Dutch Action Plan.Similar kind of efforts has been already done under Indo-Israel action Plan.

The goal of the project is to establish demonstration centre for effective dissemination of different innovative Dutch technologies through the trainings to Extension officers and farmers in the region.

The Objectives of the Project are--

- To Supply of quality Planting Material of vegetables.
- Demonstration of Hi-tech protected cultivation technologies.
- Efficient use of water & fertigation through atomization.
- Standardizing good agricultural practices for achieving higher yield.
- Training to farmers, various levels of officers, NGO's, Private Entrepreneurs, etc.
- Development of vegetable value chain.
- Employment generation.

- Market intelligence to maximize the income.

Even though KVK Baramati is working in 7 tehsils for Pune district but through this Center of Excellence for Vegetables the unreached farmers requiring Hi-tech Dutch technology can be reached very easily through planting material, trainings & demonstrations.

3. **HTA(Honorary Training Associateciate):** Honorary Training Associateciate (HTA) are the master trainers those have taken skilled training at KVK, they are the ambassadors of KVK for disseminating the agricultural technologies through the same member of the farming community. KVK is providing an identity card to the HTAs & utilizing them as a faculty member for various trainings & extension activities for reaching to unreached.

2. **Custom Hiring Centre:** Indian agriculture is undergoing a gradual shift from dependence on human power and animal power to mechanical power becauseof increasing cost for keeping of animal and growing scarcity of human labour. Further, use of mechanical power has a direct bearing on the productivity of crops apart from reducing the drudgery and facilitating timeliness of agricultural operations.Thus there is a strong need for taking farm mechanization.Mechanical power is largely consumed in big land holdings and is still beyond the reach of small/marginal holdings which constitute around 80% of the total land holdings. This is due to the fact that the small/marginal farmers, by virtue of their economic condition are unable to own farm machinery on their own or through institutional credit. Therefore in order to bring farm machinery available within the reach of small/marginal holdings, collective ownership or Custom Hiring Centres needs to promote in a big way. This model scheme is prepared to demonstrate the banks that financing for establishment of Custom Hiring Centres are a financially viable unit. ADT's KVK Baramati established 3 Custom Hiring Centers in KVK jurisdiction. Small & marginal farmer is taking benefit of this custom hiring centre.

Objectives:

- To make available various farm machinery / equipment to small and marginal farmers
- To offset the adverse economies of scale due to high cost of individual ownership
- To improve mechanization in places with low farm power availability
- To provide hiring services for various agricultural machinery/implements applied for different operations.

- To expand mechanized activities during cropping seasons in large areas especially in small and marginal holdings.
- To provide hiring services for various high value crop specific machines applied for different operations.

4. **KRUSHIK – Live Demonstration cum Agri Expo:** Keeping in view Seeing is Believing & to reduce the time lag between the technology transfer from research institutions to the farmers field for increasing production, productivity and income from the agriculture and allied sectors on a sustained basis, Agricultural Development Trust's Krishi Vigyan Kendra (KVK) have taken the initiative to organize the KRUSHIK, Live Demos & Agri Expo each year at KVK Instructional Farm, Baramati.

The debut edition of 'KRUSHIK' was a huge success with over 400 exhibitors and around 3, 21,789 visitors throughout the country attended the 3 days exhibition in 2015. With a motivation to put up a better show, the current edition of 'KRUSHIK' will have an even more extensive profile of exhibitors from the entire value chain of the agricultural sector: farming, processing, preserving, quality management, distribution & also the Insurance services, from all over the country participating in this 4-day Exhibition spread over 110 acres.

Highlights of Current edition of Krushik:

- Over 400 companies both from India and abroad will showcase their Agricultural Technologies & inputs.
- Live demonstration on 110 acres of land with variation of cropping patterns.
- An expected turnout of over 3.5 lakh farmers across India. International Participants and
- Expert's Panel Discussion on agricultural technologies & latest issues.
- An opportunity to connect with successful farmers and learn their best practices with knowledge sharing.
- Direct dialogue with government officials and policy makers for clarification of uncertainties of agriculture.
- Special lounge for interaction and networking.
- Forums and expert sessions on modern technology in farming given by industrial professionals.

So through this KRUSHIK – Live Demo cum Agri Expo, unreached farmers from all over India can get the advantage of this PPP mode activity.

5. Farmer Producer Organization (FPO): Farmer's cooperatives and Associateciations have been highly effective in enhancing linkage with markets through greater and easy access to new technologies, information and inputs besides enhanced bargaining power through collective action. Farmer's producer Companies have emerged as a powerful and effective model of building strong grassroots institutions for enhancing the economic viability and marketing potential of farmers. It aims to integrate smallholders into modern supply network. Producer companies are the legal institutions, registered under GOI's producer company Act-2013, their main activities includes production of identified commodity, branding and trading of agricultural inputs, marketing of products etc. they hire consultant for advisory services to farmers and promote local initiatives in the fields. Development of supply chain, processing, value addition and branding of products are also taken up by them. Small and marginal farmers from all companies become a seed produces. They are producing breeder, foundation and certified seed. Three companies has started a Agri. Service centers for supply of quality and cost effective inputs.

However, the challenges in growth of farmer's producer organization are galore. This is initial phase of development and it is very challenging as FPOs lack financial capabilities and basic infra structures like grading, packaging and storage. Financial and infrastructural support should be provided during the initial establishment years.Facilitating environment for skill up gradation of farmers in area of new technologies, quality standards, certification, business planning and development, market imperatives and quality standards to promote FPOs and business culture among the farming community for their welfare. KVK Baramati has been working on developing Farmer Producer organizations (FPOs) from the last year in collaboration with ATMA and NABARD. KVK works with over 10 FPOs of which 3 are under direct implementation and 7 FPOs are being developed in partnership with other department and NGOs. We are providing support tovariety of organizations in different domains and geographies in transforming community based organizations and producer organization into sustainable institutions. KVK built on its experiences, expertise and tools to transform FPOs.FPO's are group of farmers came together to establish

their company. There are nearly 500 members/share holder which are the small farmers producing various vegetables & fruit crops. Even though producing very good quality fruit & vegetables they are not getting the market. But as they come together they are marketing their produce through FPO's. KVK facilitated these FPO's to have linkages with agencies exporting fruits & vegetables to 5 star hotels, Macdonald, Pizza Hut, Dominos etc. Now Baramati Farmers Producer Company is exporting 100 tons of vegetables for every month to these agencies & earning maximum profit from their produce without any middle man. Likewise, they have signed an MOU with the agency for market rate through the year which could not create conflict for financial matter.Some of the exporters are in contact with these FPO's for exporting pomegranate, grapes, vegetables etc. to the European Union. Hence they are getting very good prices through the year. Such types of FPO's registration are increasing day by day in other parts of Maharashtra dealing with various agriculture commodities. KVK is taking care of various value chains for proving market guidance to the FPO's for their bright future.

6. **Utilization of Indian Postal Services for Soil Testing:** KVK system is working very efficiently at grass root level. They are converging with various line departments. Even though, there is a problem of reaching to unreached. KVK Baramati has started an innovative concept in which training was conducted for the Post Master of the Village Level Post Offices, who will serve as the channel/ middlemen for the KVK and Farming Community. They are collecting the soil samples from the farmer's field and sending it to KVK earliest through post services. Likewise, the farmers have to pay the soil testing fees at post office & there is no need of farmer to come to KVK for submission of soil sample. They will get the Soil Health Card/ Report with the recommendations through the Postal department. This has helped the small & marginal farmers to reach KVK directly through postal department.

7. **Mobile Soil Testing Services through Mobile Lab:**As KVK Baramati is working on group approach, so many groups in the form of Farmers Club, FPO, SHGs has been developed by KVK Baramati. Most of the farmers from the KVK operational area are living more than 50-100 km away from the centre. For them, it is not affordable to bring soil sample to KVK. On the basis of demand from the group, the soil

mobile testing services was utilized for the group of farmers those who want to collect more than 100 soil samples for getting report. Themobile van services is provided to them on affordable prices. Mobile Van goes to the villages, collects the samples and tests some elements by the Soil testing Kit and provides the report on the same day.

8. **Farmer's Club:** Farmers' Clubs are grassroot level informal forums. Such Clubs are organized by rural branches of banks with the support and financial assistance of NABARD for the mutual benefit of the banks concerned and rural people. The farmer Club is the representative group of the village that is generally is followed by the other villagers in case of technology adoption. The broad functions of the Farmers' Clubs would be to:

- Coordinate with banks to ensure credit flow among its members and forge better bank borrower relationship,
- Organize minimum one meeting per month and depending upon the need,there would be 2-3 meetings per month. Non-members can also be invited to attend the meetings.
- Interface with subject matter specialists in the various fields of agriculture and allied activities

etc., extension personnel of Agriculture Universities, Development Departments and other related agencies for technical knowhowup gradation. For guest lectures, even experienced farmers who are non members from the village/ neighboring villages could be invited,

- Liaison with Corporate input suppliers to purchase bulk inputs on behalf of members.
- Organize/facilitate joint activities like value addition, processing, collective farm produce marketing, etc.; for the benefit of members. They can also sponsor/ organize SHGs,
- Undertake socio-economic developmental activities like community works, education, health, environment and natural resource management etc.
- Market rural produce and products.

KVK has established154Farmers' clubs in 3 districts i.e. Pune, Solapur&Satara of Maharashtra out of those 13 farmers clubs are women's farmers clubs. The clubs decide their plan of action for the year in consultation with the KVK & KVK arranges to deliver the information or invite scientists from various research organizations. These programs are called meet with the experts.

The farmers come together to discuss issues pertaining to agriculture &share remedies. They get enriched by the interaction with the experts that takes place every month. Farmers have started taking lead in contract farming, Seed village concepts, Cooperative farming in green houses. Some of the farmers clubs are converted into Farmers Producer Organization (FPO).

9. **Self Help Group (SHG):**Self-help groups engaged in development activities have the potential to empower their members through the provision of knowledge, skills, motivation, and competencies that underpin sustainable agriculture. Some studies revealed that, besides contributing toward economic development, these groups are important for social networking. While social activities are more prominent among groups with members who are wealthier, larger groups with more wealthy members mainly sought access to advanced technical information.

   Group involvement helps to establish appropriate marketing relationships and to minimize input costs. Women Self help Groups are the one, who are trained in case of processing, agri-allied business, livestock management, poultry, etc.

   The KVK has also established 1142 farmers self-help groups out of that 834 are women SHGs. KVK is encouraging the illiterate women from rain fed areas to do more productive farming that can reduce their drudgery too. The women from these self-help groups have taken loans from the group for agro related self-employment such as Cow or buffalo keeping, goat keeping, vermicomposting, group dynamics in marketing etc.

10. **Commodity Interest Group (CIG):** Commodity interest groups are established by KVK since 2008-09. There are eight different commodities which are grown on large scale in the districts are selected like pomegranate, Banana, Fig , Custard apple, milk, Citrus, Tomato, seed production and newly added Turmeric is included in these group. These groups are trained for improved technologies through demonstrations, trainings, and exposure visits and by different methods of transfer of technologies. Each group meets on particular day of the month and shares their experiences with other farmers. This is one of the interactive forum through which knowledge is passed to majority. There is no limit for the membership and no any charge so any one can join and get knowledge from the group.

11. **Campaigns & Projects via Public Private Partnership (PPP):** Public

Private Partnership constitutes a new mode of operation in many fields of development including the development of innovation in the agriculture from developing countries. Indian agriculture is facing several challenges and also uncommon opportunities. The challenges in term of climate change and land degradation and increasing global trade restrictions are also providing opportunities to redefine the ways we have to deal with the production and post harvest processes. A new paradigm that has emerged in the recent years to address the problems and potentials in a holistic manner is the "Public- Private Partnership (PPP)". In PPPs, at least one public and one private organization share resources, knowledge & risk to achieve a match of interest and jointly deliver product & services. PPP can be seen as arrangements that bring together partners with different skills and knowledge to contribute jointly to the generation, adaptation, and/ or diffusion of an innovation. Likewise, KVK Baramati has conducted various projects and campaigns on PPP mode in which, large number of farmers can be reached and all the partners have win-win situation finally resulting the development of farming community.

12. **Convergence:** In KVK system funds under technical contingency are limited, so we are conducting different programmes by taking support from different line departments like NABARD, ATMA, NHM, State Agricultural department, NDDB, Animal Husbandry department, Sugar factories, Zila Parishad, Panchayat Samiti, different private companies for the extension activities of agriculture & allied sciences. We are conducting these programmes with different departments with win-win situation for all the stake holders.

13. **Grain Festival:** In KVK Baramati Jurisdiction area Farmers are cultivating paddy, wheat, sorghum, pulses, watermelon, muskmelon, Bengal gram, finger millets, turmeric and vegetables as major crops. Traditionally they sell their products to traders and middle men at low rates & on other side consumers are purchasing same products at higher rates. Farmers and consumers both expect reasonable prices to the farm products. To overcome this problem KVK has decided to organize a *DhanyaMahotsav* (Food Grain Festival*)* in Baramati. The objective of Grain Festival to bring the farmers and consumers on one platform where the farmers could directly sale their

product to consumers avoiding middle men/traders.

In this new initiative of KVK, Baramati, farmers from nine different blocks from four districts viz. Pune, Satara, Sangli and Solapur of Maharashtra participated in the food grain festival with their farm produce. Nearly 51 farmers club and 5150 families participated in the festival and the consumer purchased farm produce worth Rs. 42, 37,250/-. Local.Agri Produce Marketing Committee (APMC) provided the space free of cost to the KVK to organize the Food rain Festival.

14. **ChaitraPalavi (State Level Workshop of Leader Farmers):** ADT's KVK Baramati organizes State Level Leader Farmers workshop from last 4 years on burning agriculture issues like Allied Enterprises, Agricultural Marketing, Climate Change, Drought situation etc. Agricultural leaders from different districts of state participatedin the programme. At the end of programme region wise action plan is prepared & submitted to different departments which helps to reach to unreach throughout the state. This workshop includes group discussion, field visits & experience sharing & guidance of progressive farmers, entrepreneurs & department people.

15. **Skill Development Programmes:** The main goal is to create opportunities, space and scope for the development of the talents and to develop more of those sectors which have already been put under skill development for the last so many years and also to identify new sectors for skill development. The emphasis is to provide training & skill to farmers, rural youth & rural women in such a way so that they get employment and also improve entrepreneurship. ADT's KVK Baramati provides Skilled training as Agri Clinics &Agri Business to Agricultural graduates regarding entrepreneurship development. For farmers, rural youth & rural women training programmes like Dairy management, Poultry management, Goat management, Green house management, Gardeners training, Fruit processing, Agri& Eco tourism. All these trainings are learning by doing type.

16. **Plant Health Clinic & Bio-Control Laboratory:** Failure in timely diagnosis of diseases and other pests has often been responsible for devastating losses. Reducing crop losses by keeping pests at bay is crucial to food security. Plant clinic is an innovative paradigm which plays a vital role in assuring food security and ushering prosperity by providing

timely diagnosis and rendering necessary advice to the growers, gardeners and other stakeholders for managing pest problem.

Plant clinics are all about plant health. Though the major role of plant clinic lies in diagnostics and advisory, the activities of plant clinic extend beyond plant clinic, with emphasis on extension, working more closely with farmers and organizations involved in promoting food production. By taking help of WhatsApp the farmers group are sending various problems in the form of photos, videos & through plant health clinic they are getting recommendations.

17. **Pollination Services:** Considering the importance of pollinators in crop production and BeeKeeping as an agri allied business, KVK Baramati has started the Apiculture Unit in July 2012. Initially, there were 50 BeeHives of *Apismellifera*, which was used for supply for pollination purpose to the farmers on rental basis. Also, the trainings are conducted on BeeKeeping as A Business.

Recently, KVK Baramati has 250 Bee colonies of *Apismellifera* under the MadhuSandesh Project in collaboration with Crop Life India & ICAR, New Delhi. The main objective of this project is to develop the awareness in farming community for Honey Bee & pollinators and Safer Use of Pesticides. In this training, pomegranate & onion seed producing farmers were selected on pilot basis. The farmers were given the trainings for BeeKeeping, they were supplied the BeeHives on rental basis for pollination with field level training on Safer Use of Pesticides. MadhuSandesh App was designed to take the farmers, the BeeKeeper& the expert on the same dias, to save/ conserve the pollinators population in the vicinity.

CONCLUSIONS

In the background of the evolution and the growth of the innovative extension methodology for reaching to unreached this paper has discussed various methodology which can be used to access large number of the farmers in better way including their betterment with minimum costs and fruitful results. It is hoped if we can utilized the innovative extension methodology, the unreached farmers can be connected to mainstream for their betterment and extension could retain its due place as a vibrant scientific discipline in the country.

REFERENCES

Anonymous (June 2012), Handbook on organization and management of commodity interest group (Kanna).

Brought put by CBTMPCS, UAS, GKVK, Bangalore.

Harender Raj Gautham (2012),Can we check migration from rural area. Kurukshetra.Vol 60(4), 6 -7.

htttp://indiansearchjourlas.com/pdf/IJMFSMR/2012/June/16.pdf.

Khan David 2013. Market –oriented farming : an overview . FAO, Rome.

Kumar, G.A.K.2015. An overview of extension research in India.Personal Communication.

Gowda C.M.J., Dixit S, Burman R and Ananth P.N. 2014. Extension Research and Technology

development Blog 29, Agicultural extension in South asia.

Meena, M.S, Shobhana Gupta, P.P. Rohilla and R.B.Kale (2015), Harnessing ICTs fordissemination of agricultural knowledge through KVKs: Way Forward : ISEE National Seminar on extension innovations and methodologies for market-led agricultural growth and development: 104-116.

Policy and process guidelines for Farmers Producer Organization (2013), Govt. of India, Ministry of Agriculture, Department of agriculture and cooperation.

Prasad C, B.N.Chaudhary and K.S. Krishnan (1990), Impact of Agricultural Modernization on farm women in rainfed areas: an indian case study in "Extension Designs and Gender Issues in Rainfed Agriculture" published jointly by Indian Society of Extension Education, IARI, New Delhi, India and International Fund for Agriculture Development(IFD), Rome, Italy.

Promoting market access for the rural poor in order to achieve the Millennium Development Goals, February 2003.Roundtable discussion paper for the Twenty-Fifth Anniversary Session of IFAD's Governing Council.

Ruthenberg Hans (1971), Farming System in tropics . Clarendon Press, Oxford.

Sulaiman V Rasheed (2011), Extension –plus : new roles of extension & advisory services in agriculture innovation systems and investment source book.

Sulaiman V Rasheed (2012), Agricultural Extension in India: Current status and way forward background, paper prepared for the roundtable consultation on Agricultural Extension, Beijing, March 15-17.

RESEARCH ARTICLE

Effectiveness of Krishidarshan Programme of Nagpur Doordarshan as Perceived by the Farmers

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ABSTRACT

Doordarshan has played a crucial role in bringing the new technology in agriculture to the doors of farmers. Television is an electronic audio video medium or telecasting programme to the viewers, this medium is cosmopolite in accessibility and is suitable for communication to millions of people widely spread and situated in remote areas. The present study of effectiveness of Krishidarshan programme of Nagpur Doordarshan as perceived by the farmers with a sample size of 120 television viewers selected with 12 different villages of four talukas. Majority of the respondents were comes under high level of perceived effectiveness about Krishidarshan program of Nagpur Doordarshan. 71.67 per cent of Krishidarshan televiewing farmers were having high level of perceived effectiveness about Krishidarshan programme of Nagpur Doordarshan, while 28.33 per cent were having medium level of perceived effectiveness of programme, while not a single respondent perceived that, the programme as less effective. Major constraints founded from study that, out of total respondents 44.16 per cent of them faced problems related to inconvenient timing of Krishidarshan programme telecasting and most of the respondents (39.16 %) suggested to telecast Krishidarshan programme as per the convenient timing (8pm to 9pm) of farmers.

INTRODUCTION

Doordarshan is a crucial and popular media of communication in India. It has made special contributions to the Indian economy through promotion of scientific temper, disseminating information helped in spreading agriculture education. Agriculture being an important sector in Indian economy which not only provides farm income and employment, but also an important source

of foreign exchange. Since television is an important media of communication which helps in disseminating modern agricultural technology such as cropping pattern, seed, fertilizer use, soil and water management, market information related to supply, demand, prices, trend, import and export, forecasting etc. are of immense use to the farmers. (Chouhan, 2009)

Nagpur Doordarshan Kendra was established in 1982. It covers total Vidarbha region for gathering information about improved technology from different agriculture sector and disseminate it among the masses through Krishidarshan programme, it telecasts on Doordarshan channel from monday to friday with timing 6.00 pm to 6.30 pm. Out of total days of programme broadsting, wednesday is reserved for Nagpur Doordarshan kendra to telecast important agriculture information of Vidarbha region through Krishidarshan programme. Three month programme scheduling has been setup by Nagpur Doordarshan kendra as per the recommendation of Doordarshan kendra, Mumbai (head office). The programme is telecasted at the door steps of televiewers from Mumbai television centre (head office).

METHODOLOGY

The study was conducted in Wardha district of Kerala State. Amoung eight talukas, four talukas of wardha district such as Wardha, Arvi, Karanja (Ghadge) and Ashtiwere selected for the study. Three villages were selected randomly from each taluka. From each of the selected village twelve televiewing farmers were selected randomly. Thus in total, twelve villages were taken for the study and a total of 120 respondents were selected. The exploratory research design was used for the study. The data were collected in face-to-face situation by the personal interview method with the help of structured interview schedule containing the questions on perceived effectiveness of farmers about Krishidarshan programme of Nagpur Doordarshan. The data were tabulated, analyzed and the results were interpreted as on Table 1.

Table 1. Distribution of respondents according to their perceived effectiveness of Krishidarshan programme

Sr. No.	Particulars	Frequency	Percentage
1	**Understandability**		
	Fully understand	33	27.50
	Understand to some extent	75	62.50
	Do not understand	12	10.00

2	**Usefulness**		
	Useful	76	63.33
	Somewhat useful	32	26.67
	Do not useful	12	10.00
3	**Gain new knowledge**		
	Most gain	38	31.66
	Somewhat gain	65	54.17
	Do not gain	17	14.17
4	**New information**		
	New	79	65.83
	Somewhat new	33	27.50
	Never new	08	06.67
5	**Coverage information**		
	Complete	70	58.33
	Partial complete	32	26.67
	Incomplete	18	15.00
6	**Language**		
	Simple	42	35.00
	Somewhat simple	61	50.83
	Difficult	17	14.17
7	**Interest**		
	Interesting	41	34.17
	Somewhat interesting	63	52.50
	Not interesting	16	13.33
8	**Seasonality**		
	All programmes as per season	32	26.67
	few programmes as per season	63	52.50
	Programmes were not as per season	25	20.83
9	**Adequate time**		
	Adequate	44	36.67
	Less than required	61	50.83
	Much less than required	15	12.50
10	**Accuracy of information**		
	Accurate	70	58.33
	Less than accurate	38	31.67
	Inaccurate	12	10.00
11	**Speed of presentation**		
	Fast	25	20.83
	Normal	86	71.67

		Very slow	09	07.50
12	**Relevant to the subject matter**			
		Relevant	78	65.00
		Somewhat relevant	35	29.17
		Irrelevant	07	5.83
13	**Quality of sound & picture**			
		Good	62	51.67
		Fair	53	44.17
		Poor	05	04.16

RESULTS AND DISCUSSION

The findings of the study has presented under the following headings,

Perceived effectiveness of Krishidarshan programme

It is observed from Table 1 that, majority (62.50%) of the farmers reported that, they understood the information in the programmes 'to some extent', followed by (63.33%) of the televiewers perceived that the programme was 'useful' to them. Slight more than half (54.17%) of the televiewers expressed that, the feel they were somewhat gaining of new knowledge through programme, while 65.83 per cent of the televiewers perceived that, they received 'new' information through the programme and slightly above half (58.33%) of them perceived that, the topics information telecasted on DD was 'completely' covered. While 50.83% of the televiewers perceived that the language used in farm telecast was 'somewhat simple' to understand, 52.50 per cent of them perceived that the programme was 'somewhat interesting' and equal per cent of them (52.50%) perceived that, few Krishidarshan programmes were as per season and 50.83 per cent of them perceived that, the timing of programme telecasting was 'less than required'. While, 58.33 per cent of the televiewers told that information telecasted through the programme was 'accurate', 71.97 per cent of them perceived that, speed of presentation of farm telecast was 'normal'. It was also observed that, 65.00 per cent of the televiewers perceived about pictures used in the farm telecast programme were 'relevant' to it. While, 51.67 per cent of them perceived that the quality of pictures and sound of Krishidarshan programme of Nagpur Doordarshan was 'good'.

Table2. Distribution of farmers according to their overall perceived effectiveness about Krishidarshan programme of Nagpur Doordarshan

Sr. No.	Perceived effectiveness index	Respondents (n=120)	
		Frequency	Percentage
1	Less effective (Up to 33.33)	0	0.00
2	Effective (33.34 to 66.66)	34	28.33
3	Highly effective (66.67 and above)	86	71.67
	Total	**120**	**100.00**

Overall perceived effectiveness about Krishidarshan programme of Nagpur Doordarshan

It is observed from the Table 2 that**,** 71.67 per cent of Krishidarshan televiewing farmers were having high level of perceived effectiveness about Krishidarshan programme of Nagpur Doordarshan, while 28.33 per cent were having medium level of perceived effectiveness of programme, while not a single respondent perceived that, the programme as less effective.

Table 3. Distribution of respondents according to the constraints faced by televiewing Krishidarshan programme respondents of Nagpur Doordarshan

Sr. No.	Constraints	Respondents (n=120)	
		Frequency	Percentage
1	Krishidarshan programme telecasting time is not convenient	53	44.16
2	Technical words used by agricultural scientist in programme is not understandable sometimes	29	24.16
3	Information is not sufficient	15	12.50
4	Information is not need based	11	09.16
5	Less attention of programme toward farming policies & subsidies launched by government of India	08	06.66
6	Too much information in less time	23	19.16
7	Commercial breaks between the programme disconnect the topic in understanding	09	07.50

(The percentage is more than 100 due to multiple responses)

CONSTRAINTS ANALYSIS

It was observed in Table 3 that, 44.16 per cent of farmers faced problems related to inconvenient timing of Krishidarshan programme telecasting, followed by 24.16 per cent farmers expressed problem related to technical words used by agricultural scientist in programme is not understandable

sometimes, 19.16 per cent of the farmers were having problems about programme covering too much information in short time period, 12.50 per cent of farmers expressed problems about insufficient information provided , whereas 09.16 per cent respondents were telling problems that provided information is not need based, 07.50 per cent of respondents expressed the problem of commercial breaks between the programme which disconnect the topic in understanding and 06.66 per cent farmers showed the problems about less attention of programme toward farming policies & subsidies launched by government of India.

Table 4. Distribution of respondents according to their suggestions of televiewing Krishidarshan programme of Nagpur Doordarshan

Sr. No.	Suggestions	Respondents (n=120)	
		Frequency	**Percentage**
1	Telecast Krishidarshan programme as per convenient timing of farmers (8pm to 9pm)	47	39.16
2	Information should be given in easy language	18	15.00
3	Important Information related to agriculture should be adequate for farmers	19	15.83
4	Provided information through programme should be need based of farmers	05	04.17
5	Disseminate programmes about government policies and welfare schemes relevant to farming community	12	10.00
6	Programme duration timing should be increases	07	05.83
7	Commercial breaks should be reduced during programmes	05	04.17

(The percentage is more than 100 due to multiple responses)

SUGGESTIONS ANALYSIS

It is observed in Table 4 that, 39.16 per cent of farmers suggested to telecast Krishidarshan programme as per the convenient timing (8pm to 9pm) of farmers, followed by 15.83 per cent of farmers suggested adequate important information related to agriculture should be given for farmers, 15.00 per cent of farmers expressed their opinion that easy language should be used during telecasting of programme, Ten per cent farmers were given opinion about programme that, it should provide government policies and welfare schemes, 05.83 per cent respondents were having opinion about increases timing of the programme distribution, whereas very few of them (04.17%) opinion that, need

based information should be provided, equal per cent of respondents (04.17%) gave suggestion about commercial breaks should be reduced during programme.

CONCLUSION

The findings concluded that, although majority of respondents perceived that, the Krishidarshan programme highly effective, still one fourth respondents' perceived effectiveness of programme at medium level. Hence there is still scope to increase the effectiveness of programme and to make it more effective. Solve the different constraints and might be consider all suggestionsof respondents by all concerned to Krishidarshan programme to make the programme highly effective.

REFERENCES

Chouhan R. S., 2009. A study on perception regarding krishi darshan programme of doordashan in Sehor District of Madhya Pradesh.*M.Sc.(Agri.) Thesis (Unpub.),* JNKVV, Jabalpur (M.P.)

Jhajharia A. K., 2012. Mass media utilization behaviour of the farmers of Jaipur region of Rajasthan.*Ph.D. (Agri.)*Thesis, Swami Keshwanand Rajasthan Agricultural University, Bikaner (Rajasthan).

Karadiya S. B., 2008. A study on perception of tribal farmers viewing krishi darshan programme of doordarshan with reference to Dhar district.*M.Sc. (Agri.) Thesis (Unpub.)*, JNKVV, Jabalpur, R.A.K. College of Agriculture, Sehore (M.P.)

Kumar P. G., 2005. A study on rytumitra television programme for farm televiewers in Chittor district of Andra Pradesh. *MSc.(Agri.) Thesis (Unpub.)*, AcharyaN.G.Ranga Agricultural University, Rajendranagar, Hyderabad (A.P.).

Malgaya P., (2016), Study on viewing behaviour of the farmer regarding krishidarshan programme of doordarshanin khargone district of Madhya Pradesh. *M.Sc. (Agri.) Thesis (Unpub.),* RVKVV, Gwalior (M.P.).

RadhikaTanwar, 2016. A study on awareness of farm television among the farmers of Jaipur District of Rajasthan.*M.Sc.(Agri.) Thesis (Unpub.),*Shri Karan Naredra Agriculture university, Jobner (Rajasthan).

Spandana J., 2016. Perceived effectiveness of agricultural programme telecasted on doordarshan. *M.Sc. (Agri.) Thesis (Unpub.)*, VNAMKV, Parbhani. (M.S.)

RESEARCH ARTICLE

Constraint Analysis of Rice Farmers in Sindhudurg District of Maharashtra

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ABSTRACT

The study was conducted in Sindhudurg district of Maharashtra. The district was purposively selected because it had more area under rice crop but less rice production, compared to other districts in Konkan region. 10 rice farmers from each village were selected by using simple random sampling method as a respondent. The ex-post-facto design was selected in the present study. The 110 respondents were selected randomly who are having minimum 1 acre of land under rice cultivation. Correlation analysis revealed that the variables like social participation, mass media exposure, extension contact and scientific orientation were having negative and significant relation with constraints faced by the rice farmers. Farming experience, credit orientation and land fragmentation had positive and significant relation with constraints faced by the rice farmers.

INTRODUCTION

In Maharashtra state, rice is a main crop grown in the coastal district of Konkan region mainly in the five districts viz. Palghar, Thane, Raigad, Ratnagiri and Sindhudurg. Red laterite soil is the most dominant type of soil in this region. The major food of people of this region is rice. It occupies the area of 0.44 million hectare, with annual productivity of 15.10 lakh tons. The area under Rice crop in Sindhudurg district is 0.53 lakh hectare, with productivity 3201 Kg. per hectare in the year 2016-2017 (As per data of district Agriculture department).

Area under Rice crop in Sindhudurg district was 63490 hectare in the year 2013-2014; 60545 hectare in the year 2014-2015; 61870 hectare in the year 2015-2016; 60410 hectare in the year 2016-2017; 53320 hectare in the year 2017-2018. Likewise the production was 209888.2 metric tons in the year 2012-13 and it declined to 182888 metric tons in the year 2016-2017 (According to data collected from district Agricultural department). It can conclude from given the data, that the area under rice crop is declining day by day. In the context of food security, such a decline in the area

under rice crop is not good to meet future requirements. Thus enhancing the adaptability and stability of productivity are providing entitlement to livelihood of rice growing population is a major challenge to agricultural research and development system.

Objectives

i) To study the profiles characteristics of rice farmers and specific constraints faced by farmers in rice production.

ii) To find out relationship between selected profiles characteristics of respondents, with their constraints in rice production.

iii) To elicit suggestions from the rice farmers to overcome the constraints faced by them and to develop the strategy for increasing production of rice.

METHODOLOGY

The study was conducted in Sindhudurg district of Maharashtra. The district was purposively selected because it had more area under rice crop but less rice production, compared to other districts in Konkan region.Out of 8 tehsils of Sindhudurg district, two *viz.,* Kudal and Kankavali were purposively selected

for the study based on the highest area under rice cultivation. There are 124 and 105 villages in Kudal and Kankavali tehsil respectively. 5 per cent of villages from both tehsils were selected for the study by random sampling method. It means 6 villages from Kudal tehsil and 5 villages from Kankavali tehsil were under study.10 rice farmers from each village were selected by using simple random sampling method as a respondent.The ex-post-facto design was selected in the present study. The respondents were selected randomly who are having minimum 1 acre of land under rice cultivation. So, there will be totally 110 respondents. Totally 14 independent variables and one dependent variable were conducted for the study. The study was conducted using well-structured and pretested interview schedule. Data analysis was done by using appropriate statistical tests, i.e. frequency, percentage, mean, standard deviation, coefficient of co-relation and multiple regression. Ranks were assigned based on the frequency and categorization of respondents was done based on mean and standard deviation values.

RESULTS AND DISCUSSION

Table 1: Distribution of rice farmers based on their profile characteristics (N=110)

Characteristics	No.	Percentage
Age		
Young	6	5.45
Middle	55	50
Old	49	44.55
Education		
Illiterate	3	2.73
Can read only	1	0.9
Can read and write	0	-
Primary school	5	4.55
Middle school	66	60
High school	27	24.55
College or university	8	7.27
Farming experience		
Low	20	18.18
Medium	75	68.18
High	15	13.64
Area under rice crop		
Marginal farmer	-	-
Small farmer	67	60.91
Semi-medium farmer	35	31.82
Medium farmer	5	4.54
Big farmer	3	3.73
Training undergone		
Low	26	23064
Medium	64	58.18
High	20	18.18
Credit orientation		
Low	8	7.27
Medium	102	92.73
High	-	-
Social participation		
Low	41	37.27
Medium	53	48.18
High	16	14.55
Mass media exposure		
Low	7	6.36

Medium	82	74.54
High	21	19.1
Extension contact		
Low	13	11.82
Medium	71	64.55
High	26	23.63
Economic motivation		
Low	3	2.73
Medium	82	74.54
High	25	22.73
Scientific orientation		
Low	7	6.36
Medium	92	83.64
High	11	10
Management orientation		
Low	13	11.82
Medium	85	77.27
High	12	10.91
Risk orientation		
Low	16	14.54
Medium	7	66.36
High	21	19.10
Land fragmentation		
Low	11	10
Medium	88	80
High	11	10

Age: It is clear that majority (50.00%) of the rice farmers belonged to middle age category, followed by old (44.55%) and young age (5.45%) categories.

Education: Results revealed that majority(60.00%) of the respondents had education level of middle school followed by high school (24.55%), college level (7.27%), primary school level (4.55%), illiterate(2.73%), can read only (0.9%) categories.

Farming experience: It is evident that majority (68.18%) of the rice farmers had medium levels of experience followed by low (18.18%) and high experience (13.64%) in farming.

Area under rice crop: It is evident that majority (60.91%) of the respondents was small farmers followed by semi-medium (31.82%), medium (4.54%) and large (2.73%) farmers. Majority of the respondents were small farmers.

Training obtained: It is seen that 58.18 per cent of the respondents had received medium training, followed by high 18.18 per cent and low 23.64per cent levels of training undergone.

Credit orientation: It isfound that (92.73%) of the rice farmers had medium credit orientation followed by low (7.27%) level of credit orientation.

Social Participation: Itis seen that (48.18%) of the respondents had medium social participation followed by low (37.27%) and high (14.55%) levels of social participation.

Mass media exposure: It isfound that more than fifty per cent (74.54%) of the respondents had medium levels of mass media exposure followed by high (19.1%) and low (6.36 %) levels of mass media exposure.

Extension contact: It is seen that majority (64.55%) of the respondents had medium extension contact followed by high (23.63%) and low (11.82%) levels of extension contact.

Economic motivation: It is evident that majority (74.54%) of the rice farmers had medium economic motivation followed by high (22.73%) and low (2.73%) levels of economic motivation.

Scientific orientation: It is proved that majority (83.64%) of the respondents had medium scientific orientation followed by high (10.00%) and low (6.36%) levels of scientific orientation.

Management orientation: It is confirmedthat majority (77.27%) of the respondents had medium management orientation followed by high (10.91%) and low (11.82%) levels of management orientation.

Risk orientation: It is cleared that more than half (66.36%) of the respondents had medium risk orientation followed by high (19.10%) and low (14.54%) levels of risk orientation.

Land fragmentation: It is found that the majority (80.00%) of the respondents belonged to medium level of land fragmentation, followed by low and high both (10%).

Table 2: Distribution of rice farmers according to their extent of constraint intensity (N=110)

Sr.No.	Category	Frequency	Percentage
1.	Less constraint intensity	01	0.91
2.	Moderate constraint intensity	101	91.82
3.	Severe constraint intensity	08	7.27

It is clearedthat majority (91.82%) of the respondents faced moderate constraints in rice production followed by severe (7.27%) and less (0.91%) constraints.

Table 3: Co-relation analysis of independent variables with constraints faced by rice farmers

Sr.No.	Variable No.	Independent Variables	Co-relation co-efficient
1.	X_1	Age	0.058588^{NS}
2.	X_2	Education	-0.102625^{NS}
3.	X_3	Farming Experience	0.2547086^{**}
4.	X_4	Area under rice crop	0.02781^{NS}
5.	X_5	Training Obtained	0.0577421^{NS}
6.	X_6	Credit Orientation	0.2285583^{*}
7.	X_7	Social Participation	-0.222642^{*}
8.	X_8	Mass Media Exposure	-0.341824^{*}
9.	X_9	Extension Contacts	-0.338598^{*}
10.	X_{10}	Economic Motivation	-0.165846^{NS}
11.	X_{11}	Scientific Orientation	-0.111182^{*}
12.	X_{12}	Management Orientation	0.0436793^{NS}
13.	X_{13}	Risk Orientation	0.074351^{NS}
14.	X_{14}	Land Fragmentation	0.110698^{*}

Table 4: Multiple regression analysis of independent variables with constraints faced by rice farmers

Sr. No.	Independent Variable	Regression of Bt value	Standard error	t – value
1	Age	-0.21	0.14	1.49^{NS}
2	Education	-3.07	1.30	-2.34^{NS}
3	Farming experience	0.21	0.11	1.89^{**}
4	Area under Rice Crop	0.37	0.54	0.54^{NS}
5	Training Obtained	1.69	1.72	0.98^{NS}
6	Credit orientation	2.18	1.06	2.04^{*}
7	Social Participation	0.02	0.70	-0.04^{*}
8	Mass Media exposure	3.40	0.71	-4.73^{*}
9	Extension Contact	1.53	1.01	-1.5^{*}

10	Economic Motivation	-0.06	0.56	-0.11 [NS]
11	Scientific Orientation	-0.40	1.05	-0.38*
12	Management Orientation	1.03	0.77	1.33 [NS]
13	Risk Orientation	1.82	1.09	1.66 [NS]
14	Land Fragmentation	-0.07	0.08	0.89*

CONCLUSION

In case of land related constraints land fragmentation is the major constraint. In seed related constraint high cost of hybrid seed is the major constraint. High cost of FYM is the major fertilizer related constraint. Increasing cost of plant protection chemicals is the important plant protection constraints. Indiscriminate use of water is the irrigation related major problem. In case of labour scarcity of labour during peak period is the major constraint. Insufficient finance with farmer is financial constraint. Major mechanization constraint is the lack of sufficient training in operation of improved farm machinery. Occurrence of showers during harvest is important bio-physical constraint. Lack of processing facility is the post-harvest constraint. Less number of demonstrations on crop technologies is the extension constraint. Very low MSP in paddy is the major marketing constraint. In case of social constraint lack of common facility center is the major constraint.

Correlation analysis revealed that the variables like social participation, mass media exposure, extension contact and scientific orientation were having negative and significant relation with constraints faced by the rice farmers. Farming experience, credit orientation and land fragmentation had positive and significant relation with constraints faced by the rice farmers. Whereas age, area under rice crop, training obtained, management orientation, risk orientation had positive and non-significant relationship with constraints faced by the rice farmers and education and economic motivation had negative and non-significant relation with constraints faced by rice farmers. Among the various suggestions given by farmers, provision of minimum support price (MSP) by the government, co-operative societies at village levels for labour requirements and use of machineries like power tillers etc., different suggestions on the problem of wild animals and also suggested that there should be high extension contacts to inform the farmers about different government subsidies and schemes etc.

REFERENCES

Anonymous (2003).Socio-economic review and district statistical abstract of Ratnagiri district.

Anonymous 2005. Knowledge and adoption of Agricultural Technology of Rice

crop recommended by Dr.BSKKV, Dapoli. Research Council Report, Agriculture Extension, Agriculture Economics and statistics Sub-Committee, Dr. BalasahebSawantKonkanKrishiVidyap eeth, Dapoli.

Arathy, B. 2011.Constraint analysis of rice farmers of Trissur district of Kerala. *M.Sc. (Ag.) Thesis.* Acharya N.G. Ranga Agricultural University, Hyderabad.

Ashok, G. 2012. Knowledge and adoption system of rice intensification (SRI) technology among farmers in Nagapattinam district of Tamil Nadu.*M.Sc. (Agri.) Thesis.* Acharya N. G. Ranga Agricultural University, Hyderabad.

Kiran, S., Sandhya and Shenoy, S. 2010. Constraints in adoption of system of rice intensification in Warangal district of Andhra Pradesh. Journal of Research, Acharya N. G. Ranga Agricultural University 38 (1and 2): 77-85.

Narayana S. 2013. Constraint analysis of rice farmers in Nellore district of Andhra Pradesh. *M.Sc. (Agri.) Thesis.* Acharya N. G. Ranga Agricultural University, Hyderabad.

Ranaware, Sonali D. 2009. Organic rice cultivation practices followed by rice growers in upland.*M.Sc. (Agri.) Thesis.* Dr. BalasahebSawantKonkanKrishiVidyap eeth, Dapoli. (M.S)

Santhi, S.2006. A study on system of rice intensification (SRI) among rice farmers of Tirunelveli district.*M.Sc. (Agri.) Thesis.* Annamalai University,Annamalainagar.

RESEARCH ARTICLE

Varietal Adoption of DS-228 (Phule Kalyani) Variety of Soybean due to Demonstrations Organized by KVK, Pune in Baramati Tehasil

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ABSTRACT

The present study was carried out at Baramati tahshil Dist. Pune. This area was selected mainly because major agronomical crop in this region is Soybean and most of demonstrations of varietal were conducted by KVK, Baramati in this area.It is observed from Table no 1, that majority of respondents (43.00 percent) were in high level of adoption of soybean demonstration package of practices. This was followed by medium category which comprised (36.00 percent) respondents.After observing the varietal demonstration of DS-228 variety majority of farmers gain medium knowledge about its cultivation practices and they adopt it. After adopting (96.66 percent) farmers stated that their yield soybean crop was increased 2.1 quintal / acre.

INTRODUCTION

Soybean [*Glycine max* (L.) Merill] has become a miracle crop of the twentieth century. It is a triple beneficiary crop, a unique food, a valuable feed and an industrial raw material with considerable potential. Variety DS -228 of soybean (Phule Kalyani) is recommended by MPKV, Rahuri for the use in *kharif* season of Maharashtra particularly in Rust affected area .This variety is having rust tolerant characteristic and giving average yield of 35 q/ha in irrigated condition so that KVK Baramati were conducted various demonstration of this variety since 2007 in rust affected area of Baramati and after that we are conduct the impact assessment and adoption of this variety is nearby villages. Keeping this view present study undertaken on adoption of variety DS-228 against use of existing variety used by farmers

METHODOLOGY

Location of study-
The present study was carried out at Baramati tahshil Dist. Pune. This area was

selected mainly because major agronomical crop in this region is Soybean and most of demonstrations of varietal were conducted by KVK, Baramati in this area.

Method of sampling

Demonstration of the variety DS-228 was conducted in five villages by KVK, Baramati in Baramati tehsil, from this villages information have been collected from 100 farmers who have visited DS-228 variety demonstration plot of soybean & were present while demonstration various practices in above selected five villages.

Finding and discussion:-

In this chapter the finding of study are presented along with discussion

1. Tools for data collection –

Interview schedule was prepared for collection of data from farmers

RESULTS AND DISCUSSION

Table No. -1 distribution of farmers according to adoption of soybean demonstration techniques and its package of practices

Sr. No.	Category	Frequency	Percentage (%)
1	Low (up to 57)	20	20.00
2	Medium (58 to 72)	36	36.00
3	High (73 & above)	43	43.00

Min. - 42%   Maxi. - 88%

It is observed from data in Table no 1, that majority of respondents (43.00 percent) were in   high level of adoption of soybean demonstration package of practices. This was followed by medium category which comprised (36.00 percent) respondents. While (20.00 percent) of respondents were found in low category. It could thus be inferred that the majority of respondents were in high category of adoption of soybean DS-228 variety.

Table no. -2 distributions of farmers according to knowledge of soybean DS-228 variety demonstration techniques

Sr. No.	Category	Frequency	Percentage (%)
1	Low (up to 55)	20	20.00
2	Medium (56 to 73)	46	46.00
3	High (74 & above)	34	34.00

Min. – 36%   Maxi. - 93%

It is observed from Table No 2, that majority of respondents (73.00 percent) have medium level of knowledge of DS-228 demonstration practices. This was followed by low category which comprised (20.00 percent) respondents.

While very few (6.00 percent) of respondents were found in high category. It could thus be inferred that the majority of respondents have medium knowledge of DS-228 demonstration package of practices.

b. Independent variable-

3. Age-

Sr. No.	Age range	Frequency	Percentage (%)
1	Up to 30	13	13
2	31 to 40	40	40
3	41 to 50	27	27
4	51 & above	20	20

(Bahadur and Siegfried. 2004)

It is indicated from Table 3 that majority of (40.00 percent) respondents were from 31 to 40 year age & (27 percent) respondents were from 41 to 50

year age while 20.00 & 13.0 percent respondent have been grouped in between 51 and above age & up to 30 year age respectively.

4. Education

Sr. No.	Category	Frequency	Percentage (%)
1	Illiterate	0	0
2	primary	0	0
3	Middle school	3	3
4	High school	60	60
5	College & above	37	37

(Bahadur and Siegfried. 2004)

It is observed from Table 4 that majority of (60.00 percent) soybean growers were educated up to high school

while (37 percent) and (3 percent) farmers were educated up to college & above and middle school respectively.

5. Land holding

Sr. No.	Category	Frequency	Percentage (%)
1	Low up to 3 ha	74	74
2	Medium 4 to 9 ha	26	26
3	High 10 and above	-	-

(Bahadur and Siegfried. 2004)

It is indicated from Table 5 that majority of (74 percent) respondents have low land holding & (27 percent) respondents have been grouped in medium land holding.

6. Annual income

Sr. No.	Category	Frequency	Percentage (%)
1	Up to 50000	17	17
2	50001 to 100000	23	23
3	100001 & above	60	60

(Bahadur and Siegfried. 2004)

It is observed from Table 6 that 60.00 percent farmers were grouped in 100000 and above annual income category while (23 and 17 percent) farmers were categorized in 50001 to 100000/ and - up to 50000 annual income group respectively.

7. Social participation

Sr. No.	Category	Frequency	Percentage (%)
1	Low (up to 2)	27	27
2	Medium (3 to 4)	53	53
3	High (5 & above)	20	20

Mean- 3.33   S.D. – 1.24

It is indicated from Table 7 that majority of (53 percent) farmers having medium level of social participation while (27 percent) farmers were have low level of social participation and (20 percent) farmers were have high level of social participation.

8. Extension contact

Sr. No.	Category	Frequency	Percentage (%)
1	Low (up to 7)	17	17.00
2	Medium (7.1 to14)	73	73.00
3	High (15 & above)	10	10.00

(Bahadur and Siegfried. 2004)   Mean- 10.33   S.D. – 3.45

It is indicated from Table 7 that majority of (73 percent) farmers having medium level of extension contact while (17 percent) farmers were have low level of extension contact and (10 percent) farmers were have high level of extension contact.

9. Scientific orientation

Sr. No.	Category	Frequency	Percentage (%)
1	Low (up to18)	7	7
2	Medium (19 to 26)	86	86
3	High (27 & above)	7	7

Mean – 22.26 S.D.-3.96   (Bahadur and Siegfried. 2004)

It is observed from Table 8 that 87 percent farmers have medium scientific orientation while (7 percent) farmers grouped in low as well as high level of scientific orientation.

10. Constraints in adoption

Sr. No.	Problem	Out of 100	Percentage (%)
	A) Problem on input supply		
1	Availability of chemical fertilizers and micronutrient	63	63
2	Inadequate availability of insecticide in village	27	27
3	Less availability of farm labor	70	70
4	Irrigation difficulty due to electricity load shedding	63	63
5	DS-228 variety not available easily	40	40
	B) Economical Problem		
1	Financial shortage	33	33
Sr. No.	**Problem**	**Out of 100**	**Percentage (%)**
2	Higher labour charges	80	80
3	Higher FYM & chemical fertilizer charges	80	80
4	Transport charges	17	17
	C) Market problem		
1	Fluctuation in market rate	57	57
2	Low market rate at the time of harvesting	77	77
3	market rate information about different market	43	43
4	Un availability of store house	20	20
5	Transport equipment problem	10	10
6	Traders cheating	17	17
	Technical problem		
1	No information about availability of seed	27	27
2	No information about how to sow seed	17	17
3	No information about seed treatment	17	17
4	No information about chemical fertilizer	23	23

	application		
5	No information about insecticide and pesticide	20	20
6	No information about storage of grains	20	20
7	Un availability of improved implement for sowing	43	43
8	Grain shedding due to Late harvesting	50	50

(Anonymous.2009)

It is indicated from Table 9, that (80 percent) farmer's expresses problems in higher labour charges and Higher FYM & chemical fertilizer charges as constraint in economic problem. (77 percent) respondent reported Low market rate at the time of harvesting. (70.00 percent) farmers have reported that less availability of farm labour. (63.00 percent) farmers reported Availability of chemical fertilizers and micronutrient & Irrigation difficulty due to electricity load shedding as constraint in input supply. Similarly (57 percent) farmer recorded Fluctuation in market rate & (50 percent) farmers have recorded grain shedding due to late harvesting.

11. Opinion of farmers about soybean DS-228 variety after adoption

1	Did your yield is increases due to DS-228 variety than other variety	Yes -96.66 %	average 2.1 q/acre
2	Whether this crop is infested with rust	No	93.33 %

(Alauddin and Tisdell.1988)

CONCLUSION -

It was observed that most of the farmers were 31 to 40 years old, educated up to college level having low land holding with annual income above 100000/- majority of they have medium extension contact, social participation and scientific orientation.

After observing the varietal demonstration of DS-228 variety majority of farmers gain medium knowledge about its cultivation practices and they adopt it.

After adopting (96.66 percent) farmers stated that their yield soybean crop was increased 2.1 quintal / acre and (93.33 percent) farmers reported that there is no rust attack on this variety

REFERENCES

Adekambi, SA, Diagne A, Smite FP and Biaou G. (2009), "The Impact of Agricultural Technology Adoption on Poverty: The Case of NERICA rice Varieties in Benin". *International Associateciation of Agricultural Economists* 2009 Conference ,Beijing, China, Aug 16-22.

Palmer RG, Pfeiffer TW, Buss GR and Kilen TC. 2004. Qualitative genetics.

Soybeans: Improvement, Production, and Uses. Boerma HR and Specht JE (Eds), edn. 3, pp 137–233.

Alauddin, M and Tisdell, C, (1988), Patterns and determinants of adoption of high yielding varieties: farm-level evidence from Bangladesh.

Anonymous. 2009. Guidelines for the conduct of test for distinctiveness, uniformity and stability (DUS) on Soybean [*Glycine max* (L.) Merrill]. *Plant Variety Journal of India* 3(10): 289–298.

Bahadur KL. and Siegfried B. (2004). Technology Adoption and Household Food Security. Analyzing Factors Determining Technology Adoption and Impact of Project Intervention: A Case of Smallholder Peasants in Nepal, Paper prepared for presentation at the Deutscher Tropentag, 5-7 October 2004, Humboldt University, Berlin.

Chung G and Singh RJ. 2008. Broadening the Genetic Base of Soybean: A Multidisciplinary Approach. *Critical Reviews in Plant Science* 27: 295–341.

Cober ER and Morrison MJ. 2010. Regulation of seed yield and agronomic characters by photoperiod sensitivity and growth habit genes in soybean. *Theoretical and Applied Genetics* 120:1005–1012.

Gupta A, Mahajan V, Khati P and Srivastava AK. 2010. Distinctnessin Indian soybean (Glycine max) varieties using DUS characters. *Indian Journal of Agricultural Sciences* 80 (12):1081–1084.

Palmer RG and Kilen TC. 1987. Qualitative genetics and cytogenetics. Soybeans Improvement, Production and Uses. *Wilcox J R (Ed.) edn*. 2, pp 135–209.

Ramteke R, Kumar V, Murlidharan P and Agarwal DK. 2010. Study on genetic variability and traits interrelationship among released soybean varieties of India [*Glycine max* (L.) Merrill]. *Electronic Journal of Plant Breeding* 1(6): 1483–1487.

Raut VM. 2003. *Qualitative genetics of soybean*- a review. Soybean Research 1: 1–28.

Samuel Diro and Wondaferahu Mulugeta. 2015. Determinants of Adoption of Soybean and Its Impact on the Livelihood of Smallholder Farmers in Jimma zone . *ZENITH International Journal of Multidisciplinary Research* Vol. 5 (4):119 -138

Satyavathi CT, Bharadwaj CH, Husain SM, Karmakar PG, Tiwari SP, Joshi OP and Mohan Y. 2004. Identification key for soybean (*Glycine max*) varieties released or notified in India. *Indian Journal of Agricultural Sciences* 74: 215–8.

Yadav, SP and Sharma SP. 2001. Variation for hilum colour and its stability during four crop seasons in soybean (Glycine max). *Indian Journal of Agricultural Sciences* 71(1): 23–6.

RESEARCH ARTICLE

Integrated Management of Eriophyid Mite in Coconut – Multidimensional Analysis

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ABSTRACT

The study was conducted in the randomly selected villages of Malvan, Vengurle, Kudal and Sawantwaditaluka of Sindhudurg district. These talukas are having more number of coconut growers and occupy more area under coconut cultivation as compared to the other talukas in the district and also based on the criteria of high infestation level of eriophyid mite.The data regarding extent of field level utilization of recommended technologies for integrated management of eriophyid mite in coconut revealed that majority (63.75 per cent) of the respondents had 'medium' extent of fieldlevel utilization. The average field level utilization index was 40.20.

INTRODUCTION

The coconut palm (*Cocosnucifera* L.) is the most useful palm in the world. Every part of the tree is useful to human life. Because of its manifold uses it is popularly called as 'Kalpavriksha' means the tree of heaven or tree of paradise. It is one of the commercial crops grown in India and belongs to family Aracaceae (Palmaceae). The coconut fruit is botanically known as fibrous drupe, popularly known as 'Nut'.

Coconut is a very versatile and an important commercial palm in the tropics of the world. It is being cultivated since time immemorial, as references are available in various literatures including *'Ramayana'.* There are different opinions about its origin. Probably the coconut may be originated in Malaysia or Indonesia and spread locally by sea currents to many island groups with wide dissemination occurring as a result of humid movement (Child, 1974). According to some reports, coconut had been cultivated in many parts of India and the climatic and geographical changes in due course the confinement of coconut to the coastal tracts in the country. It is one of the most valuable crops of wet tropics

and is considered to be one of among 20 most important crop plants in the world (Vietmeyer, 1986).

In India, coconut plays an important role in agrarian economy in many states particularly in the states of peninsular India. The sector provides employment in India to nearly 10 million farmers contributing nearly Rs 7,000 corers annually to the gross domestic product (GDP) along with a share of 6 per cent to the vegetable oil pool of the country. Coconut is essentially an oilseed crop providing all amenities for human life, which include food, energetic beverage, medicine, fiber, wood and a variety of raw materials for the production of an array of products of commercial importance.

In Maharashtra, the Konkan region accounts for 92.34 per cent of the total area under coconut. About 26,884 hectare area is under yielding with a production of 193.8 million nut and productivity of 7208 nut/ha. Among all districts of Konkan region Sindhudurg ranks first in the area under production of coconut accounting for 58.44 per cent. Although Sindhudurg and Ratnagiri district ranks 1st and 2nd in area and production of coconut,the productivity of coconut in the region is highest in Thane followed by Raigad district. The productivity of coconut is 82 nuts per tree in Thane district, whereas it is only 45 nuts in Sindhudurg.

The coconut palm is attacked by a number of insect pests at all stages of its growth. Nirula (1955) recorded 107 pests damaging coconut palm in India. Out of these, the rhinoceros beetle, red palm weevil, black headed caterpillar and the white grub have recorded as major pests in most of the coconut growing states. The coconut eriophyid mite (*Aceriaguerreronis* Keifer) is the most important addition to the list arthropod pest causing major damage today, not only in India but also in many other coconut growing countries (Griffith, 1984).

Objectives

1. To analyse the extent of field level utilization of recommended technologies for integrated management of eriophyid mite.
2. To analyse the perception of coconut farmers about integrated management of eriophyid mite.
3. To know the severity of damage caused by eriophyid mite in coconut.

METHODOLOGY

The research design adopted for the study was ex-post-facto research technique.All the coconut growers who had knowledge and adopted one or more integrated management practices of eriophyid mite control and having minimum 0.20 ha land under coconut cultivation constituted the population of

the study. The study was conducted in the randomly selected villages of Malvan, Vengurle, Kudal and Sawantwaditaluka of Sindhudurg district. These talukas are having more number of coconut growers and occupy more area under coconut cultivation as compared to the other talukas in the district and also based on the criteria of high infestation level of eriophyid mite.

A list of all coconut growers in Malvan, Vengurle, Kudal and Sawantwaditalukas is prepared with the help of Taluka Agriculture Officer of State Department of Agriculture for each taluka. Four villages from each taluka were selected in consultation with the Taluka Agriculture officer. In each village list of farmers cultivating coconut crops was prepared. 10 per cent farmers were selected randomly from the total coconut grower in each village. Thus 160 coconut growing farmers spread over 16 villages constituted the total sample size for the study. The interview schedule was formed, so as to collect the information in line with the objectives of the study.Personal interview technique was used for data collection. The data were processed and tabulated by using simple frequencies and the parameters like percentage, mean, range, standard deviation were used according to requirements.

RESULTAND DISCUSSION

1. The extent of field level utilization of recommended technologies for integrated management of eriophyid mite in coconut

The extent of field level utilization of the respondents was studied for the recommended technologies of integrated management of eriophyid mite in coconut. It was ascertained with the help of a teacher made field level utilization test specially developed for the study. The observations on these aspects are presented and discussed in this part.

The results of the present investigation in respect of the overall extent of field level utilization of the coconut farmers about recommended technologies for integrated management of eriophyid mite in coconut are presented in Table 1.

Table 1: Overallextent of field level utilization of recommended technologiesfor integrated management of eriophyid mite in coconut

SI. No	Category	Respondents (N=160)	
		Number	Percentage
1	Low	41	25.62
2	Medium	102	63.75

3	High	17	10.63
	Total	160	100.00

(Mean: 40.20,SD: 19.80)

It is noticed from Table 1 that majority (63.75 per cent) of the respondents had 'medium' extent of field level utilization, while 25.62 per cent and 11.33 per cent of the respondents had 'low' and 'high' extent of field level utilization, respectively. The average extent of field level utilization index was 40.20. Conclusion can be drawn from these findings that majority of coconut farmers had medium extent of field level utilization. Hence, efforts ought to be

made to increase the extent of field level utilization about integrated management of eriophyid mite to the coconut farmers.

2. Perception of coconut farmers about integrated management oferiophyid mite

The results of the investigation in respect of perception of the coconut farmers about the usefulness of recommended technologies for integrated management of eriophyid mite in coconut are presented in Table 2.

Table 2.Perception about recommended technologies for integratedmanagement of eriophyid mite in coconut

Sl.No.	Level of Perception	Respondents (N=160)	
		Number	**Percentage**
1	Less useful	15	09.38
2	Useful	88	55.00
3	More Useful	57	35.62
	Total	160	100.00

It is noticed from Table 2 that more than half (55.00 per cent) of the respondents perceived integrated management of eriophyid mite as 'useful' whereas, sizeable number of respondents (35.62 per cent) perceived it as 'more useful' and negligible number of respondents (09.38 per cent) had perceived as 'less useful'.

Conclusion can be drawn from these findings that more than half of the coconut farmers had perceived integrated

management of eriophyid mite as useful. The reason may be that the coconut is an important commercial crop grown by farmers in this region. The attack of eriophyid mite is more in coconut. Integrated management would decrease infestation of eriophyid mite in coconut.

3. Severity of damage caused by eriophyid mite in coconut

The findings related to severity of damage caused by eriophyid mite in coconut are presented in Table 3

Table 3. Severity of damage caused by eriophyid mite in coconut

Sl.No.	Category	Respondents (N=160)	
		Number	**Percentage**
1	No damage	05	03.12
2	Negligible damage	09	05.62
3	Mild damage	11	06.88
4	Moderate damage	13	08.13
5	Heavy damage	82	51.25
6	Severe damage	40	25.00
	Total	160	100.00

The results presented in Table 3 revealed that about half (51.25 per cent) of the respondents felt that the damage was 'heavy', while one fourth (25.00 per cent) of the respondents felt that the damage was 'severe', followed by 8.13 per cent and 6.88 per cent of the respondents felt that the damage was 'moderate' and 'mild', respectively. Only 3.12 per cent and 5.62 per cent of the respondents felt 'no' damage and 'negligible' damage due to eriophyid mite in coconut, respectively.

The eriophyid mite causes severe damage to coconut resulting in reduction of kernel weight and fibre content. Reduction in nut size leads to almost 25 per cent loss in yield of copra. Dissemination of the mite occurs through wind. Life cycle completed in a very short span of (7-10 days). It effects on the qualitative and quantitative losses, hence majority of the farmers felt that there is a heavy damage due to the infestation of eriophyid mite, respectively.

4. The knowledge level of coconut farmers about integrated management of eriophyid mite

The knowledge level of the respondents was studied for the recommended technology for integrated management of eriophyid mite in coconut. It was ascertained with the help of a teacher made knowledge test specially developed for the study. The observations on these aspects are presented and discussed in this part.

Table 4. Knowledgeof coconut farmers about integrated management of eriophyid mite

Sl.No.	Category	Respondents (N=160)	
		Number	Percentage
1	Low	29	18.13
2	Medium	109	68.12
3	High	22	13.75
	Total	160	100.00

(Average knowledge index: 43.17, SD: 18.23)

It is noticed from Table 5 that majority (68.12 per cent) of the respondents had 'medium' level of knowledge, while 18.13 per cent and 13.75 per cent of the respondents had 'low' and 'high' level of knowledge, respectively. The average knowledge index was 43.17 indicating fair knowledge levels of the coconut farmers.

Conclusion can be drawn from these findings that majority of the coconut farmers had low to medium knowledge level. Since, knowledge is a pre-requisite for adoption; efforts ought to be made to impart detail knowledge about integrated management of eriophyid mite to the coconut farmers.

Summary

The data regarding extent of field level utilization of recommended technologies for integrated management of eriophyid mite in coconut revealed that majority (63.75 per cent) of the respondents had 'medium' extent of field level utilization. The average field level utilization index was 40.20.

The data regarding practice wise extent of field level utilization revealed that out of 24 practices, only 8 practices namely, 'regular and sufficient quantity of irrigation' (82.50 per cent), 'dose of organic manures' (86.87 per cent), 'balanced dose of inorganic fertilizers' (66.87 per cent), 'use of neem cake' (63.75 per cent), 'applying neemazal or econeemplus through root feeding' (61.25 per cent), 'use of fine nozal spray pumps for spraying' (57.50 per cent), 'depth of pit for root feeding 1.5 to 2 ft.' (56.26 per cent)' and 'root should be dip in polythene bag containing pesticides' (55.62 per cent) were fully majority of the respondents.

The data regarding perception of coconut farmers about integrated management of eriophyid mite revealed that more than half (55.00 per cent) of the respondents perceived as medium level of integrated management of eriophyid mite.

The study revealed that more than half (51.25 per cent) of the respondents felt that the damage was 'heavy' while one fourth (25.00 per cent) of the respondents felt that damage was 'severe'.

It is noticed that majority (68.12 per cent) of the respondents had 'medium'

knowledge level about recommended technologies for integrated management of eriophyid mite in coconut.

CONCLUSIONS

The study established that majority of the coconut growers had medium extent of field level utilization. Hence, efforts ought to be made to increase the extent of field level utilization about integrated management of eriophyid mite to the coconut farmers.

The data in respect of practice wise extent of field level utilization of the coconut farmers have pinpointed the area that need to be focused in the transfer of technology programme for the eriophyid mite control. It is necessary to ensure that the complete package of eriophyid mite control is to be made available to the coconut farmersso that, the coconut growers would think of utilizing the recommended technologies.

It was found that more than half of respondents perceived integrated management of eriophyid mite as useful. The perception of the farmers about the recommended technologies has a direct effect on the proper utilization. It implies to increase the awareness among the farmers regarding usefulness of the recommended technologies for integrated management of eriophyid mite in coconut.

It was observed by present study that about half of the respondents felt that

the damage was heavy due to infestation of the eriophyid mite. Hence, it is necessary to take collaborative and quarantine measures for checking further spread of the eriophyid mite. There is a need to activate the pest surveillance in each district.

REFERENCES

Anithakumari, P. and Kalavathi, S. (2001). Knowledge and adoption of recommended practices by coconut cultivators of root (wilt) affected area. *Indian coconut Journal*, 31(5): 14-16.

Anonymous (2001) Eriophyid mite at talk and coconut state of art report. Coconut Development Board.p.13

Anonymous (2003). Statistical information on coconut. Published by Department of Horticulture, Govt. of Maharashtra *coconut Journal*, 31(5): 14-16.

Ambily, Nandakumar, C. and Stephen, R. (2009). Extent of yield loss in coconut due to the infestation of coreid bug.*Journal of plantation crops*.37 (1): 45-50

Arthanari, P. M., T. N. Balsubramanian, R. Selvaraju, S. Kannaiyan (2002) Studyon the weather relationship of eriophyid mite in coconut. *Journal ofAgrometrology*. 2002, 4 (2):153 – 157.

Chanda, K. L. (2007). Coconut research in India – A review, *Indian Coconut Journal*, 1: pp.3-7

RESEARCH ARTICLE

Extent of Participation and Constraints faced by Farm Women in Agricultural operations

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ABSTRACT

The present investigation was conducted in Shrigonda and Rahuri tahsils of Ahmednagar district with objectives to study the extent of participation of farm women in agriculture and to assess the constraints faced by the farm women. The study revealed that majority of the respondents had always participated in the operations viz. weeding, inter-culturing and storage of food grains, harvesting of vegetables, planting , while, a large majority of the respondents never participated in the operations like water management, seed treatment and marketing of farm produce. Majority of the respondents had occasionally participated in the operations like, milking, cultivation of fruit crop and application of fertilizer. In overall 58.34 percentage respondents had medium participation in agriculture activities. Majority of farm women expressed constraints like lack of time to attend the training programme at peak agricultural season followed by unable to attend training programme for long period due to family problem and lack of wide publicity of training programmes.

INTRODUCTION

The rural women work hard in agriculture than their counterparts. They participate in most of the agricultural operations like application of manures, land preparation, seed grading, sowing, dibbling, planting, transplanting, weeding, hoeing, irrigation, fertilizer application, plant protection, harvesting, threshing, shelling, hulling, winnowing, cleaning, storing food grains and seed, feeding the cattle, looking after milch animals and poultry, kitchen gardening etc. Govt. of India has given much attention in development projects and supportive services to motivate rural women to become partners in socio – economic development. However women in rural areas are generally observed to be less responsive to the improved techniques, since they are not much exposed to these techniques being practiced outside. Hence

it is imperative that the rural women be trained in agriculture and allied activities to keep them abreast of the latest innovations available in the field. For these training is vital and essential to enhance motivation, create confidence and inoculate efficiency in an individual. The present investigation was undertaken in view following specific objectives.

1. To study the extent of participation of farm women in agriculture
2. To study the constraints experienced by farm women and obtain the suggestions for overcoming constraints.

METHODOLOGY

The present investigation was conducted in Shrigonda and Rahuri tahsils of Ahmednagar district. A list of villages having maximum participation of women in agriculture from sample tahsils was prepared with the help of Taluka Agriculture Officer. Five villages for each tahsil and thus total ten villages were selected. From each selected village, twelve farm women who were actually working on farm were selected randomly. In all total 120 farm women were selected for study purpose. For extent of participation in agriculture firstly, four main farm management pursuits including 46 sub-areas identified. The responses were sought on a three point continuum namely, 'always', 'sometimes' and 'never' with the score of 2,1 and 0, respectively. Total score for all the items gave the participation score of an individual. Following categories were formed by using range, range obtained by formula was 12, maximum score was 68 and minimum score was 32.

FINDINGS

Extent of participation of the farm women in different activities related to agriculture.

Operation-wise participation of farm women

The information regarding operation-wise participation of the farm women in agriculture activities is given in Table 1.

Table 1. Participation of farm women in different farm and allied activities

Sr. no.	Activities	Participation		
		Always	**Occasionally**	**Never**
A)	**Farm activities**			
1.	Collection of stubbles	87 (72.50)	26 (21.67)	07 (05.83)
2.	Filling compost pits	54 (45.00)	40 (33.33)	26 (21.67)
3.	Spreading of FYM	63 (52.50)	32 (26.67)	25 (20.83)
4.	Seed Treatment	13 (10.83)	14 (11.67)	93 (77.50)
5.	Sowing			

	a) By seed-drill	58 (48.33)	24 (20.00)	38 (31.67)
	b) By hands	88 (73.33)	06 (05.00)	26 (21.67)
6.	Weeding	107 (89.17)	09 (07.50)	04 (03.33)
7.	Hoeing	90 (75.00)	20 (16.67)	10 (08.33)
8.	Applications of Fertilizers			
	a) Compost	46 (38.33)	31 (25.83)	43 (35.84)
	b) Chemical fertilizers	39 (32.50)	25 (20.83)	56 (46.67)
9.	Water management	05 (04.17)	10 (08.33)	105 (87.50)
10.	Protecting crop from birds	88 (73.33)	12 (10.00)	20 (16.67)
11.	Harvesting of crop	90 (75.00)	25 (20.83)	05 (04.17)
12.	Storage of grains	107 (89.16)	10 (08.34)	03 (04.17)
13.	Marketing of produce	10 (08.34)	20 (16.66)	90 (75.00)
14.	Distribution of work to labourers	51 (42.50)	34 (28.33)	35 (29.17)
15.	Supervision on labourers	60 (50.00)	31 (25.83)	29 (24.17)
16.	Farm management	15 (12.50)	22 (18.33)	83 (69.17)
B)	**Horticultural activities**			
I)	**Fruit growing**			
1.	Cultivation of fruit crop	48 (40.00)	62 (51.67)	10 (08.33)
2.	Application of fertilizers	50 (41.67)	62 (51.67)	08 (06.66)
3.	Interculturing	98 (81.67)	22 (18.33)	00 (00)
4.	Irrigation	09 (07.50)	25 (20.83)	86 (71.67)
5.	Harvesting	101 (84.17)	19 (15.83)	00 (00)
6.	Looking after orchard	100 (83.33)	18 (15.00)	02 (01.66)
II)	**Vegetable Cultivation**			
1.	Selection of proper seed	12 (10.00)	32 (26.67)	76 (63.33)
2.	Preparation of nursery	11 (09.16)	36 (30.00)	73 (60.84)
3.	Care of nursery	11 (09.16)	36 (30.00)	73 (60.84)
4.	Treatment for seedlings	20 (16.67)	28 (23.33)	72 (60.00)
5.	Planting	104 (86.67)	16 (13.33)	00 (00)
6.	Application of fertilizers	50 (41.66)	62 (51.67)	08 (06.67)
7.	Interculturing	107 (89.17)	13 (10.83)	00 (00)
8.	Irrigation	13 (10.83)	29 (24.17)	78 (65.00)
9.	Harvesting	105 (87.50)	15 (12.50)	00 (00)
10.	Marketing of Vegetable	30 (25.00)	52 (43.33)	38 (31.67)
C)	**Allied activities**			
I)	**Dairy**			
1.	Feeding management	38 (31.67)	42 (35.00)	40 (33.33)
2.	Drinking water to animal	65 (54.17)	43 (35.83)	12 (10.00)

3.	Care of young-ones	85 (70.83)	28 (23.34)	07 (05.83)
4.	Grazing of animal	12 (10.00)	26 (21.67)	82 (68.33)
5.	Cleaning of byre	98 (81.67)	12 (10.00)	10 (08.33)
6.	Milking	20 (16.67)	35 (29.17)	65 (54.16)
7.	Sale of milk	15 (12.50)	37 (30.83)	68 (56.67)
II.	**Goat rearing**			
1.	Feeding management	90 (75.00)	20 (16.67)	10 (08.33)
2.	Drinking water to animal	65 (54.17)	43 (35.83)	12 (10.00)
3.	Care of young-ones	85 (70.83)	28 (23.34)	07 (05.83)
4.	Grazing of animal	12 (10.00)	26 (21.67)	82 (68.33)
5.	Milking	35 (29.17)	65 (54.17)	20 (16.66)

(Figures in parentheses indicates percentage)

The data in Table-1 revealed that, majority of the respondents had always participated in the operations viz. weeding, inter-culturing and storage of food grains (89.17 %), harvesting of vegetables (87.50 %), planting (86.67 %) while a large majority of the respondents never participated in the operations like, water management (87.50 %), seed treatment (77.50 %), and marketing of farm produce (75.00 %). Majority of the respondents had occasionally participated in the operations like, milking (65.00 %), cultivation of fruit crop, and application of fertilizer (51.67 %).

The findings regarding operation-wise participation of farm women in agricultural activities are similar with the findings of Hossain and Mishra (2002) and Jaishree Ekale *et al*. (2003)

Overall Extent of participation of the respondents in different agricultural activities

The data with respect to overall extent of participation of the respondents in different agricultural activities are presented in Table 2.

Table 2. Distribution of the respondents according to their overall participation in agricultural activities

Sr. No.	Participation in agriculture work (score)	Frequency (N=120)	Per cent
1.	Low (up to 44)	22	18.33
2.	Medium (45 to 56)	70	58.34
3.	High (57 and above)	28	23.33
	Total	**120**	**100.00**

The data presented in table- 2 depicted that a majority i.e. 58.34 per cent of the respondents had medium level of participation in agriculture activities. While, 23.33 per cent had high and 18.33 per cent had low level of participation in agriculture activities.

Constraints experienced by the farm women participating in agricultural activities.

The finding revealed that a majority of farm women (60.00 %) expressed that lack of time to attend the training programme at peak agricultural season followed by unable to attend training programme for long period due to family problem (58.33%) and Lack of wide publicity of training programme (40.00 %). A few of farm women expressed that Lack of visits of extension workers (29.16 %), frustration due to lack of knowledge and illiteracy (25.00 %), inconvenient training organization (25.00 %) and Lack of teaching learning environment particularly as per the need of women (20.83 %) were the constraints faced by them.

Suggestions of the farm women for overcoming the constraints in agriculture

The result of study showed that 58.33 per cent farm women suggested that training should be conducted before commencement of season followed by training should be conducted for short duration (48.33%). A considerable proportion (46.67%) of them suggested that use of audio visual aids in training programme is must for effectiveness , training information should be publish through newspaper or any media(37.50%), visit should be organized by the extension workers(26.66%), training should be organized at farmers locality (25.00%) and 20.83 per cent farm women suggested that the training organizers should create awareness among the trainees about the government policies and programmes and training should be well organized as per the subject matter, strength of trainees and as regard with facilities.

CONCLUSIONS

Majority of the respondents had always participated in the operations viz. weeding, inter-culturing and storage of food grains, harvesting of vegetables, planting .While, a large majority of the respondents never participated in the operations like, water management, seed treatment and marketing of farm produce. Majority of the respondents had occasionally participated in the operations viz. milking, cultivation of fruit crop, application of fertilizer. Majority of farm women expressed constraints like lack of

time to attend the training programme at peak agricultural season followed by unable to attend training programme for long period due to family problems. Nearly, 58.33 per cent farm women suggested that, training should be conducted before commencement of season.

REFERENCES

Antwal, P.N. and Bellurkar, C.M. 2007. 'Participation of rural women in farm and livestock management activities'. *International J. of Extension Education*.3: 61-67.

Ganeshan, R. and Seethalakshmi, R. 2002. 'Participation pattern of women on IPM in rice'. Agricultural Extension Review. 14(5): 28-30.

Hossain, M.M. and Mishra, S.N. 2002. Studies on involvement of women in agriculture and allied activities in Kalahandi district of Orisa. Manage Extension Research Review. 3 (1) :88-89.

Inamdar, U.S., 2000. A study of constraints faced by farmers availing credit facilities extended by Bank of Maharashtra. M.Sc. (Agri.) Thesis (Unpublished) M.P.K.V..Rahuri.

Jayashri Ekale, Nikhade D.M. and Chitra Bellurkar. 2003. 'Role perception of farm women in farm women farm activities'. Maharashtra J of Extension Education. 22(2): 90-93.

RESEARCH ARTICLE

Socio-economic Consequences Occurred among Tribal Beneficiaries as a result of *Wadi* project

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ABSTRACT

The present study was conducted to assess thesocio-economic consequences occurred among beneficiaries as a result of *Wadi* project. The study was conducted in Navsari, Valsad and The Dangs districts purposively. The overall socio-economic consequences were also found highly significant. The tribal beneficiaries possessed medium to high extent of socio-economic consequences occurred among beneficiaries as a result of *Wadi* project. The education, land holding, occupation, annual income, source of information, social participation, risk orientation, economic motivation, scientific orientation, extension contact, aspiration, cohesiveness, management orientation, communication skill, distance from market found highly significant Associateciation with socio-economic consequences occurred among tribal beneficiaries as a result of *Wadi* project. Further, the farming experience, innovativeness, training acquired were significantly Associateciated with the socio-economic consequences occurred among tribal beneficiaries as a result of *Wadi* project.

INTRODUCTION

The *Wadi* project mainly involves development of orchard (locally known as *Wadi*) on degraded lands. Mango, Cashew, Guava, Custard apple, Aonla, Lemon, Sapota and Drumstick are the major fruit crops that are cultivated by the tribal. *Wadi* is a comprehensive project for improving living standards and socio-economic condition of tribal families in remote areas.

The consequence is the change that occurs to an individual or to a social system as a result of adoption or rejection of an innovation / idea. In this study, the beneficiaries due to adoption of components of *Wadi* project in the form of socio- economic changes. In all, mostly Associateciated thirteen aspects namely; change in land use pattern, change in agri-horti-forestry production, change in annual income, change in consumption of farm inputs, change in modern technology

based farm machinery and farm implements, change in household items, change in saving and investment, change in food habit, change in clothing, change in housing, change in social status, change in self-sufficiency and change in social relationship which were considered as consequences of *Wadi* project. The study was undertaken on following specific objectives.

OBJECTIVES

1. To study Socio-economic consequences occurred among tribal beneficiaries as a result of *Wadi* project.
2. To study extent of socio-economic consequences occurred among tribal beneficiaries as a result of *Wadi* project.
3. To study relationship betweenprofileof the tribal beneficiaries andsocio-economic consequences.

METHODOLOGY

The present study was examined thesocio-economic consequences occurred among beneficiaries as a result of *Wadi* project. The study was conducted in Navsari, Valsad and The Dangs districts purposively, because the *Wadi* project was started in 1982 in these three districts with maximum number of beneficiaries of the project. A list of all tribal beneficiaries of *Wadi* project were collected from the BAIF-DHRUVA office of Village Lachhakadi, P.O.Gangpur, Tal.Vansda, Dist. Navsari, Gujarat. The proportionate random sampling method was used for selection of 200 tribal beneficiaries from the 55 villages of 4 talukas of three districts of South Gujarat for the present investigation. The measurement of socio-economic consequences the structured schedule was developed.

FINDINGS

Socio-economic consequences occurred among tribal beneficiaries as a result of *Wadi* project

The change in 13 aspects was measured by obtaining the mean score and to know the difference the 't' test was employed. The information given in Table 1 revealed that the highly significant change occurred in case of change in land use pattern (4.4364**), change in agri-horti-forestry production (13.1374**), change in annual income (22.3753**), change in consumption of farm inputs (20.1005**), change in modern technology based farm machinery and farm implements (16.3551**), change in household items (18.8586**), change in saving and investment (24.2433**), change in food habit (9.6503**), change in clothing (12.4169**), change in housing (9.5008**), change in social status (9.4149**), change in self-sufficiency (18.2351**) and change in

social relationship (12.9631**). Moreover, the overall socio-economic consequences (29.8484**) was also found highly significant.

Table 1: Aspect wise socio-economic consequences occurred as a result of *Wadi* project (n=200)

Sr. No.	Aspects	Mean score		Mean difference	"t" value
		Before project	After project		
1.	Change in land use pattern	1.2100	1.3000	0.09	4.4364**
2.	Change in Agri-horti-forestry production	1.7850	2.3100	0.5100	13.1374**
3.	Change in Annual income (Rs.)	35002.73	55769.5	20766.77	22.3753**
4.	Change in consumption of F.I.	1.7600	2.4300	0.6700	20.1005**
5.	Change in Modern Technology	4.3800	5.2500	0.8700	16.3551**
6.	Change in Household items	5.1450	6.0650	0.9200	18.8586**
7.	Change in Saving/ investment	1.7650	2.8600	1.0950	24.2433**
8.	Change in food habit	4.4400	5.0850	0.6450	9.6503**
9.	Change in clothing	2.2900	2.7800	0.4900	12.4169**
10.	Change in housing	2.5600	2.9450	0.3850	9.5008**
11.	Change in social status	4.2900	4.7200	0.4300	9.4149**
12.	Change in self sufficiency	2.6700	3.3150	0.6450	18.2351**
13.	Change in social relationship	5.3050	6.4750	1.1700	12.9631**
	Overall consequences	**36.5250**	**47.0450**	**10.5200**	**29.8484**

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

Extent of socio-economic consequences occurred among tribal beneficiaries as a result of *Wadi* project

The data manifested in table 2 shows that a majority (62.00 per cent) of the tribal beneficiary's hadmedium extent of socio-economic consequences regarding components of *Wadi* project, followed by 19.00 per cent had high and low extent of socio-economic consequences respectively.

Table 2: Distribution of tribal beneficiaries according to their extent of socio-economic consequences   **(n=200)**

Sr. No.	Extent of socio-economic consequences	Frequency	Percentage
1.	Low extent of socio-economic consequences	38	19.00
2.	Medium extent of socio-economic consequences	124	62.00
3.	High extent of socio-economic consequences	38	19.00
Total		**200**	**100.00**

Relationship between profile and Socio-Economic Consequences

The data evident in table 3 revealed that the education (0.445**), land holding (0.401**),occupation (0.397**),annual income(0.450**),source of information (0.369**), social participation (0.345**),risk orientation (0.390**), economic motivation (0.432**), scientific orientation (0.409**), extension contact (0.383**), aspiration (0.321**), cohesiveness (0.518**), management orientation (0.352**), communication skill (0.375**), distance from market (0.358**) found highly significant Associateciation with socio-economic consequences occurred among tribal beneficiaries as a result of *Wadi* project. Further, the farming experience (0.147*), innovativeness (0.143*), training acquired (0.160*) were significantly Associateciated with the socio-economic consequences occurred among tribal beneficiaries as a result of *Wadi* project. The age (-0.373**) were negatively highly significant Associateciation with the socio-economic consequences occurred among tribal beneficiaries as a result of *Wadi* project. On the other hand, family size (0.0059^{NS}) was non-significant Associateciation with the socio-economic consequences occurred among tribal beneficiaries as a result of *Wadi* project.

Table 3: Relationship between profile of the tribal beneficiaries and socio-economic consequences   **(n=200)**

Sr. No.	Independent variable	Socio-economic consequences ('r' value)
1.	Age	-0.373**
2.	Education	0.445**
3.	Family size	0.0059^{NS}
4.	Land holding	0.401**
5.	Farming experience	0.147*
6.	Occupation	0.397**
7.	Annual income	0.450**

8.	Source of information	0.369**
9.	Social participation	0.345**
10.	Risk orientation	0.390**
11.	Economic motivation	0.432**
12.	Scientific orientation	0.409**
13.	Extension contact	0.383**
14.	Innovativeness	0.143*
15.	Training acquired	0.160*
16.	Aspiration	0.321**
17.	Cohesiveness	0.518**
18.	Management orientation	0.352**
19.	Communication skill	0.375**
20.	Distance from market	0.358**

* Significant at 5 per cent   ** Significant at 1 per cent [NS] Non significant

CONCLUSION

The socio-economic consequences due to *Wadi* project showed that the highly significant change occurred in case of change in land use pattern, change in agri-horti-forestry production, change in annual income, change in consumption of farm inputs, change in modern technology based farm machinery and farm implements, change in household items, change in saving and investment, change in food habit, change in clothing, change in housing, change in social status, change in self-sufficiency and change in social relationship. Moreover, the overall socio-economic consequences were also found highly significant. The tribal beneficiaries possessed medium to high extent of socio-economic consequences occurred among beneficiaries as a result of *Wadi* project. The education, land holding, occupation, annual income, source of information, social participation, risk orientation, economic motivation, scientific orientation, extension contact, aspiration, cohesiveness, management orientation, communication skill, distance from market found highly significant Associateciation with socio-economic consequences occurred among tribal beneficiaries as a result of *Wadi* project. Further, the farming experience, innovativeness, training acquired were significantly Associateciated with the socio-economic consequences occurred among tribal beneficiaries as a result of *Wadi* project.

REFERENCES

Darandale, A. A. (2015). Consequential Assessment of the Farmers about Adoption of Recommended Practices

of Major Crops in South Gujarat. Ph.D. thesis *(unpublished)* submitted to N.A.U., Navsari, Gujarat.

Matwa, J. (2012). Consequences of ATMA project on maize growers. M.Sc. (Agri.) thesis (unpublished) submitted to A.A.U., Anand, Gujarat.

Ninama, M. D., Patel, J.B. and Raghuvansh, S.K. (2016). Relationship between

impact of check dam on socio-techno-economic status of tribal farmers. *Guj. J. Extn. Edu.*, **27** (2) : 204-205.

Pandya, S. P., Prajapati, M. R. and Patel, K. S. (2016). Relationship between charecteristics of the farmers with change in socio economic impact as a result of participating in Krushi Mahostav. *Guj. J. Extn. Edu.,***27** (2): 212-214.

RESEARCH ARTICLE

Development of a Scale to Measure the Attitude of Cotton Growers towards Integrated Pest Management technology

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ABSTRACT

Attitude is one of the most important determinants of human behaviour. It influences the process of learning fundamentally. Attitude of a person may reflect his central value or shows his consistency in ways of reacting. A scale was developed to measure the attitude of cotton growers towards integrated pest management technology. Likert's method of summated rating scale technique was followed for the construction of attitude scale. Out of 45 statements 26 statements were retained on final scale. The reliability and validity of the scale indicates its precision and consistency of the results. This scale can be used to measure cotton grower's attitude beyond the study area with suitable modifications.

Keywords: Attitude scale, Integrated Pest Management technology, Likerts method of summated rating, reliability, validity

INTRODUCTION

Integrated Pest Mananagement technology is an important tool in pest management as it reduces the expenditure on insecticide sprays and helps in increasing yield .But now a days the cotton growers uses the chemical insecticides for the control of insect pest that's harms the nature and environment. So, it is necessary to know the attitude of cotton growers towards integrated pest management technology through this tool.Attitude refers to an individual's degree of favourableness or unfavourableness towards some psychological object. By a psychological object, Thurstone (1946) meant any symbol, phrase, slogan, person, institution, ideal or ideas towards which people can differ with respect to positive or negative affects,. A particular job, a political party, a particular food are some of the example of psychological objects. In this study it referred to degree of positive and negative attitude of cotton growers towards integrated pest management technology. For this

purpose, the study was designed with the objective of develop the scale to measure the attitude of cotton growers towards integrated pest management technology.

METHODOLOGY

A scale was specially developed to measure the attitude of cotton growers towards IPM technology with slight modification. The method of summated rating suggested by Rensis Likert (1932) and Edwards (1957) was followed in construction of the scale.

Collection and editing of items

Fifty statements, expressing the attitude of cotton growers towards IPM technology have been collected from available literature, websites and in consultation with the specialists in the field of extension and entomology. They were edited on the basis of criteria suggested by Thurstone (1946), Likert (1932) and Edward (1957). Out of 50 statements, 45 statements were retained after editing. These statements were found to be non ambiguous and non-factual.

Relevancy test

The list of 45 statements, so selected, were sent to 104 judges which are senior faculty members in the disciplines of Agricultural Extension from the State Agricultural Universities, programme coordinator and Subject Matter Specialists of entomology of the Krishi Vigyan Kendras, Extension Scientists from the ICAR institutes. They were requested to indicate their responses about each of the statements on a three point continuum namely, 'most relevant' 'relevant' and 'not relevant' with the score of 3, 2, and 1, respectively. So also, their opinion about inclusion of the statements in the final scale was sought. A total of 74 judges responded to the appeal and returned the duly filled in questionnaire. On the basis of the responses received, the relevancy Weightage, relevancy percentage and mean relevancy score for each statement were worked out by using the following formulae.

Relevancy Weightage

Following formula was used to work out the relevancy Weightage of a statement.

$$RW = \frac{MRR \times 3 + RR \times 2 + NRR \times 1}{MOS\ (3 \times 74 = 222)}$$

Where,

RW = Relevancy Weightage

MRR = Most Relevant Response

RR = Relevant Response

MOS = Maximum Obtainable Score

Relevancy Percentage

Relevancy percentage of each statement was computed by using the following formula.

$$RP = \frac{OS}{MOS\ (3 \times 74 = 222)}$$

Where,

RP = Relevancy Percentage

OS = Obtained Score

MOS = Maximum Obtainable Score.

Mean Relevancy Score

For calculating the mean relevancy score of each item, following formula was used.

$$\text{MRS} = \frac{\text{MRR X 3 + RR X 2 + NRR X 1}}{\text{Number of judges (74)}}$$

Where,

MRS = Mean Relevancy Score

MRR = Most Relevant Response

RR = Relevant Response

NRR = Not Relevant Response

Using these three criteria, the items were screened for their relevancy. Finally, the statements having, more than 0.66 relevancy Weightage, more than 66.00 per cent relevancy percentage and more than 2 mean relevancy score were considered relevant to assess the perception.

Table 1. Selection of statement based on judges: Relevancy Weightage (RW), Relevancy Percentage (RP) and Mean Relevancy Score (MRS)

Sr. No.	Statements	Relevancy		
		RW	RP	MRS
1	IPM technology is eco-friendly	0.7387	73.87	2.21
2	IPM technology is more complex in nature	0.8693	86.93	2.61
3	IPM technology helps to manage infestation of insect pest with minimum use of insecticide	0.8288	82.88	2.48
4	IPM technology is not practically feasible to the farmers	0.7477	74.77	2.24
5	IPM technology provides better economic return	0.8513	85.13	2.55
6	IPM technology on large farms require more human resources	0.7927	79.27	2.33
7	IPM technology can be used in any agri-ecosystem	**0.6486**	**64.86**	**1.94**
8	The practices of IPM technology in cotton is more time consuming	0.7792	77.92	2.33
9	IPM technology strengthen the socio economic status of the farmers	0.8153	81.53	2.44
10	IPM technology is not accepted by cotton growers	**0.6576**	**65.76**	**1.97**
11	There is no risk to use the IPM technology in cotton	0.7477	74.77	2.24
12	IPM technology requires proper technical guidance	0.7747	77.47	2.32
13	IPM technology reduces the expenditure on indiscriminate use of insecticide	0.7792	77.92	2.33
14	Cotton growers have no trust on IPM technology	**0.6261**	**62.61**	**1.87**
15	IPM technology requires personal experience	0.7927	79.27	2.37
16	IPM technology in cotton crop does not control all insect pest	0.8603	86.03	2.58
17	IPM technology enhances living standard of cotton growers	**0.6396**	**63.96**	**1.91**
18	IPM technology does not make any impact on cotton yield	0.8333	83.33	2.50

19	IPM technology is safe for environment(Deleted due to repetition)	0.7567	75.67	2.27
20	IPM technology gives more benefits in low cost	0.8288	82.88	2.48
21	IPM technology can be adopted by all categories of farmers	0.8108	81.08	2.44
22	Cotton growers are not aware about the importance of IPM technology	0.8553	85.53	2.44
23	IPM technology gives additional income from trap crops	0.7837	78.37	2.35
24	I would like to advise my family members to continue IPM technology in cotton	0.7387	73.87	2.21
25	IPM technology gives results very slowly	0.8603	86.03	2.58
26	All cotton related problems cannot be solved by the use of IPM technology	0.8243	82.43	2.47
27	IPM technology in cotton is only option at present to achieve sustainable production of cotton	**0.6567**	**65.67**	**1.96**
28	IPM technology in cotton can be made compulsory for cotton growers for better future	0.8288	82.88	2.48
29	IPM technology is cheaper method of pest control(Deleted initially)	0.8513	85.13	2.55
30	IPM technology is easy to implement	**0.6396**	**63.96**	**1.91**
31	IPM technology is sustainable method of pest control	0.8243	82.43	2.47
32	IPM technology increases employment opportunities to cotton growers	0.8558	85.58	2.56
33	IPM technology is boon to cotton growers(Deleted initially)	0.7792	77.92	2.33
34	IPM technology preserve ecosystem(Deleted due to repetition)	0.7567	75.67	2.27
35	IPM technology is suffers from lot of shortcomings	**0.6417**	**64.17**	**1.92**
36	IPM technology cannot be used by illiterate cotton growers	0.7837	78.37	2.35
37	IPM technology helps in conservation of natural enemies(Deleted initially)	0.8603	86.03	2.58
38	It is good to use IPM technology to get quicker control of pests	**0.6261**	**62.61**	**1.87**
39	IPM technology requires costly plant protection equipments	0.8558	85.58	2.56
40	IPM technology requires skilled labourers	0.6666	66.66	2.00
41	IPM technology is not profitable to the marginal and small cotton growers	0.7882	78.82	2.36
42	IPM technology will increases the burden of loans on the cotton growers	**0.5045**	**50.45**	**1.51**
43	The high cost of IPM technology puts limitations on its use(Deleted due to repetition)	0.8558	85.58	2.56
44	IPM technology helps in maintaining ecological	0.8198	81.98	2.45

	equilibrium(Deleted due to repetition)			
45	The cotton growers should adopt the IPM technology without any hesitation	0.7387	73.87	2.21

Calculation of 't' value (Item analysis):

These 29 statements were subjected to item analysis to delineate the items based on the extent to which they can differentiate the respondent with high impact than the respondent with low impact of IPM technology in Marathwada region. For this 40 IPM cotton growers were selected from non-sample area. The respondents were asked to indicate their degree of agreement or disagreement with each statement on the three-point continuum ranging from " agree" to " disagree". The scoring pattern adopted was 3 to 1, in which, 3 weighs to agree response, 2 to undecided response, 1 to disagree response for positive statement and for negative statement, the scoring pattern was reversed. Based upon the total scores, the respondents were arranged in descending order. The top 25 per cent of the respondents with their total scores were considered as the high group and the bottom 25 per cent as the low group, so as these two groups provide criterion groups in terms of evaluating the individual statements as suggested by Edwards (1957). Thus out of 40 IPM cotton growers to whom the items were administered for the item analysis, 10 IPM cotton growers with lowest, 10 IPM growers with highest scores were used as criterion groups to evaluate individual items.

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 statements was calculated by using the formula suggested by Edward (1957).

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

Where,

"$(X_H - X_H)^2$ = "X_H^2 – ("X_H)^2

"$(X_L - X_L)^2$ = "X_L2 – ("X_L)^2

X_H = The mean score on given statement of the high group

X_L = The mean score on given statement of the low group

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

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

X_H = Summation of scores on given statement for high group

X_L = Summation of scores on given statement for low group

n = Number of respondents in each group

Σ = Summation

Table 2. List of total statements of scale with their 't' values

Sr. No.	Stat. No.	Statements	t-value
1	1	IPM technology is eco-friendly	3.91
2	2	IPM technology is more complex in nature	1.97
3	3	IPM technology helps to manage infestation of insect pest with minimum use of insecticide	4.35
4	4	IPM technology is not practically feasible to the farmers	1.78
5	5	IPM technology provides better economic return	3.50
6	6	IPM technology on large farms require more human resources	2.34
7	8	The practices of IPM technology in cotton is more time consuming	1.92
8	9	IPM technology strengthen the socio economic status of the farmers	2.16
9	11	There is no risk to use the IPM technology in cotton	1.82
10	12	IPM technology requires proper technical guidance	3.16
11	13	IPM technology reduces the expenditure on indiscriminate use of insecticide	4.28
12	15	IPM technology requires personal experience	3.20
13	16	IPM technology in cotton crop does not control all insect pest	1.98
14	18	IPM technology does not make any impact on cotton yield	1.79
15	19	IPM technology is safe for environment(Deleted due to repetition)	0
16	20	IPM technology gives more benefits in low cost	1.58
17	21	IPM technology can be adopted by all categories of farmers	1.36
18	22	Cotton growers are not aware about the importance of IPM technology	1.82
19	23	IPM technology gives additional income from trap crops	4.60
20	24	I would like to advise my family members to continue IPM technology in cotton	3.50
21	25	IPM technology gives results very slowly	4.03
22	26	All cotton related problems cannot be solved by the use of IPM technology	6.34
23	28	IPM technology in cotton can be made compulsory for cotton growers for better future	2.86
24	29	IPM technology is cheaper method of pest control(Deleted initially)	0
25	31	IPM technology is sustainable method of pest control	2.30
26	32	IPM technology increases employment opportunities to cotton growers	3.91
27	33	IPM technology is boon to cotton growers(Deleted initially)	0
28	34	IPM technology preserve ecosystem(Deleted due to repetition)	0
29	36	IPM technology cannot be used by illiterate cotton growers	2.16

30	37	IPM technology helps in conservation of natural enemies(Deleted initially)	0
31	39	IPM technology requires costly plant protection equipments	3.60
32	40	IPM technology requires skilled labourers	4.35
33	41	IPM technology is not profitable to the marginal and small cotton growers	5.31
34	43	The high cost of IPM technology puts limitations on its use(Deleted due to repetition)	0
35	44	IPM technology helps in maintaining ecological equilibrium(Deleted due to repetition)	0
36	45	The cotton growers should adopt the IPM technology without any hesitation	1.73

Selection of Statements for final scale

After computing the 't' value for all the 29 items, statements with greater than 1.75 and highest 't' value were finally selected for inclusion in scale.

Table 3. List of statements selected for inclusion in the final scale

Sr.No.	Statements	Response		
		A	UD	DA
1	IPM technology is eco-friendly			
2	IPM technology is more complex in nature			
3	IPM technology helps to manage infestation of insect pest with minimum use of insecticide			
4	IPM technology is not practically feasible to the farmers			
5	IPM technology provides better economic return			
6	IPM technology on large farms require more human resources			
7	The practices of IPM technology in cotton is more time consuming			
8	IPM technology strengthen the socio economic status of the farmers			
9	There is no risk to use the IPM technology in cotton			
10	IPM technology requires proper technical guidance			
11	IPM technology reduces the expenditure on indiscriminate use of insecticide			
12	IPM technology requires personal experience			
13	IPM technology in cotton crop does not control all insect pest			
14	IPM technology does not make any impact on cotton yield			
15	Cotton growers are not aware about the importance of IPM technology			
16	IPM technology gives additional income from trap crops			

17	I would like to advise my family members to continue IPM technology in cotton			
18	IPM technology gives results very slowly			
19	All cotton related problems cannot be solved by the use of IPM technology			
20	IPM technology in cotton can be made compulsory for cotton growers for better future			
21	IPM technology is sustainable method of pest control			
22	IPM technology increases employment opportunities to cotton growers			
23	IPM technology cannot be used by illiterate cotton growers			
24	IPM technology requires costly plant protection equipments			
25	IPM technology requires skilled labourers			
26	IPM technology is not profitable to the marginal and small cotton growers			

Reliability

Test-retest method

The final set of the 26 statements, which represent the attitude of cotton growers towards IPM technology, was administered on three-point continuum to a fresh group of 40 IPM cotton growers, which were not included in the actual sample. After a period of 15 days the scale was again administered to the same respondents and thus two sets of scores were obtained. The Pearson's product moment of correlation coefficient for the both the sets were worked out. The 'r' value (0.844) was significant at 0.01 level of probability indicating the attitude scale was highly suitable for administration to the cotton growers as the scale was stable and dependable in its measurement.

Validity

Validity of instrument is the property "that ensures the obtained test scores correctly measure the variable they are supposed to measure" (English and English, 1958).

Content validity

The content validity of the scale was tested. 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. As the content of the attitude was thoroughly covered the entire universe of IPM technology on cotton growers literature and expert opinion, it was assumed that present scale satisfied the content validity. As the scale value difference for almost all the statements

included had a very high discriminating value, it seemed reasonable to accept the scale as a valid measure of the attitudeensuring a fair degree of content validity.

RESULTS AND DISCUSSION

The final scale consists of 26 statements. The responses had to be recorded on three point continuum representing agree, undecided and disagree with scores of 3,2 and 1for positive statements and vice-versa for negative statements. The attitude score of each respondent can be calculated by summing the scores obtained by him on all the items. The attitude score on this scale ranges from 60 to 72.The medium score indicates that respondent had favorable attitude towards integrated pest management technology.

CONCLUSION

The reliability and validity of the scale indicated the precision and consistency of the results. This scale can be used to measure the cotton growers attitude beyond the study area with suitable modifications.

REFERENCES

Allport, G. W. (1935). Attitudes, in a handbook of Social Psychology (Ed.) C. Murchison Clark University Press, Worchester, pp: 357-359

Chavai. A. M. and Sawant. G. K (2007). Attitude of cotton growers towards Integrated Pest Management (IPM) Technology: development and standardization of scale. *Asian journal of Extension Education.* 26 (1 and 2): 109-112

Thakur D., Chander M. and Sinha S .(2017)Indian research journal Extension Edu.17(3) 10-15.

Eagly, A.H. and Chaiken, S. (1998). Attitude structure and function. The handbook of Psychology, pp: 269-322.

Edward, A. L. (1957). *Techniques of attitude scale construction.* Appleton Century crops: New York. 118-119

English H.B. and A. C. English (1958). A comprehensive dictionary of psychological and psycho-analytical terms. Congmans Gree and Company, New York, pp: 781-783..

Likert, R. (1932). A technique for measurement of attitudes *Arch; psychol*.22 (55), 140.

Thurstone (1946). The Measurement of attitudes. *American Journal of social sciences,* 39-50.

RESEARCH ARTICLE

Adoption of Vegetable Growers about Environmental Hazards and Eco-friendly Management Practices

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ABSTRACT

Green revolution technologies have more than doubled the yield potential of rice and wheat, especially in Asia. These high input production systems requiring massive qualities of fertilizers, pesticides, irrigation and machines, however, disregard the ecological integrity of land, forests and water resources, endanger the flora and fauna and cannot be sustained over generations. For the present study, an ex-post-facto research design was followed and research was carried out in Pune and Kolhapur districts of Western Maharashtra. The sample size encompassed with 180 vegetable growers. Variables which had direct relevance to the eco-friendly agriculture practices followed in vegetables are carefully chosen for the present research. Henceforth, fifteen independent and two dependent viz. knowledge and adoption were firm up for the current investigation. Precisely rare studies attempted to measure the level of knowledge, adoption and attitude of eco-friendly technologies therefore attempt is made to outing the knowledge test, adoption index and attitude scale towards eco-friendly management. Data composed were administered and categorized by using frequency, percentages, mean, standard deviation, range, coefficient of correlation, coefficient of multiple determination and path analysis. At overall, majority of the respondents has medium knowledge regarding environmental hazards and eco-friendly management practices. Furthermore, less than one third of the sample respondents have low adoption of eco-friendly management practices. Though research put exultant annotation about majority of the respondents have favourable and sensible attitude towards eco-friendly management in the interior of their nurtured vegetables. While majority of the designated independent variables have positive and significant relationship with dependent variables and nearly fifty per cent variation is found in Associatertment of variables for the existing research. Altogether every independent variable put notable effect on dependent variable directly, indirectly as well as substantially.

Key words : Attitude,Environment, Eco-Friendly,

INTRODUCTION

Green revolution technology as resulted in a phenomenal growth in agricultural productivity; however it treads heavily in the environment. Continuous use of chemical pesticides has severely affected the environment. Pesticide residues in food items and their bioaccumulation in the body trigger several health hazards. These indiscriminately used chemical insecticides led to the contamination of water and food sources, poisoning of non-target beneficial insects and development of insect populations resistant to the insecticide. Due to the problems of resistance development in pests and withdrawal of some products for either regulatory or commercial reasons, only a fewer chemical pesticides are available in the market.

Eco-friendly and environmentally friendly are synonyms used to refer to goods and services considered to inflict minimum or no harm on the environment. To make consumers aware environmentally friendly goods and services often are marked with eco-labels. Eco-friendly farming is the process of producing food naturally. This method avoids the use of synthetic chemicals and generally modified organisms to influence the growth of crops. The main idea behind eco-friendly farming is Zero impact on environment. It works in harmony with nature rather than against it. This involves musing techniques to achieve good crop yields without harming the natural environment or the people who live and work in it.

Hence, realizing the importance of eco-friendly practices of farming systems that are environmentally sound, profitable production and maintain the social fabric of the rural community, this study was undertaken to divulge the managing aspects of eco-friendly practices in vegetables, designed with the following specific objectives.

1. To study the personal, socio-economic and psychological characteristics of vegetable growers from Western Maharashtra.
2. To study the extent of adoption of vegetable growers about environmental hazards and eco-friendly management practices.
3. To find out the relationship between personal, socio-economic, psychological and communication variables of vegetable growers and adoption level of environmental hazards and eco-friendly practices.

METHODOLOGY

Research study carried out in Pune and Kolhapur districts of Western Maharashtra during the year 2015-2016. An Ex-post-facto research design was

followed for the existing study besides the sample size encompassed with 180 vegetable growers which were personally interviewed with a structured and questionnaire pre-tested was used to collect data from vegetable growers. A variable which has direct relevance to the eco-friendly agriculture practices followed in vegetables are carefully chosen for the present research. Henceforth, fifteen independent and two dependent viz., knowledge and adoption were firm up for the current investigation. Precisely rare studies attempted to measure the level of knowledge, adoption and attitude of eco-friendly technologies therefore attempt is made to outing the knowledge test, adoption index and attitude scale towards eco-friendly management. Data composed were administered and categorized by using frequency, percentages, mean, standard deviation, range, coefficient of correlation, coefficient of multiple determination and path analysis.

RESULTS AND DISCUSSION

The results pertaining to personal, socio-economic, psychological and communication characteristics of vegetable growers which are followed eco-friendly practices during last three years were depicted under precisely selected variables and presented in the following tables.

It was found from Table 1 that nearly forty per cent of the respondents belonged to middle age group (37.78%), followed by old age (32.78%) and young age (29.44%) group. These findings are alike to the results of Gupta (2012) and Soni (2014).

Table 1. Distribution of sample respondents according to their age

Sr. No.	Age (years)	Sample respondents	
		Frequency	Per cent
1	Young age (Up to 35 years)	53	29.44
2	Middle age (36 to 55 years)	68	37.78
3	Old age (56 years and above)	59	32.78
	Total	**180**	**100**

The results (Table 2) reveal that 27.22 per cent of respondents studied up to higher secondary; whereas 25.56 per cent of them were educated up to primary education level. About 21.11 per cent of them had education up to high school level, while 11.67 per cent studies up to pre-primary school level. A meager 10 and 4.44 per cent of them were graduates and illiterate, respectively. These remarks are similar with Manjunath (2014) and Rai (2015).

Table 2. Distribution of the respondents according to their level of education

Sr. No.	Education level	Sample respondents	
		Frequency	Per cent
1	Illiterate	08	04.44
2	Pre-primary (1st – 4t Std.)	21	11.67
3	Primary education (5th -7th Std.)	46	25.56
4	High School (8th - 10th Std.)	38	21.11
5	Higher Secondary education (11th& 12th Std.)	49	27.22
6	Gradutes (Degree and above)	18	10.00
	Total	**180**	**100.00**

More than forty per cent (43.33%) of respondents belonged to small farmers'category that possesses only one to two hectares of cultivable land (Table 3) followed by 20.56 per cent of them belonging to marginal farmer category. Moreover 17.22 per cent of them possess land two to four hectares. Merely, 10.56 and 8.33 per cent of them belonged to medium and big farmers'category respectively. These findings are similar with the findings of Chouan et al. (2013) and Abbasov (2015).

Table 3. Distribution of the respondents according to their size of land holding

Sr. No.	Size of land holding (ha)	Sample respondents	
		Frequency	Per cent
1	Marginal (up to 1.00)	37	20.56
2	Small (1.01 to 2.00)	78	43.33
3	Semi-Medium (2.01 to 4.00)	31	17.22
4	Medium (4.01 to 10.00)	19	10.56
5	Big (10.01 and above)	15	8.33
	Total	**180**	**100.00**

The results presented in Table 4 indicates that nearly thirty per cent (28.33%) of te defendants had low level of income between Rs. 1450001 to Rs. 204000, followed by very low (25%), hig (22.22%) and medium level income (17.78%). Only 6.67 per cent respondent possesses more than 3.22 lakhs annually. These findings are similar with the findings of Singh (2011) and Deepthi (2014).

Table 4. Distribution of the respondents according to their annual income

Sr. No.	Annual income (Rs.)	Sample respondents	
		Frequency	Per cent
1	Very low (up to 145000)	45	25.00
2	Low (Rs. 145001 to Rs. 204000)	51	28.33
3	Medium (Rs. 2,04,001 to Rs. 263000)	32	17.78
4	High (Rs. 263001 to Rs. 322000)	40	22.22
5	Very high (Rs. 322001 and above)	12	6.67
	Total	**180**	**100.00**

The Table 5 reveals that 25.56 per cent of respondents had high level of achievement motivation, followed by low (22.22%), medium (18.89%), very low (18.89%) and very high (14.44%) achievement motivation categories, respectively. The finding is analogous to the results of Deepthi et al. (2014).

Table 5. Distribution of the respondents according to their achievement motivation

Sr. No.	Achievement motivation	Sample respondents	
		Frequency	Per cent
1	Very low (Up to 36)	34	18.89
2	Low (37 to 41)	40	22.22
3	Medium (42 to 45)	34	18.89
4	High (46 to 49)	46	25.56
5	Very high (50 and above)	26	14.44
	Total	**180**	**100.00**

The data depicted in Table 6 revealed that near about thirty per cent (28.89%) of respondents had law level of innovative proneness, followed by very low and medium (20%) and high innovative proneness category (19.44%), respectively. Only 11.67 per cent respondents were found very highly innovative. This finding is alike with the findings of Gautam et al. (2014) and Hudak (2015).

Table 6. Distribution of the respondents according to their innovative proneness.

Sr. No.	Innovative proneness	Sample respondents	
		Frequency	Per cent
1	Very low (Up to 28)	36	20.00
2	Low (29 to 34)	52	28.89
3	Medium (35 to 41)	36	20.00

4	High (42 to 47)	35	19.44
5	Very high (48 and above)	21	11.67
	Total	**180**	**100.00**

From Table 7 it was found that more than thirty (31.67%) of respondents had medium scientific orientation. Besides, 24.44 and 23.33 per cent of them belonged to high and low scientific orientation category, respectively.

Further, merely 10 per cent respondents categorized under very low and very high orientation separately. These findings are similar with the findings of Bacchav (2013) and Tey (2015).

Table 7. Distribution of the respondents according to their scientific orientation

Sr. No.	Scientific orientation	Sample respondents	
		Frequency	Per cent
1	Very low (Up to 11)	19	10.56
2	Low (12 to 16)	42	23.33
3	Medium (17 to 21)	57	31.67
4	High (22 to 25)	44	24.44
5	Very high (26 and above)	18	10.00
	Total	**180**	**100.00**

From the Table 8, it is observed that majority of the respondents (28.33%) belonged to high risk orientation, whereas, 20.56 per cent and 18.89 per cent of them belonged to very high and medium risk orientation category, respectively. Risk orientation of the respondents was set up jeopardy in adopting eco-friendly performs is found moderately influenced and this might be because of the respondents also having equal willingness to avail risk towards other means of vegetable cultivation. These findings are analogous with the discoveries of Sudheer (2011) AND Riungu (2015).

Table 8. Distribution of the respondents according to their risk orientation

Sr. No.	Risk orientation	Sample respondents	
		Frequency	Per cent
1	Very low (Up to 12)	27	15.00
2	Low (13 to 16)	31	17.22
3	Medium (17 to 20)	34	18.89
4	High (21 to 25)	51	28.33
5	Very high (26 and above)	37	20.56
	Total	**180**	**100.00**

From the Table 9, the results revealed that 27.78% of respondents belonged to medium category of cosmopoliteness. Whereas, 26.67 and 18.89 per cent of them belonged to high and low cosmopoliteness followed by 17.78 per cent and 8.89 per cent respondents placed in very high and very low category. These findings are similar with the findings of Probst (2011) and Borua et al. (2015).

Table 9. Distribution of the respondents according to their cosmopoliteness

Sr. No.	Cosmopoliteness	Sample respondents	
		Frequency	Per cent
1	Very low (Up to 4)	16	08.89
2	Low (5)	34	18.89
3	Medium (6)	50	27.78
4	High (7)	48	26.67
5	Very high (8)	32	17.78
	Total	**180**	**100.00**

From Table 10, it was found that 31.67 per cent of respondents belonged to high economic motivation, while 21.67 and 18.33 per cent of tem belonged to medium and low economic motivation category, respectively. However, 16.11 and 12.22 per cent respondents independently placed in very high and very low categorization of economic motivation. These findings are similar with the findings of Adjrah et al. (2013) and Holmer (2013).

Table 10. Distribution of the respondents according to their economic motivation

Sr. No.	Economic motivation	Sample respondents	
		Frequency	Per cent
1	Very low (Up to 12)	22	12.22
2	Low (13 to 16)	33	18.33
3	Medium (17 to 21)	39	21.67
4	High (22 to 25)	57	31.67
5	Very high (26 and above)	29	16.11
	Total	**180**	**100.00**

The data in the Table 11 reveals that, majority 30%) of the respondents belonged to low adoption category. In addition, 25.56 and 23.33 per cent of them are classified under medium and high adoption categories of followed by very low adoption group (15.56%). Only 5.56 per cent plaintiffs fit in high adoption category of eco-friendly practices. The plausible reason for low adoption of eco-

friendly technologies might be that it is relatively a new concept to many farmers. This implied that farmers need to be educated regarding benefits and advantages of eco-friendly technologies.

Table 11. Distribution according to overall ado ption of eco-friendly practices

Sr. No.	Adoption category	Vegetable g rowers	
		Frequency	Per cent
1	Very low (Up to 22)	28	15.56
2	Low (23 to 29)	54	30.00
3	Medium (30 to 35)	46	25.56
4	High (36 to 41)	42	23.33
5	Very high (42 and above)	10	05.56
	Total	180	100.00
	Mean – 29.25	Standard deviation – 6.18	

The results in Table 12 revealed that the extent of eco-friendly management practices as implemented by vegetable growers with respect to Integrated Pest Management practices. Cent per cent of vegetable growers fully adopted the practices like deep ploughing in summer and crop rotation, followed by use of pest and disease resistant varieties (79.44%) and use of synchronized planting (64.44%). While 70.56 per cent of them had partially adopted the practice of trap cropping. In case of practices such as use of inter cropping, seed treatment with bio-fertizers and installation of bird perches for predatory birds, 71.11, 65.56 and 100.00 per cent of the respondents respectively were found in no-adoption category. Regarding the seed treatment with bio-fertilizers majority of the vegetable growers (65.56% did not practice their impact was found to be no-observable and again farmers were not exposed to the utility of the bio-fertilizers.

Cent per cent of respondents partially adopted the practices like monitoring of pests, while 43.89 and 65 per cent of them were found in full adoption and non-adoption categories, respectively in case of uprooting of alternate host plants. The high majority of respondents were found to be in non-adoption category regarding the use of pheromone traps (85%) and use of light traps (73.33%), while, 72.78 per cent of them respondents were found to have partially adopted the practice of collection and destruction of egg masses and larvae.

Cent per cent of the respondents were found in non-adoption category regarding practices such as conservation and encouraging predators, parasitic wasps and introduction of bio-control agents.

In case of bio-pesticides, majority of the respondents were found in non-adoption category regarding use of Bt and NPV to control larvae (92.78%), neem seed kernel extract for worms and while flies (67.78%), use of neem cake to control nematodes/root diseases (71.11%) and cow dung slurry (74.44%) and application of ash (84.44%).

It is noticed that cent per cent of the respondents had fully adopted the practice of keeping buds free from weeds and use of hand/mechanical weeding in standing crop, while 84.44 per cent of them were found have partial adoption of timely inter cultivation practices. None of them were found to use bio-herbicides to control weeds.

Table 12. Extent of adoption of integrated pest management practices followed by vegetable growers

Sr. No.	Practices	Full adoption		Partial adoption		Non adoption	
		Freq.	%	Freq.	%	Freq.	%
1	**Cultural management practices**						
a	Deep ploughing in summer	180	100.00	-	-	-	-
b	Use of pest and disease resistant varieties	143	79.44	-	-	33	18.33
c	Seed treatment with bio-fertilizers	37	20.56	-	-	118	65.56
d	Synchrnous planting	116	64.44	47	26.11	34	18.89
e	Crop rotation	180	100.00	-	-	-	-
f	Trap cropping	-	-	127	70.56	51	28.33
g	Inter cropping	49	27.22	-	-	128	71.11
h	Installation of bird perches for predatory birds like crow, myna and blue joy, etc.	-	-	-	-	180	100.00
2	**Mechanical management practices**						
a	Uprooting alternate host plants	79	43.89	-	-	117	65.00
b	Monitoring of pest	-	-	180	100.00	-	-
c	Collection and destruction of egg masses/larvae	-	-	131	72.78	55	30.56
d	Use of pheromone traps	-	-	29	16.11	153	85.00
e	Use of light traps to attract	-	-	-	-	132	73.33

	insect and pests						
3	**Biological pest control**						
a	Conservation and encouraging of predators	-	-	-	-	180	100.00
b	Conservation and encouraging of parasitic wasps	-	-	-	-	180	100.00
c	Introduction of bio-control agents	-	-	-	-	180	100.00
4	**Use of bio-pesticides**						
a	Use of neem seed kernel extract for worms and whitefly	-	-	64	35.56	122	67.78
b	Use of neem cake to control nematodes/root diseases	-	-	51	28.33	128	71.11
c	Use of NPV/Bt to control larvae	-	-	18	10.00	167	92.78
d	Cow dung slurry for control of pest and diseases	-	-	50	27.78	134	74.44
e	Application of ash	-	-	18	10.00	152	84.44
5	**Weed management practices**						
a	Keeping field bunds free from weeds	180	100.00	-	-	-	-
b	Timely intercultivation	-	-	152	84.44	28	15.56
c	Hand weeding/mechanical weeding	180	100.00	-	-	-	-
d	Bio herbicides (Ex. Biolophos, Biopolis, De-vine and Collego)	-	-	-	-	180	100.00

The results presented in Table 13 revealed that, the two independent variables namely achievement motivation and risk orientation were significant at 1 per cent level of probability, in influencing the level of adoption of eco-friendly management practices. Hence, these two variables could be termed as good predictors of the adoption of eco-friendly technologies by vegetable growers. Even there is a significant change in the adoption of farmers towards eco-friendly technologies by vegetable growers can be brought about by brining

positive changes in these two variables viz., achievement orientation and risk orientation..

The "F" value was significant and co-efficient of determination was "0.4851", which revealed that 48.91 per cent of variation in the adoption of eco-friendly technologies was explained by the variables selected for the study. This indicated that the selected variable could explain forty eight per cent of the variation in the adoption and remaining fifty two per cent variations could be attributed to some other variables which were not indicated in the study.

This leads to the conclusion that achievement orientation and risk orientation had significantly contributed to increase in adoption of eco-friendly.

Table 13. Contribution of independent variables with adoption of eco-friendly management practices

Code No.	Characteristics	Regression coefficient	Standard error	't' value
X_1	Age	0.1120	0.0762	-0.5620
X_2	Education	0.1089	0.1549	0.5460
X_3	Land holding	0.1021	0.1341	-1.1345
X_4	Annual income	0.0965	0.0546	1.3356
X_5	Achievement motivation	0.1318*	0.1258	1.1894
X_6	Innovative proneness	0.0456	0.1560	1.1284
X_7	Scientific orientation	0.0773	0.0568	1.1154
X_8	Risk orientation	0.1273*	0.1089	2.6621
X_9	Deferred gratification	0.0968	0.1007	1.1229
X_{10}	Cosmopoliteness	0.1864	0.1312	1.0126
X_{11}	Economic motivation	0.0134	0.0337	-0.2561
X_{12}	Attitude towards chemical fertilizers	0.0456	0.1220	0.4271
X_{13}	Extension participation	0.0563	0.1221	0.2301
X_{14}	Institutional participation	0.0143	0.1456	0.1920
X_{15}	Mass media use	0.1325	0.1862	1.8467

$R^2 = 0.4891$ F value = 1.872*   DF = (15, 145)

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

CONCLUSION

From the results and findings of personal profile of the vegetable growers it can be concluded that average adopters were auxiliary energetic, knowledgeable, dynamic and having more interest in adopting modern vegetable technologies. As majority of vegetable growers were middle aged, this group should be

imparted training, so that they can act as catalyst in motivating other growers through communication networks with reference to adoption as well as dissemination of eco-friendly management.

REFERENCES

Abbasov, E. A. 2015. The status of environmental friendly agriculture in Azerbaijan and its improvement directions. Internatinal Periodical for the Languages, Literature and History of Turkish. 10(6):1-26.

Adjrah, Y., A. Dovlo, S. D. Karou and K. Eklu-Gadegbeku. 2013. Survey of pesticide application on vegetables in the Littoral area of Togo. Annals of Agricultural and Environmental Medicine. 20(4):715-720.

Bachhav, N. B. 2013. Information needs of the rural farmers : a survey from Maharashtra, India. Indian Journal of Extension Education, 38(3):4-9.

Chouhan, N., Citra, H. and D. K. Solanki. 2013. Constraints faced by the farmers in getting agriculture technology information under ATMA in western region of Rajasthan. Indian Journal of Extension Education. 49(3&4):203-206.

Gautam, A. K., P. Singh, D. Mishra, A. Kumar and A. P. Singh. 2014. Constraints in adoption of mushroom production enterprise. Indian Journal of Extension Education, 20(1&2):39-41.

Gupta, V., P. K. Rai and K. S. Risam. 2012. Integrated crop-livestock farming systems : a strategy for resource conservation and environmental sustainability. Indian Research Journal of Extension Education. 49(2):65-71.

Probst, L. 2011. Drivers and constraints of an innovation towards improved vegetable safety in urban West Africa. International Research Journal of Extension Education. 22(3):58-69.

Singh, R., P. S. Gurjar, S. Singh and A. K. Singh. 2011. Income generation through varietal selection of rabi onion in Kymore plateau of Madhya Pradesh. Indian Journal of Extension Education. 47(3&4):96-99.

Sudheer, P. S. K. 2011. Economics of organic farming : a study in Andhra Pradesh. Indian Journal of Extension Education. 11(1):22-28.

RESEARCH ARTICLE

Adoption Level of Farmers about the Finger Millet Production Technology

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ABSTRACT

The study was conducted during the year 2016-17 in the Kolhapur district of Maharashtra state.The present investigation "Extent of adoption of recommended cultivation practices of finger millet in Kolhapur district" was conducted in Ajara, Chandgad, Radhanagari and Shahuwadi tahsil of Kolhapur district of Maharashtra.. Three villages from each tahsil and 10 respondents from each village were selected. Data were collected by personally interviewing 120 finger millet growers with the help of specially designed interview schedule.Collected data were analyzed with the help of suitable statistical methods. The analysis of the result showed that maximum (52.50 per cent) respondents had medium adoption regarding recommended finger millet production technology. Most of the respondents had high level of adoption regarding soil, ploughing and 2 harrowing, weeding and hoeing as per need during first month, harvesting and threshing.

Key words: Production technology, Finger Millet, Adoption.

INTRODUCTION

Finger millet is a major food crop of the semi-arid tropics of Asia and Africa. Finger millet is a small grained cereal referred as ''Poor man's cereal''. This hardy cereal is grown where other cereals failed to yield satisfactorily due to unfavourable agroclimatic conditions. Finger millet being nutrient rich is one of the best sources of nourishment and considered as "whole food" by the rural poor who consumes it. One of the striking features of finger millet is its resilience and ability to adjust to different agro-climates in terms of soil, rainfall and weather parameter. The millets production in the World accounts for 30.73 million tonnes, out of which 11.42 million tonnes is produced in India accounting for 37 per cent of total World production (http://www.fao.org). India is

the largest producer of Finger millet in the world. The Finger millet production in India during 2015-2016 was 1822 (000 tonne) with total area of 1138 (000 hectare) (FAO, statistic). The Karnataka, Maharashtra, Uttarakhand, Orissa and Gujrat are the major Finger millet producing states in India. Maharashtra ranks second followed by Karnataka in the production as among the leading Finger millet producing states in India. The Finger millet production in Maharashtra during 2015-2016 was 93,000 tonne with total area of 92,000 ha. As far as the area and production are concerned, Nashik district ranks first followed by Kolhapur, Ratnagiri, Palghar, Raigad and to limited extent in Amravati, Nandurbar and Sangli district. Finger millet is an important staple food in India.

METHODOLOGY

The present study was undertaken in Kolhapur district of Maharashtra state on the basis of increasing area under finger millet crop. There are 12 tahsils in Kolhapur district and four of them *viz*. Ajara, Chandgad, Radhanagari and Shahuwadi tahsil were selected for study on the basis of highest area of finger millet crop from each tahsils 3 villages were selected based on maximum area under finger millet cultivation. From each village 10 finger millet growers were selected. The data was collected personally with the help of structured interview schedule as per the method given. The same was analyzed and presented in the following tables.

RESULTS AND DISCUSSIONS

Adoption Level of Farmers about the Finger Millet Production Technology in Kolhapur District is given in Table.1

Table 1 Classification of the respondents according to their overall adoption level

Sl. No.	Adoption Level (Scores)	Respondent (N = 120)	
		Number	Percentage
1	Low (Up to 49)	36	30.00
2	Medium (50 to 54)	63	52.50
3	High (55 and above)	21	17.50
	Total	**120**	**100.00**

The Data presented in Table 1 indicated that (52.50 per cent) of the finger millet growers having medium adoption level regarding the improved finger millet production technology.

While (30.00 per cent) and (17.50 per cent) of them had low and high level of adoption about the improved finger millet production technology.

Table 2 Classification of the respondents according to their adoption of recommendedcultivation practices of finger millet crop.

Sr. No.	Production Technology	Adoption		
		Complete	Partial	No
1.	**Soil** Light to medium, well drained, having sufficient quantity of organic matter.	108 (90.00)	12 (10.00)	-
2.	**Pre-cultivation:** Ploughing and 2 Harrowing	103 (85.83)	17 (14.16)	-
	Mixing of 20 to 25 cartload FYM/ha at the time of harrowing	15 (12.50)	38 (31.66)	67 (55.83)
	Laying of Continuous contour trenches or vegetative bunds at specific distance for rain water conservation.	23 (19.17)	13 (10.83)	84 (70.00)
3.	**Sowing distance:** Sowing with seed drill at 22.5 cm (9 inches) distance	45 (37.50)	28 (23.33)	47 (39.17)
	Transplanting at 22.5 x 10 cm distance	22 (18.33)	24 (20.00)	74 (61.67)
4.	**Seed rate:**3 to 4 kg/ha.	57(47.50)	43(35.83)	20 (16.67)
5.	For transplanting preparation of seedlings on raised beds and transplanting after 25 to 30 days	60 (50.00)	29 (24.17)	31 (25.83)
6.	Sowing by seed drill in low rain fall area.	53 (44.17)	26 (21.67)	41 (34.17)
7.	Transplanting from nursery in high rainfall area.	52 (43.33)	33 (27.50)	35 (29.17)
8.	**Improved varieties**: **Early:** VL 149, PES 400, GPU 26	-	-	120 (100.00)
	Mid late: RAV 8, HR 374, Dapo1i 1, GPU 28	9 (7.50)	-	111 (92.50)
	Late: Phule Nachani, PR 202	57(47.50)	-	63(52.50)
9.	**Seed Treatment**: **Chemical** - Use of 3 to 4 gm Thirum or Folidol for 1 kg of seed before sowing	5 (4.17)	-	115 (95.83)
	Organic- Use of 25 gm. *Azospirilum brosilence* and *Aspergilus abomori* each for 1 kg of seed before sowing.	-	-	120 (100.00)

10.	**Nursery Management**: Raised beds of 1 to 1.5 m width, 8 to 10 cm hight and long as per the slope. use of 3 kg of FYM per m^2 area, use of 1 kg urea per Gunta, 1 to 2 cm deep line sowing with 7 to 8 cm distance between two lines, use of 1 kg urea/Gunta after 15 days from sowing and transplanting after 25 to 30 days from sowing	41 (34.17)	30 (25.00)	49 (40.83)
11.	**Fertilizer management**: **Lighter type of soil**- Use of 30 kg N and 20 kg P/ha.	23 (19.17)	15 (12.50)	82 (68.33)
	Medium deep type of soil -use of 60 kg N, 30 kg P and 30 kg K/ha.	6 (5.00)	8 (6.67)	106 (88.33)
12.	**Interculturing** Thinning after 20 to 25 days from sowing and retaining of 1 healthy plant at one place.	51 (42.50)	13 (10.83)	56 (46.67)
	Weeding and hoeing as per need during first month.	120 (100.00)	-	-
	Spraying of weedicides i.e. Oxiflorophen (Gol) 100 gm./ 500 liters of water or Isoproturon 50% w.s. 375 gm/500 liter of water.	7 (5.83)	-	113 (94.17)
13.	**Crop Protection**: 10 ml. Rogor per 10 liter of water are to be sprayed for controlling aphids, leaf and grain cutting larvae.	12 (10.00)	6 (5.00)	102 (85.00)
	Dusting of 2% Methyl parathion 20 kg powder/ha. for the control of Heliothis.	5 (4.17)	4 (3.33)	111 (92.50)
	Spraying of zineb or Carbendenzim (Bavistin) or Mancozeb 2.5 to 3.0 gm/liter water for the control of blast disease.	12 (10.00)	7 (5.83)	101 (84.17)
14.	**Harvesting and threshing**: Harvesting by cutting the ear heads by sickle after maturity.	120 (100.00)	-	-
	Threshing with beating of ear heads by sticks.	120 (100.00)	-	-
15.	Yield 25-30 q ha^{-1}	45 (37.50)	-	75 (62.50)

It is observed from Table 2 that the respondents had complete adoption regarding recommended practices of finger millet production technology such as weeding and hoeing as per need during first month (100.00 per cent), harvesting and threshing (100 per cent), soil (90.00 per cent) and pre-cultivation (85.83 per cent)

About half of the respondents had less knowledge about For transplanting preparation of seedlings on raised beds

and transplanting after 25 to 30 days (50.00 per cent), Sowing by seed drill in low rain fall area (44.17 per cent), transplanting from nursery in high rainfall area (43.33 per cent), Nursery Management (34.17 per cent) sowing distance (37.50 per cent), Seed rate (47.50 per cent), thinning after 20 to 25 days from sowing and retaining of 1 healthy plant at one place (42.50 per cent), Improved late varieties Phule Nachani and PR 202 (47.50 per cent), fertilizer management lighter type of soil (19.17 per cent)

CONCLUSIONS

From the present research work it can be concluded that maximum number of the respondents (52.50 per cent) had medium level of adoption about recommended finger millet production technology followed by low level and high level of adoption about improved finger millet production technology.

On the basis of practice wise adoption, it was found that most of the respondents had high level of adoption regarding soil, ploughing and 2 harrowing, weeding and hoeing as per need during first month, harvesting and threshing

RECOMMENDATION

Even though the people have the knowledge of recommended cultivation practices of finger millet the adoption is not up to the mark. So the Department of Agricultural, Maharashtra state and Krishi Vigyan Kendras should conduct the Result demonstration and Front line demonstration on recommended cultivation practices of finger millet use in cluster villages.

REFERANCES

Anonymous, 2015-2016. Ministry of Agriculture and Farmers walfer, Govt. of India.

Gurav, K.V., More, S. M. a nd Nigade, R. D. 2011. A study of knowledge and adoption of Nagali production technology in Kolhapur district Presented in RRC, MPKV Rahuri.

Suchan, R. C., Sharma, A. K. and Jha, S.K. 2005. Adoption pattern of recommended mustard production technology in Bharatpur district of Rajasthan. *Rajasthan J.Extn. Edn*. 5(1): 27-30.

Wagh, B. R., and Patil V. S., 2007. A study of finger millet growers from Nashik District. Presented in RRC, MPKV Rahuri.

Wanyera, N. 2004. Farmer Participatory Evaluation and Dissemination of Improved Finger Millet Varieties in the Teso and Lango Farming Systems. Final Technical Report, October 2004, Serer Agricultural and Animal Production Research Institute (SAARI), P.O. Soroti, Uganda.

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