Print ISSN 2230 – 9047
Online ISSN 2231 – 6736
Vol. 10, No. 2, July-December, 2015

Journal of Community Mobilization and Sustainable Development

Society for Community Mobilization for Sustainable Development
New Delhi - 110 012

Journal of Community Mobilization and Sustainable Development

Registration No.: 268Ag. 33221; Print ISSN : 2230 - 9047; Online ISSN : 2231-6736

Biannual Journal of Society for Community Mobilization for Sustainable Development, New Delhi -12

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ABOUT THE SOCIETY

MOBILIZATION Society was established in 2003 as an non-profit professional society aimed at sensitizing and mobilizing development partners and community for sustainable development. The Society, during these ensuing years has successfully mobilized researchers, academicians, planners, grass root mobilizers and student and created conducive intellectual atmosphere for introspective deliberations and conducted National seminars/workshop to address the emerging problems experienced by the agrarian mass. Presently the Society has 900 Life Members. The recognition of the Society in the efforts for strengthening the forum for scientific communication is growing among the related professionals and concerned agricultural stakeholders rapidly. The Society works on following objectives-

1. To document the on-farm and adaptive research experiences in multi- disciplinary agri-bio sciences and extension education.
2. To offer a platform for sharing the empirical experiences of development professionals, community mobilizers, academicians, multi-sectoral researchers, students etc. for the benefit of ultimate users.
3. To facilitate close and reciprocal linkage among the institutions for sustainable rural development.
4. Promoting potential and practicing entrepreneurs.
5. To disseminate the documented knowledge to the global partners through approach abstracting and indexing.

ABOUT THE JOURNAL

Journal of Community Mobilization and Sustainable Development (print ISSN 2230 – 9047; online ISSN 2231 – 6736) is published by Society for Community Mobilization for Sustainable Development twice a year. The Journal of Community Mobilization and Sustainable Development has NAAS rating 3.46. The Journal of Community Mobilization and Sustainable Development, is also available on our website www.mobilization.co.in and it has been registered with www.indianjournal.com for national and global abstracting and indexing. MOBILIZATION envisages reorienting the young professionals and researches for imbibing the values of community participation in research, training and extension efforts.

The aim and scope of the journal are:

1. Sharing the relevant experiences and issues related to agriculture and allied fields at the grass root level and global forum to create the necessary academic and development climate.
2. Sensitizing the different stakeholders about the knowledge and innovation management system in pluralistic agri-rural environment.
3. Developing network among the related partners for convergence of their efforts for sustainable academic development of extension education discipline.

Editorial

India's agriculture sector continues to be the lifeline of its people and a key factor in the economy's overall productivity. It is the source of livelihood for almost two third of the rural workforce in the country residing in rural areas. This sector has undergone structural transformation from production-based to agri-business based. Over the period of time, this situation demands the need for adopting holistic approach in the form of inclusive growth which encompasses inter-sectoral linkages for ensuring sustained food security and improving equity in employment and income generating opportunities for the rural population.

The current agricultural situation requires intensive efforts to tackle the problems of escalating cost of agricultural production, declining level of farm income and employment opportunities. The proposition 'inclusive growth' means to support farmers for adopting modern technologies and inputs, improve economic viability of farming, create employment, and ensure national food security and improve socio-economic development.

Society for Community Mobilization for Sustainable Development (MOBILIZATION) is constantly striving for stimulating the multi-sectoral stakeholders *viz*., researchers and extension professionals, innovative farmers, development practitioners and students for igniting their passion through different activities like bringing out research Journal, capacity building of all stakeholders, mobilizing for group action and holding the National Conference, etc.

We are happy to bring out July-December, 2015 issue and the issue has enveloped the research domain in the areas of income enhancement of tribal farmers,; self-help group's functioning, credit utilization, decision making, effectiveness and their empowerment; entrepreneurial behaviour of dairy farmers; assessment of clean milk production programme; climate change awareness; agricultural marketing; diversification, women participation in agricultural activities; knowledge empowerment; newer livelihood opportunities in agriculture; scale construction for measurement of attitude; old age homes intervention; ergonomic aspects; adoption studies; role performance of extension staff; training need assessment and information linkages. Broadly the issue covers communication, ICT application in Agriculture, women empowerment, group approaches of extension, agripreneurship development and emerging challenges in agriculture.

I extend my heartfelt thanks to the members of the editorial team - Drs. M.S. Nain, R. Roy Burman, S.K. Dubey, R.K. Dhaliwal, L.K. Tyagi, S.R.K. Singh and Souvik Ghosh who meticulously edited the papers to bring out the issue on time. I also express my sincere gratitude to the researchers for contributing the quality research papers for the journal. I extend my special thanks to Dr. Tulsi Bhardwaj in shaping this issue of the journal.

J.P. Sharma
Chief Editor

Journal of Community Mobilization and Sustainable Development Vol. 10(2), 147-151, July-December, 2015

Factors affecting the Income generation of tribal farmers in Madhya Pradesh State of India

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ABSTRACT

Krishi Vigyan Kendra is an innovative science based institution which conducts On Farm Testing for technology assessment and refinement; undertakes vocational training of farmers, farm women and rural youths; and Front-line demonstrations to promptly demonstrate the latest agricultural technologies to the farmers as well as the extension workers in India. The study was conducted in three districts of Madhya Pradesh state during 2013-14 to study the factors affecting the income generation of tribal farmers. The present study was undertaken to assess the income generation of beneficiaries and non-beneficiaries of Krishi Vigyan Kendra (KVKs) working in the tribal districts of Madhya Pradesh, India. The study was conducted with 300 tribal farmers randomly selected in 12 villages of Mandla, Dindori and Shahdol district, the findings revealed that, tribal farmers were of comparatively middle age group, education up to high school, agriculture+other as their occupation, medium annual income, medium landholdings, medium experience, The income generation of tribal farmers was high.

Keywords: Beneficiaries, Income generation, Krishi Vigyan Kendra, Non-beneficiaries, Tribal farmers

INTRODUCTION

The Krishi Vigyan Kendra (Farm Science Center) has excelled in bringing the modern technologies packages at the farmers doorstep with the help of various instructional units. The KVK today has sufficient resources to impart training skills for not only the farmers but also to the rural youth. The concept of technology assessment and refinement is based on participatory mode ensuring greater scientists-farmer linkage and access to agricultural technologies generated by research systems to the farming community. FLD plays a very important role in disseminating recommended technologies because it shows the potential of technologies resulting in an increase of yield at farmers' level (Chauhan, 2013). For this, the role of KVKs is of immense importance for overall agricultural and rural development through its various research and technology transfer mechanisms.

With a population of 72.6 million, Madhya Pradesh is the sixth-most populous state in the country, contributing six percent to the total population of India. Over the last decade, the state has witnessed a 20.3 percent growth in its population. Out of the total population, about 72.4 percent live in rural areas. Goand, Bhil, Baiga, Korku, Bharia, Halba, Koal, Pardhan, Dhula, Bhoomia and Agaria are the main tribes found in Madhya Pradesh. Bahu Lamsena, Jadoo-Tona, Jhada-Phooki and Alcoholism are co-tradition of their life. Badadev is the main god of tribes.

Tribal peoples have significant contributions to the local and national economy by being participated in Income generating activities (IGAs) such as vegetable production, nursery establishment, livestock and poultry rising, cottage industry and small business etc. Unfortunately, the tribal people community is almost unknown to modern agricultural technology and has been left out from the main stream of economic development (Mondol, 2006). United Nations Conference on Environment and Development (1992) put forward the idea of sustainable livelihoods as an approach to maintain or enhance productivity; secure ownership of and access to resources and income

generating activities as well as to ensure adequate and sustainable flows of food and cash to meet basic needs of tribal farmers (Barua, 2013).

Tribal population are scattered all over the hilly and forest regions of the country, majority of them inhabitants in Central India, high concentration of tribal's live in Madhya Pradesh, Chhattisgarh, Orrisa, Andhra Pradesh, Jharkhand. The excessive dependence of tribal communities on land for their income and employment makes land alienation and landlessness a major livelihood concern of the tribes." (Human Development Report of Tribal Communities, Kerala, 2010). The progress and prosperity of a nation to a very great extent depends on how far its agriculture sector is advanced and modernized. The government is running various programmes to improve the economic conditions of the tribals. Agriculture being the backbone of tribal economy, it is envisaged to enhance agricultural production in tribal areas (Kirar, 2009). In order to give proper direction to the study, the following objectives were set forth, which were: to assess impact of KVK on tribal farmers in terms of income generation; to establish the relationship between independent and dependent variables; to identify the constraints faced by tribal farmers in carrying out income generation activities.

MATERIALS AND METHODS

The study was carried out in three district of Madhya Pradesh state during 2013-14 i.e. Mandla Dindori and Shahdol, purposively. As these districts come under tribal districts of M.P. The Mandla district comprises of seven blocks out of which two blocks were selected and from each selected block two adopted villages of KVK were selected i.e., Prempur, Bhavarda, Silwara, Madanpur. The Dindori district also comprises of seven blocks out of which two blocks were selected and from each selected block two adopted villages of KVK were selected i.e., Rusamal, Nariya, Bilasar, Chaura. The Shahdol district comprises of five blocks out of which two blocks were selected and from each selected block two adopted villages of KVK were selected i.e., Sinduchunia, Kalyanpur, Shahpur, Kudeli. A comprehensive list of tribal farmers of each selected village was prepared with the help of KVKs of each district. From the list a proportionate sample of 10 per cent from each village were selected as the beneficiaries and non-beneficiaries for the investigation. Thus, 75 equal numbers of beneficiaries and 25 equal numbers of non-beneficiaries from each district was selected randomly, thus the total 300 tribal farmers was the sample size of the study.

The following statistics was used to measure the income generation of tribal farmers regarding selected technologies given by KVKs.

t- test: Student's t-test was used for testing the significant differences of mean scores of various categories of the respondents. The t-value was worked out by using the following statistics:

$$t = \frac{|\bar{x}_1 - \bar{x}_2|}{\sqrt{S^2\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

Correlation coefficient 'r': Pearson's product moment correlation (r) was used to assess the Correlation between two variables with the help of formula.

$$r = \frac{\sum xy - \frac{(\sum x)(\sum y)}{N}}{\sqrt{\left(\sum x^2 - \frac{(\sum x)^2}{N}\right)\left(\sum y^2 - \frac{(\sum y)^2}{N}\right)}}$$

Chi-Square: Test to determine whether two attributes are independent by comparison of observed frequencies related to expected frequencies.

Formula: $X^2 = \sum \frac{(Oi - Ei)^2}{Ei}$ Withd.f. = (r-1) (c - 1)

Table 1 shows profile of beneficiaries and non-beneficiaries.The study revealed that the majority of beneficiaries 54.66% belonged to middle age group. The data indicates that their level of education was high school about 23.33% of the beneficiaries had education up to high school. In case of occupation most of the beneficiaries 49.33% was doing agriculture + other as an occupation for lively hood of the family. In case of annual income most of the beneficiaries 42.33 % had medium annual income (Rs 1, 00,001–1, 76,000/-). The average land holding of beneficiaries was 2.01–4 ha.

Table 1: Profile of Beneficiaries and Non-beneficiaries

Categories		N= 225 Beneficiaries		N= 75 Non-Beneficiaries	
		Freq	% age	Freq	% age
Independent Variable					
Age	Young age group (Up to 35 years)	66	29.34	27	36.00
	Middle age group (36-50yrs)	117	52.00	38	50.66
	Old age group (Above 50)	42	18.66	10	13.34
Education	Illiterate	39	17.34	15	20.00
	Up to primary school	31	13.78	10	13.33
	Up to middle school	34	15.11	07	09.33
	Up to High school	53	23.55	20	26.67
	Up to Higher Secondary	53	23.55	17	22.67
	Up to College	15	06.67	06	08.00
Occupation	Agriculture	35	15.55	10	13.34
	Agriculture + Labour	23	10.22	30	40.00
	Agriculture + Other	111	49.33	18	24.00
	Agriculture + Cast Occupation	11	04.88	09	12.00
	Agriculture + Independent Business	45	20.00	08	10.66
Annual income	BPL (Below Rs 24,000/-)	30	13.33	29	38.66
	Low income (Rs 24,000 - 1,00,000 /-)	59	26.22	16	21.34
	Medium income (Rs 1,00,001 – 1,76,000/-)	95	42.23	20	26.66
	High income (Rs 1,76,001 – 2,50,000/-	41	18.22	10	13.34
Land Holding	Marginal (Below 1 ha)	40	17.77	19	25.33
	Small (1.01 – 2 ha)	65	28.88	16	21.33
	Medium (2.01 – 4 ha)	79	35.12	30	40.00
	Large (Above 4 ha)	41	18.23	10	13.34
Farming Experience	Low experience (5 - 16 years)	78	34.66	30	40.00
	Medium experience (17 - 27 years)	87	38.67	29	38.66
	High experience (28 - 38 years)	60	26.67	16	21.34

About 35.12% of beneficiaries had medium land holdings. In case of farming experience majority of beneficiaries 38.67% had medium experience. While in case of non-beneficiaries, the study revealed that the majority of non-beneficiaries 50.66% belonged to middle age group, their level of education was high school about 26.67% of the non-beneficiaries had education up to high school. In case of occupation most of the non-beneficiaries 40.00% was doing agriculture + labour as an occupation for lively hood of the family. In case of annual income most of the non-beneficiaries 38.66% had come under below poverty line. The average land holding of non-beneficiaries was 2.01–4 ha. About 40.00% of non-beneficiaries had medium land holdings. In case of farming experience majority of non-beneficiaries 40.00% had low experience.

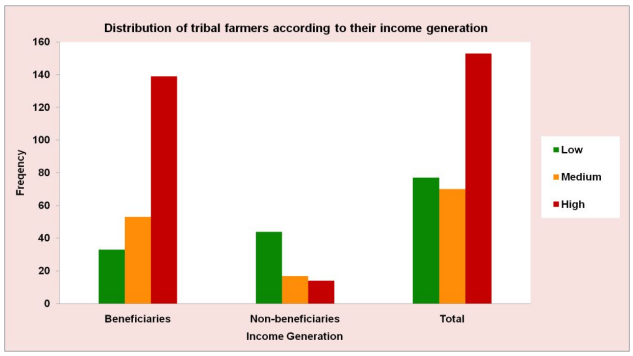
The data in the Table 2 indicates that out of the total beneficiaries, highest percentage i.e. 61.78 per cent was found in high income generation category, followed by 23.56 per cent in medium and 14.66 per cent in low income generation category. In case of non-beneficiaries 58.67 per cent was found in low income generation category, followed by 22.66 per cent in medium and 18.67 per cent in high income generation category. On

Table 2: Distribution of tribal farmersaccording to their income generation

Categories	Beneficiaries	Non-beneficiaries	Total
Low (14-28)	33(14.66)	44(58.67)	77(25.66)
Medium (29-42)	53(23.56)	17(22.66)	70(23.34)
High (43-56)	139(61.78)	14(18.67)	153(51.00)
Total	225	75	300
Mean	42.64	28.05	
S.D.	8.89	9.01	
*t =12.26***			

**Significant at 0.01 probability level

the basis of above data, it can be concluded, that the highest per cent of the beneficiaries found in high income generation category while the highest per cent of the non-beneficiaries found in low income generation category. Thus, it can be concluded that the highest (51.00%) of tribal farmers were found in high income generation category (Rana, 2010) and (Belwanshi and Khare, 2012).



Statistical parameters reveal the mean score for beneficiaries and non-beneficiaries 42.64 and 28.05 respectively with standard deviation of 8.89 and 9.01 respectively. The t-test calculated was found to be significant. Thus, the earlier stated hypothesis that there is no difference between beneficiaries and non-beneficiaries regarding income generation is rejected, thereby, indicating that there was difference between the income generation of beneficiaries and non-beneficiaries.

It is seen from Table 3 that all the attributes of beneficiaries and non-beneficiaries have significant positive association with income generation. Only age was found to be non significant with income generation of beneficiaries as well as non-beneficiaries. It suggest that in general, the tribal farmers income generation increases with the increase in their education, occupation, annual income, land holding, farming experience.

Table 3: Association between independent variables with their Income Generation

Variables	Income generation			
	Beneficiaries		Non-beneficiaries	
	χ^2	df	χ^2	df
Age	2.334*NS	4	0.007**NS	2
Education	20.324*	6	8.606*	3
Occupation	24.849*	6	7.834	3
Annual income	28.552**	6	12.968**	2
Land Holding	29.831**	6	20.787**	2
Farming Experience	10.071*	4	6.844*	4

CONCLUSION

Regarding the income generation of tribal farmers majority of beneficiaries had high income generation while, non-beneficiaries had low income generation.

Table 4: Constraints reported by Tribal farmers

S.No.	Constraints	Beneficiaries N=225			Non-Beneficiaries N=75		
		f	%	Rank	f	%	Rank
A	**Economic constraints**						
i	Lack of agro based and rural industries for the income generation and employment to tribals.	90	40.00	I	60	80.00	II
ii	Lack of money to purchase useful inputs.	50	22.22	II	40	53.33	IV
iii	Lack of money for land preparation.	45	20.00	III	50	66.66	III
iv	High cost of seeds.	40	17.77	IV	65	86.66	I
v	High labour charges.	30	13.33	V	40	53.33	V
B	**Extension constraints**						
i	Lack of technical guidance by the KVK.	50	22.22	III	75	100.00	I
ii	Irregular visit of FEOs.	100	44.44	II	50	66.66	IV
iii	Demonstrations not conducted adequately and timely	160	71.11	I	70	93.33	II
iv	Lack of trainings provided by KVKs.	40	17.77	IV	60	80.00	III
C	**Situational constraints**						
i	Low market price.	200	88.88	II	65	86.66	II
ii	Lack of storage facilities.	220	97.77	I	60	80.00	III
iii	Lack of Irrigation facilities.	170	75.55	III	70	93.33	I
iv	Lack of market.	150	66.66	IV	50	66.66	IV

The t-test calculated was found to be significant, this indicates that there was considerable difference between the income generation of beneficiaries and non-beneficiaries. Association between independent variables with their income generation, revealed that education level, occupation, annual income, land holding, farming experience of beneficiaries and non-beneficiaries except age have significant positive association with the income generation. (Choudhary, 2011) and (Shrivastava *et al.,* 2012). The major constraints reported by the tribal farmers were lack of agro based and rural industries for the income generation and employment to tribal's, High cost of seeds, Technological skills are not developed through special training programme, Lack of current agricultural literature, Irregular visit of FEOs, Demonstrations not conducted adequately and timely, Co-operative societies are not providing seeds timely, Low market price, Lack of storage facilities, Lack of Irrigation facilities, Lack of market (Girase *et al.,* 2004).

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Received on March, 2015, Revised on June, 2015

Journal of Community Mobilization and Sustainable Development Vol. 10(2), 152-156, July-December, 2015

Utilization and Linkage with Agricultural Information Sources: A Study of Palwal District of Haryana State

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ABSTRACT

Access and use of information sources is a first step toward better targeting of extension programs and advisory services that facilitate information sharing. Even in the era of modern information revolution strong linkage of contact for family member, neighbour and progressive farmers as information sources is prevalent and farmers generally are reported to be less aware of ICT tools. In order to appropriately target extension programs and advisory services, it is therefore important to understand the access and use of information by the farmers. The present study conducted in *Hathin* Tehsil of *Palwal* district, showed that At field level, presence of governmental development bodies was found to be minimal, that too in advocacy and one way information supplier kind of linkage . The findings shows that still the personal sources dominate the agricultural information system in the technologically and developmentally backward district, the dearth of extension personnel and their poor linkages with farmers and amongst themselves have enough indication for the development planners to think plan and implement accordingly so the farming can be retained as a source of livelihood .

Keywords: Actor linkage matrix, Information source, Utilization pattern, Type of linkages

INTRODUCTION

The public or government extension system has been one of the important channels for information dissemination for farmers in India, but its outreach has remained limited to a small proportion of farm households (GoI, 2005). Studies identified a number of factors that influence the use of information by farmers such as socio-economic status, age, education, experience, land size, cropping patterns, risk bearing capacity, distance to an information source among others (Ali, 2012; Okwu and Dauda, 2011; Babu, *et al.,* 2011; Alvarez and Nuthall, 2005; Solano *et al.,* 2003; Carter and Batte, 1993). Also the studies have pointed out that institutional networks, such as self-help groups, cooperatives and producer organizations, can play an important role in dissemination of information (Putnam, 2001; Glaeser *et al.,* 2002). Association with such networks reduces costs of search and acquisition of information to individual farmers due to scale economies (Babu *et al*., 2011). Through such networks farmers improve their contacts, interact and gather or share their information and knowledge about modern agricultural technologies, inputs, marketing practices, government policies, etc. It has been reported that those who use information realize 12% more returns per hectare than those who do not. The impact of information is higher in the case of diversified systems (cash crops along with food grains) as compared to farms specialized in food grains. Further, the formal information sources, though their outreach is smaller, have a larger impact on net returns, almost twice of that of the informal sources possibly due to qualitative differences in information and delivery mechanisms (Birthal *et al.,* 2015). Davis *et al.* (2010) using data from three countries (Kenya, Tanzania and Uganda) find that farmers' income per capita to increase by 61% with participation in farmer field schools. Across countries, the estimated effect is 104% in Tanzania, by 21% in Kenya and by 18% in Uganda. Agricultural extension services were found raising the value of crop production (i.e. gross returns per hectare) by about 15%. In Zimbabe (Owens *et al*., 2001)

Access and use of information sources is a first step toward better targeting of extension programs and

advisory services that facilitate information sharing. Characteristics of information search from an individual perspective translate into farm productivity and income. Ability to search for information depends on the sources that are accessible to farmers. To access, assess, and apply the content, users must have social resources, such as motivation, trust, confidence, and knowledge and economic resources such as money, skills, and technology, and (Heeks, 2005). Even in the era of modern information revolution, network analysis identified strong linkage of contact for television, family member, neighbour and progressive farmers as information sources and regarding the ICT, farmers were less aware and accessed at very limited scale (Bhagat *et al*., 2004; Raina *et al*., 2011; Ravi Kumar *et al.,* 2015). In order to appropriately target extension programs and advisory services, it is therefore important to understand the access and use of information by the farmers.

MATERIALS AND METHODS

The study was conducted in purposively selected *Hathin* Block of *Palwal* district, as the block is the part of Mewat region of Haryana state where the human development index (HDI) is extremely low. The district level analysis of aggregate development reveals that *Mewat* is the least developed region of Haryana, specifically in terms of the standard of living, education and health indices, Mewat lagged way behind to other districts in Haryana, including BRGF (Backward Regions Grant Fund) districts. Considering all indices of development, Mewat performance on all parameters, except demographic index, is worse than all districts of Haryana. Aggregate development status across the blocks in Mewat masks pervasive inequalities. Based on seven indices of development, the typology of development also differs markedly across blocks. In Mewat, around 90% population resides in those rural areas where agriculture and livestock are one of the major sources of livelihood. The situation is quite grim due to poor availability of water in Mewat. Water in 55% of this region is mostly saline which is not fit either for drinking or for irrigation purposes and eventually affects crop and land productivity. This makes many people dependant on purchased water which adds to their household expenditure.

Four villages namely *Swamika, Bhanguri, Ferozpur and Bighawali* were selected randomly for the purpose of primary data collection. Focused group discussion (FGD) method was adopted for the purpose. In total eight FGDs were organized (four of male farmers and four of farm women). Each FGD consisted of 18-32 participants, in total 210 farmers/ farm women participated. The FGDs were targeted to find out the information source utilization pattern, type of linkages among farm stakeholders and actor linkage matrix. The pattern of information source utilization was traced in respect of various information sources (print, electronic, traditional, localite and cosmopolite) in vogue in the area under study. Actor linkage matrix was identified on five point continuum (no linkage, poor, fair, good and very good) and weighted accordingly ranging from zero to 4. An analysis on the types of linkages between the stakeholders is important as it helps to distinguish between different types of linkages and identifies the important one. The type of linkages among the stakeholders was identified as per the typology given by Hall *et al*., 2006. The sessions were summarized and analyzed to identify trends in the qualitative responses of the participants regarding their agricultural information needs, information sources used, preferred information medium, and bottlenecks to information searching.

RESULTS AND DISCUSSION

The results have been presented under two head viz.; pattern of information use and actor linkages as follows**:**

Pattern of information source utilization: Media has played an important role in creating awareness among the farmers on various issues. Continuous reporting of the technology and the success stories removes the scepticism about the technological sustainability from the minds of the farmers. Media generally publish or broadcast reports about the timings of disease and pest outbreaks much ahead of time, critical practices, employment opportunities, governmental schemes, new technologies and alike making the farmers aware. Some of the kinds of information are not always available from the extension personnel. Contrary to the fact Table 1 shows that the internet and the social networks were among the much disfavoured information sources among the electronic one. Print sources in general were not much utilized whereas the farm magazines could

Table 1: Pattern of information source utilization

Sources of information	Mean utilization index	Rank
Print media		
Magazine	0.5	IV
Poster	1.7	III
News paper	2.1	II
Pamphlet/leaflets	2.2	I
Printed advertisement	2.1	II
Electronic media		
Radio	1.5	III
Television	3.5	I
Phone	3.0	II
Internet	0.7	IV
Social networks via internet	0.6	V
Traditional media		
Folk song/folklores	2.8	II
Puppet show	1.1	IV
Public announcement	3.6	I
Story tellers	1.4	III
Localite sources		
Neighbour/friend/relatives/progressive farmers	3.9	I
Exhibition	1.3	V
Non-Government Organization(NGO)	3.4	II
Personnel from state extension agency	0.9	VI
Panchayat Raj institutions	3.2	III
Self-help groups	2.4	IV
Cosmopolite Sources		
Input supply agency/Input Dealers	3.3	I
Farmer fair/kissan mela	0.5	II
Representative from capacity building organisations (RUDSETI, KVK etc.)	0.3	III

find place only up to very poor level. It was found that in the era of ICT revolution still personal sources (localite as well as cosmopolite) like Neighbour/friend/ relatives/progressive farmers, Panchayat Raj institutions and Input supply agency/ Input Dealers were the most used and accessed sources of farm information. The respondents could not find opportunities to participate much in farmers fair, interact with capacity development organisations and state level extension functionaries. The finding are in support of Bhagat *et al.* (2004); Raina *et al.* (2011) and Ravikumar *et al.* (2015).

Linkage among Actors: Examining the gross value of agricultural output per hectare in 2005-06 to 2008-09, *Mewat* obtains the lowest rank among the three analysis categories, the output is almost same as compared to BRGF districts. The actor linkage matrix of the actors in selected district of Haryana (Table 2) revealed that farmers linkages with all other information sources was recorded to be poor to good except for KVK where no linkage was reported. However KVK was having fair to good linkages with state line departments NGO working in the area, SHGs and PRIs. Bank being the important organisation to sponsor the development process was fairly linked with farmers and good linkage with some of the line departments. Upon in-depth inquiry it was noted that the linkage with banks was for availing the developmental schemes (Subsidies) of the state level programmes. The findings are similar to the survey report submitted to NITI Ayog by Sehgal foundation (2015) whereas it was reported that in Mewat the average number of people per bank counts up to 26600 which shows less availability of banks, the proportion of households availing bank services was only 41% of the total households whereas only 11% of the total population are members of societies. , in the rest of the two study regions, membership almost doubles. Inclusion of women in entrepreneurial activities can escalate the functioning and expansiveness of cooperative societies thereby fetching larger socio economic benefits for the region. The PRIs being lowest level decentralization bodies were fairly accessed information sources for developmental purposes. It was further revealed that the issues like job availability in MNREGA scheme, health and sanitation related issues, capacity development opportunities, opportunities and assistance for self employment and infrastructural improvement dominated among the issues discussed. The linkages with and amongst the state line departments was reported to be either absent or poor which may be viewed as very serious. Upon enquiry at district level it was found that the grass root level extension worker for SDA SHD and Soil conservation was in single digit for nearly 290 villages of the district (87 alone in *Hathin* tehsil) that too in the situation of multiplicity of developmental programmes demanding the intensive contacts with the farmers are in vogue. This demands serious look for the development planners of the state.

The linkage between the stakeholders helps in understanding the relationship between actors and draws out the strong and weak links in the network (Matsaert, 2002; Biggs and Matsaert, 2004; Hall, 2007;

Table 2: Identified Actor linkage matrix in *Hathin* tehsil of Palwal district

Information Actors	SDA	SHD	SRD	SAHD	KVK	NGO	SHG	RUDSETI	Bank	Farmer/farm women	PRI
SDA	x	0	0	0	2.8	1.5	0.5	0	2.5	0.8	1.5
SHD	0	X	0	0	2.8	1.5	0.8	0	2.0	1.1	1.2
S R D	0	0	x	0	1.6	1.1	0.9	0	0	0.3	3.4
SAHD	0.5	0	0	X	2.6	1.0	0.8	0	0.5	1.5	1.6
KVK	2.8	2.8	1.6	2.6	x	1.4	1.0	0	0	0	1.0
NGO	1.5	1.5	1.1	1.0	1.4	X	3.2	3.5	2.7	3.5	2.8
SHG	0.5	0.8	0.9	1.0	1.1	3.2	x	2.5	2.8	3.2	2.9
RUDSETI	0	0	0	0	0	3.5	2.5	x	2.9	2.1	2.1
Bank	2.5	2.0	0	0.5	0	2.7	2.8	2.9	x	2.0	2.3
Farmer/farm women	0.8	1.1	0.3	1.5	0	3.5	3.2	2.1	2.0	x	3.6
PRI	1.5	1.2	3.4	1.6	1.1	2.8	2.9	2.1	3.6	3.6	x

SDA – State Department of Agriculture, SHD- State Department of Horticulture, SRD- State Rural Development Department, SAHD- State Department of Animal Husbandry, KVK- Krishi Vigyan Kendra, NGO- Non Government organisation(s), SHG- Self-help group, RUDSETI- Rural Development and Self-Employment Training Institute, PRI- Panchayat Raj Institutions

Mohammad *et al.,* 2012). The type of linkage that existed between the stakeholders decided to a large extent the type of learning between them. The kind of learning encouraged is dependent on kind of relationship that exists. PRIs were found involved in promotional programmes like awareness programmes, ensuring participation in trainings, workshops, field visits, etc., at local levels being well connected to farmers SHGs and RUDSETI for advocating, Partnership, Network, Alliance, Information exchange/ capacity development and Implementation of programmes. The self help groups (women group for self employment) were more involved with capacity development and advocacy of the policies. The farmers in the villages very frequently interact and discuss various aspects of farming and in the process disseminate information and influence each other and accordingly leading to all type of linkages except formal contracts which not only is a source for dissemination of the technology but also a source of mastering the learning. In nutshell it can be inferred that at field level, presence of governmental development bodies was found to be minimal, that too in advocacy and one way information supplier kind of linkage. The partnership, networking, alliance and formal contracts for maximizing farm productivity were missing for most of the state line departments.

Table 3: Type of linkage among stakeholders

Major Actors	NGO	SHG	RUDSETI	Bank	Farmer/farm women	PRI
SDA		1,6	1	3,8	1,5,6,8	1,3,5,6,8
SHD		1,6		3,8	1,5,6,8	1,6
SRD		1,8			1,5,6,8	1,2,3,8
SAHD	2	1,6,8			1,5,6,8	1,5,6
KVK	2,3				1,5,6	1,5,6
NGO	X			1,3,4,7,8	1,2,3,4,6	1,6
SHG	1,2,3,4,6,8	x	1,2,3,4,6,8	1,3,4,7,8	1,2,3,4,6	1,3,5,6,8
RUDSETI	2,3,4,6,8		X	1,3,4,7,8	6,3	3,6
Bank	3,7,8		3,7,8	X	2,7,8	1,5,7,8
Farmer/farm women	1,2,3,4,5,6,8		1,2,3,4,6,8	5,6,8	X	1,2,3,4,5,6,7
PRI	1,2,3,4,5,6,8	1,3,5,6,8	1,6,8	1,6,8	1,2,3,5,6,8	x

1= Advocacy linkage, 2= Partnership, 3= Network, 4= Alliance, 5= Paternalistic, 6= Information exchange/ capacity development, 7= Formal contact, 8= Implementation of programmes, Blank cells= Undefined

CONCLUSION

Access to and use of current information is critical, not only for the financial success of farmers, but to support sustainable agricultural systems as the value of information has increased considerably due to knowledge intensive nature of changing agriculture. By understanding farmers' access and use of agricultural information, their linkages and actor matrix has the capacity to better target farmers. The findings shows that still the personal sources dominate the agricultural information system in the technologically and developmentally backward district , the dearth of extension personnel and their poor linkages with farmers and amongst themselves have enough indication for the development planners to think plan and implement accordingly so the farming can be retained as a source of livelihood . Smallholder farmers with low agricultural incomes require less information due to may be, lack of motivation and interest in agriculture, as such sufficiently and the timely delivery along with reliability of information could encourage them to improve their information utilization pattern and strategies for improved farm outcomes.

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Received on October, 2015, Revised on November, 2015

Journal of Community Mobilization and Sustainable Development Vol. 10(2), 157-162, July-December, 2015

A Multidimensional Study on Self Help Groups and Their Functioning: A Case of West Tripura District, Tripura

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ABSTRACT

Marginalised people gain more strength by group formation and Self Help Group (SHG) is a potential vehicle for this. This study was conducted among the 50 SHGs functioning for more than five years in two blocks (Mohanpur and Lefunga) of West Tripura district of Tripura State with the objectives: 1) To study the socio-economic profile of the SGHs; 2) To assess the interrelationship of different causal variables; and 3) To draw inference and to suggest some measures for better functioning of SHGs. The data was collected with structured questionnaire during July - December, 2013. From the study it could be noted that SHGs were either in economic activity stage or capital formation stage. The SHGs had reached all categories of people i.e. Scheduled Caste, Scheduled Tribe and General category; and educational level of SHGs members skewed towards below secondary level. Total number of members to the each SHGs had positive bearing over the jobs/occupations of SHGs members; education level had escalating effect over their selection of occupation; and SHGs members receiving training, interaction and collaboration with banks had positive association. The Factor Analysis of twenty variables by following Principal Component Analysis showed that twenty variables were clustered in eight factors. The eight factors had represented about 70 percent of the total data variance. These factors were named as Decision making in on-farm activities, Loan Prayer and marketing support, Banking support to managerial skill development for financial management, Managing resources for marketing, Meeting leads to training, Fund management and group dynamics, Training for Book Keeping and Market linkage and banking support.

Keywords: Self Help Group, Market linkage, Exiting Capacity, Bank Linkage

INTRODUCTION

Self Help Group (SHG) is an organisation of homogeneous group of people voluntarily formed to accumulate whatever amount they can suitably save out of their earnings and mutually agree to contribute to a common fund and working at the grass roots level meant to explore their potential for their own betterment and application of own decision. The SHGs are basically of three types *viz.* all women, all men or mixed. The SHGs are a powerful tool of socio-economic development of the poor women in rural areas as it accelerate the change in income, occupation, social participation, expenditure, decision making and change in confidence level (Bansode *et al.,* 2013). Previous studies have shown that the empowerment variables of SHGs are decision making pattern, economic, psychological, and confidence building (Das, 2012), achievement motivation and education, social and extension participation (Verma *et al*., 2013), micro credit (Narasiah, 2004). The SHGs have enough potential for establishing capacity building and self-efficiency (Manimekalai, 2004). Participatory Group Approach among women is a successful model for adoption of integrated technologies for women empowerment under SHGs (Dash *et al*., 2014), family support, self satisfaction, accessibility to credit, cooperative approach, social protection are the important factors responsible for the success of SHGs. However, strict rules and regulations, ambiguity in leadership, difficulty in maintaining accounts, intra group conflicts and sub grouping were the major factors

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which hindered the success of SHG (Sangeetha *et al.*, 2010).

In view of the above, the present study was conducted with these objectives: 1. To study the socio-economic profile of the SHGs; 2. To assess the interrelationship of different causal variables; and 3. To draw inference and to suggest some measures for better functioning of SHGs in West Tripura district..

MATERIAL AND METHODS

There are eight districts in Tripura. From the eight districts one district i.e. West Tripura district was purposively selected due to its progressiveness. There were six blocks in West Tripura district. From six blocks Mohanpur and Lefunga blocks were selected randomly. Based on the availability of both men and women SHGs operating in villages, ten villages were selected from each block having maximum number of SHGs. From twenty villages 50 SGHs were selected, who were functioning for the last five years or more and Head of each SHG were interviewed. The questionnaire was pretested over 10 non-respondents SHG heads and required changes were made. Although questionnaire were prepared in English, but during interview it was translated to local language. The study was carried out at study area during July-December 2013. The questionnaire developed by Voluntary Operation in Community and Environment (2008) for Planning Commission, Government of India were employed with some modification. The statistical tools used for data analysis were mean, percentage, standard deviation, range, Pearson's correlation coefficient, factor analysis. For analysis of data IBM SPSS 21 was employed.

RESULTS AND DISCUSSION

It is clear from the data presented in Table 1 that 80 percent SHGs were functioning for last 5 to 7 years. It was also noted that 94 percent SHGs had 10 to 15 number of members in each SHG. SHGs were either mixed (Male and Female) or all women group and only 16 percent SHGs were all men SHG. Fifty six per cent SHGs were in economic activity stage and 44 percent SHGs were in capital formation stage. It was also noted that 42 percent SHGs's monthly deposit by each members to own fund ranged Rs.101 to 200. It was observed 31.41 percent members of the SHGs had upto 5th standard educational level and 11.38 percent members had education graduation or above. It was also noted 33.81 percent, 23.56 percent and 29.17 percent SHG members belonged to Scheduled Caste, Scheduled Tribe and General category, respectively.

It is clear from Table 2 that the variable Y_2 is positively and significantly correlated with the variable Y_4 at 0.01 level. This implies that existing total number of members to the each SHGs had positive bearing over the jobs/occupations of SHGs members. Variable Y_3 is positively and significantly correlated with variable Y_4 and negatively and significantly correlated with variable Y_7. The positive and significant relation may imply that SHGs members' education level had escalating effect over their selection of occupation. The negative association may indicate that present formal education is not supportive and the SHGs members need further training for livelihood. SHGs members receiving training, interaction and collaboration with banks had positive association, hence the variable Y_7 had positive and significant association with the variable Y_9. As most of the SHGs are either in capital formation or economic activity stage so fund management became more imperative and in consequence variable Y_{12} had positive and significant correlation with variable Y_{10}.

Variables with their code

Code	Variables
Y_1	Years of functioning of SHGs
Y_2	Number of members of the SHGs
Y_3	Education level of SHGs Members
Y_4	Jobs/Occupations of SHGs members
Y_5	Human resource management within SHGs
Y_6	Capacity/Skills Existing with the Beneficiaries
Y_7	Extend of Training received by the SHG members and training providing agencies
Y_8	Marketing Support provided to SHGs
Y_9	Interaction and collaboration with banks
Y_{10}	SHGs fund management
Y_{11}	Extend of money deposit to own fund by SHGs members per month
Y_{12}	Stages of SHG evaluations
Y_{13}	Sources of information for different schemes

Five variables (i.e. Y_5 to Y_{10}) were the cumulative outcome of 23 individual independent variables. Out of these 23 variables 20 variables had shown significant relation and these are presented in the Table 3 for further factor analysis. To bring out an easily comprehensible simple structure of different

Table 1: Details of profile of SHGs

Characteristics	Category	Frequency	Percentage	Mean	Std. deviation	Coefficient of variation	Range	Min.	Max.
Years of functioning of SHGs	5 to 7	40	80						
	8 to 9	7	14	6.44	1.37	21.27	5	5	10
	>9	3	6						
Number of members of the SHGs	10 to 15	47	94						
	16 to 20	2	4	12.48	2.76	22.12	15	10	25
	>20	1	2						
Types of SHGs	All women	20	40						
	All men	8	16	2.04	0.92	45.09	2	1	3
	Mixed	22	44						
Stages of SHG evaluations	Group Formation	0	0						
	Capital formation	22	44	2.42	.51	21.07	1	2	3
	Economic activity	28	56						
Extend of money deposit to own fund by SHGs members per month	Upto Rs.100	8	16						
	Rs.101 to 200	21	42	275.90	192.27	69.69	950	50	1000
	Rs.201 to 300	4	8						
	>Rs.300	17	34						
Education level of SHGs members*	Upto 5th Standard	196	31.41						
	Upto 8th Standard	155	24.84						
	Upto 10th Standard	124	19.87						
	Upto 10+2 standard	78	12.50						
	Graduation & above	71	11.38						
Categories of SHGs members*	General	182	29.17						
	Scheduled Caste	211	33.81						
	Scheduled Tribe	147	23.56						
	Others	84	13.46						

Source: Primary data

*Although there are 50 number of SHGs surveyed, but total number of members of those SHGs was 624.

Table 2: Correlation matrix of the variables

	Y_1	Y_2	Y_3	Y_4	Y_5	Y_6	Y_7	Y_8	Y_9	Y_{10}	Y_{11}	Y_{12}
Y_1	1											
Y_2	-.191	1										
Y_3	-.156	.183	1									
Y_4	.125	.427**	.290*	1								
Y_5	.064	-.001	.147	.222	1							
Y_6	.076	-.207	-.016	-.188	-.052	1						
Y_7	-.002	-.187	-.284*	-.167	-.055	.120	1					
Y_8	.082	.260	-.081	.194	.171	-.004	.129	1				
Y_9	-.127	-.068	-.151	-.260	-.253	-.020	.342*	.082	1			
Y_{10}	-.107	.114	-.058	.046	.051	.046	.016	-.116	-.104	1		
Y_{11}	-.078	-.033	-.096	.115	.170	.053	.189	.224	.040	.084	1	
Y_{12}	-.123	.100	-.005	.051	-.050	-.019	-.112	-.137	-.068	.917**	.118	1
Y_{13}	.049	-.187	-.055	-.276	.094	.075	.174	.027	.103	-.223	-.115	-.281*

**Correlation is significant at the 0.01 level (2-tailed); *Correlation is significant at the 0.05 level (2-tailed)

dimensions of SHGs, factor analysis of the 20 variables showing significant correlation (as shown in Table 3) was carried out. For extraction of factors, the Principal Component Analysis method was followed with Varimax rotation with Kaiser Normalization. In the present study, the Eigenvalues which were greater than 1 were retained. In respect of the independent variables, the following Eigenvalues were greater than 1 for first eight factors: 2.636, 2.511, 2.146, 1.778, 1.527, 1.315, 1.142 & 1.042. The total variance per cent explained by the Eigenvalues for first eight factors were as follows: 13.178, 12.556, 10.732, 8.890, 7.634, 6.575, 5.708 & 5.208, respectively.

The cumulative percentage of the Eigenvalues were: 13.178, 25.734, 36.467, 45.357, 52.990, 59.566, 65.274 &70.482. For interpretation of the factors, variables with high factor loadings and high communality were taken into consideration. The eight factors represented about 70 per cent of the total data variance. The rotated factor (Varimax) matrix of the independent variables with their communalities is presented in the Table 4.

Factor 1: Factor 1 accounted for 13.178 percent of the total data variability. Two variables with high factor loadings and high communality were taken for interpretation of this factor. These variables were X_3 (SGHs Members participation in decision making process) and X_{20}(Investment in on-farm activities by SHGs members).The factor loadings of these two variables0.412(X_3) and 0.783 (X_{20}). As the study was conducted on rural based SHGs, so investment in on-farm activities may be outcome of joint decision making. This factor may be named as *Decision making in on-farm activities*.

Table 3: Variables showing significant correlation coefficient

Variables	**Variables which are significantly correlated**			
	Positively correlated at		**Negatively correlated at**	
	0.01 level	**0.05 level**	**0.01 level**	**0.05 level**
Availability of physical & human resources (X_1).		X_{12}, X_{20}		
Leadership, micro-planning, and documentation quality of SHGs members (X_2).			X_3	X_6
SGHs Members participation in decision making process (X_3).			X_2	X_4, X_{10}
Frequency of meeting of SHGs (X_4).	X_7, X_{19}			X_3
Better interaction, communication, Conflict resolution in SGHs(X_5).		X_9		
Improving groups viability and sustainability (X_6).	X_{20}	X_{15}		X_2
Attending orientation training programme by SHGs members (X_7).	X_4	X_{17}		
Skill development training programmes for SHGs members (X_8).	X_{17}, X_{20}			
Organiser of Technical skill development programme (X_9).	X_{14}	X_5		
Organiser of managerial skill development programme (X_{10}).	X_{17}			X_3
Types of marketing support to SHGs (X_{11}).	X_{16}			X_{13}
Location of market for SHGs(X_{12}).		X_1		
Linkages with marketing agencies/cooperative bodies (X_{13}).				X_{11}
Time gap (in month) between formation of SHGs and opening of the account (X_{14}). in the bank	X_9		X_{20}	
Time gap (in month) between formation of SHGs and come into contact with the local bank (X_{15}).		X_6, X_{17}		
Place of submission of loan prayer (X_{16}).	X_{11}		X_{18}	
Managing financial management norms covering loans, sanction procedure, repayment schedule, interest rates (X_{17}).	X_8, X_{10}	X_7, X_{15}		
Maintenance and keeping of basic records of SHGs (X_{18}).			X_{16}	
Managing thrift and credit activities of SHGs (X_{19}).	X_4			
Investment in on-farm activities by SHGs members (X_{20}).	X_6, X_8	X_1	X_{14}	

Factor 2: Factor 2 accounted for 12.556 percent of the total data variability. Two variables i.e. X_{11}(Types of marketing support to SHGs) and X_{16} (Place of submission of loan prayer) having high factor loadings to this factor and the factor loadings of these two variables were 0.756(X_{11}) and 0.859 (X_{16}). This result indicates that SGHs members' decision on loan prayed based on availability of marketing support. This factor may be called as *Loan Prayer and marketing support.*

Factor 3: Factor 3 accounted for 10.732 percent of the total data variability out of 70.482 per cent. Three variables i.e. X_{10} (Organiser of managerial skill development programme), X_{15} (Time gap (in month) between formation of SHGs and come into contact with the local bank) and X_{17} (Managing financial management norms covering loans, sanction procedure, repayment schedule, interest rates) were inclusive variables for this factor and the factor loadings of these variables were 0.594(X_{10}), 0.538(X_{15}) and 0.862(X_{17}). This result showed that earlier contact with bank may lead to proper managing of financial management norms with received training on managerial skill development. This third factor may be called as *Banking support to managerial skill development for financial management.*

Factor 4: Factor 4 accounted for 8.890 percent of the total data variability. Three variables with high factor loadings and high communality were taken for interpretation of this factor. These three variables are X_1 (Availability of physical & human resources), X_2 (Leadership, micro-planning, and documentation quality of SHGs members) and X_{12} (Location of market for SHGs). Factor loadings of these variables were 0.788 (X_1), 0. 448 (X_2) and 0.651(X_{12}). It was noted that resources, leaderships and marketing were interrelated, hence, this factor may be called as *Managing resources for marketing.*

Factor 5: Factor 5 accounted for 7.634 percent of the total data variability. Two variables i.e. X_4(Frequency of meeting of SHGs) and X_7 (Attending orientation training programme by SHGs members) having high factor loading i.e. 0.794 and 0.605 were included to this factor. This was conclusive that meeting and training were interrelated and this factor may be named as *Meeting leads to training.*

Factor 6: Factor 6 accounted for 6.575 percent of the total data variability. Two variables i.e. X_6 (Improving groups viability and sustainability) and X_{19} (Managing

Table 4: Rotated Component Matrix

	Factors								Commu-nality
	1	2	3	4	5	6	7	8	
X_1	.227	-.011	-.129	***.788***	-.003	.032	.075	.098	.706
X_2	-.120	-.118	.120	***.448***	.301	-.575	-.285	.012	.746
X_3	***.412***	.215	-.104	-.321	-.544	-.160	.187	.103	.697
X_4	-.120	-.027	-.152	-.037	**.794**	-.002	.073	.320	.778
X_5	-.248	.133	-.094	.112	.139	-.057	***.800***	.068	.768
X_6	.268	.028	.042	.044	.118	***.838***	-.096	-.050	.804
X_7	.346	.018	.349	-.094	***.605***	.016	.110	.155	.654
X_8	.439	-.168	.380	.210	-.072	.142	***.506***	.084	.698
X_9	-.369	.168	.237	-.099	.139	-.279	.211	***.528***	.650
X_{10}	-.167	.000	***.594***	.253	.207	.068	-.397	-.046	.652
X_{11}	.035	***.756***	.074	.013	-.032	-.133	.334	-.083	.716
X_{12}	.128	-.085	.219	***.651***	-.029	-.136	.110	-.078	.533
X_{13}	-.077	-.254	-.004	.398	-.404	.327	-.272	***.416***	.745
X_{14}	-.619	-.055	.135	-.267	.078	-.109	.103	**.265**	.575
X_{15}	-.205	.149	***.538***	-.156	.065	.502	-.053	.013	.637
X_{16}	-.114	***.859***	-.076	-.101	-.033	.158	-.031	-.082	.800
X_{17}	.112	-.082	***.862***	.028	-.060	-.066	.080	.064	.781
X_{18}	-.309	-.640	.068	.088	.011	-.128	***.319***	-.333	.747
X_{19}	.120	-.063	.000	.050	.230	***.803***	. 005	.034	.719
X_{20}	***.783***	.017	.087	.145	.043	.127	-.079	.162	.692

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

thrift and credit activities of SHGs) having high factor loading i.e. 0.838 and 0.803 were included to this factor. The nomenclature to this factor may be given as *Fund management and group dynamics*.

Factor-7: Factor 7 accounted for 5.708 percent of the total data variability. Three variables with high factor loadings i.e. 0.800 (X_5: Better interaction, communication, Conflict resolution in SGHs), 0.506 (X_8: Skill development training programmes for SHGs members) and 0.319 (X_{18}: Maintenance and keeping of basic records of SHGs) were taken for interpretation of this factor. From this finding it may be inferred that skill acquiring, and better interaction and conflict resolution facilitated better book keeping of funds. This factor may be known as *Training for Book Keeping*.

Factor 8: Factor 8 accounted for 5.208 percent of the total data variability. Three variables with high factor loading were clubbed for this factor and these variables were X_9 (Organiser of Technical skill development programme), X_{13} (Linkages with marketing agencies/ cooperative bodies) and X_{14} (Time gap (in month) between formation of SHGs and opening of the account in the bank) and factor loading of these variable were 0.528 (X_9), 0.416 (X_{13}) and 0.265 (X_{14}). This type of clustering showed that SGHs members with acquired technical skill with support from bank would make linkage with market. This factor may be called as *Market linkage and banking support*.

CONCLUSION

This multidimensional study of variables involved in the functioning of SHGs showed the interrelationships of various factors. Twenty casual variables were grouped into eight factors and these were named as Decision making on on-farm activities, Loan Prayer and marketing support, Banking support to managerial skill development for financial management, Managing resources for marketing, Meeting leads to training, Fund management and group dynamics, Training for Book Keeping and Market linkage and banking support. From the study it might be suggested that SHG members with their varying educational level should be supported with basket of choices of jobs and accordingly training and banking support should be provided. Marketing and its linkage with SHGs is another important area for special thrust.

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Received on January, 2015, Revised on June, 2015

Journal of Community Mobilization and Sustainable Development Vol. 10(2), 163-167, July-December, 2015

Promoting Clean Milk Production: The Path for Milk Quality Improvement

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ABSTRACT

Dairy is the integral part of agriculture, which is giving stability to it, with sustainable production. As we know, milk is the heart of dairy business, which is affected by various elements that are not in hands of a dairy farmer but he can manage them by using Good Animal Husbandry Practices (GAHP). The present study was carried out among dairy farmer of Rajasthan to know the relationship between their antecedent characters, knowledge, adoption and milk quality. Only those dairy farmers were selected who were selling their animal's milk in DCS system of RCDF. Out of 21 milk unions of RCDF four were purposively selected viz., Alwar, Bhilwara, Bikaner and Hanumangarh. A total number 120 of dairy farmers were selected by using proportionate random sampling. The intervening effect of knowledge and adoption on the antecedent characteristics of dairy farmers were found positive and significant with family education status, experience in dairying, social participation, herd size, annual income, milk production and milk sale; and for the milk quality at all the levels it was positively and significantly correlated. It was found that family education status, experience in dairying, social participation, land holding, herd size, annual income, and milk production and milk sale had positive and significant correlation with the milk quality at *pail* level of milk collection. These characters except land holding had positive and significant correlation with milk quality at DCS level. At *dock* level family size, social participation, land holding and milk sale had positive and significant correlation with milk quality; however, land holding had negative and significantly correlation.

Keywords: Good Animal Husbandry Practices, Clean Milk Production, National Dairy Development Board

INTRODUCTION

Indian dairy sector needs to build its competitiveness on the basis of quality, productivity and efficiency to continue its march towards success in national and international market (Kurien, 2004). In India fast deterioration in milk quality has been observed by the time it reaches from milk producer to dairy *dock* (Milk processing plant at district level). Although, India is the largest milk producer (132.4 MT in 2012-13) in the world, but its contribution in export market is less than 0.13 per cent of total export of country (DADF, 2012-13). One of the major factors for low export of our dairy products has been the quality and safety aspects of the raw milk. Consumers all over the world have become quality conscious and prefer high quality products. This needs to be taken into consideration by introducing concept of Clean Milk Production (CMP) at the village level. Clean milk can be defined as milk coming from healthy milch animal possessing normal flavour, devoid of dirt and filth containing permissible limit of bacteria and essentially free from adulterants, pathogens, various toxins, abnormal residues, pollutants and metabolites (Gupta, 2003). The efforts were initiated by the National Dairy Development Board (NDDB) in collaboration with different dairy federations of various states to introduce the practices of CMP at the village level to meet the present day challenges (NDDB Perspective-2010). RCDF adopted CMP programme in 1999 in collaboration with NDDB. These initiatives are intended towards attaining milk quality at all stages from producer to consumer (Singh and Gupta, 2014). The CMP involves thorough

cleanliness at all phases of handling and stringent quality control and hygienic measures have to be adopted at farm level. The milk quality is determined by aspects of composition and hygiene of milk. Breeding, feeding, management system, genetics and many such facts mainly influence the compositional quality. Dairy farmer is the key client in this process, who decides the quality of milk from feeding of the milch animal at *pail* (milking stage at dairy farmers home) level to dairy product supply chain i.e. DCS system. So, this study was conducted to know the level of relationship of knowledge, adoption and milk quality with the antecedent characters of dairy farmers.

MATERIALS AND METHODS

The study was conducted in dairy cooperative system of Rajasthan state, which was purposively selected due to the growth of milk procurement in organized sector i.e. Rajasthan Cooperative Dairy Federation (RCDF) in Rajasthan was highest in India and Rajasthan state registered highest growth rate in packed milk marketing. RCDF is having 21 district cooperative milk unions. A multistage proportionate random sampling procedure was applied to draw the sample for the study. Out of 21 unions four district milk unions were selected for the present study viz. Alwar, Bhilwara, Bikaner and Hanumangarh. A list of dairy farmers of each Dairy Cooperative Society (DCS), who were pouring milk for the last two years, was prepared. From that list, a total of 120 farmers were selected on the basis of proportionate random sampling. The data were collected finally from all the selected 16 DCSs and 120 respondents. The milk samples and information for different antecedent characteristics of the respondents were collected from three different levels viz. *pail* level, DCS level, and *dock* level. The analytical techniques used in this study include coefficient of correlation multiple regressions and stepwise regression analysis.

The objective of study was to know the relationship between antecedent characteristics of dairy farmers, and their knowledge and adoption level about CMP with the milk quality at different levels of cooperative system of Rajasthan.

The present study is the pioneer attempt in India where the milk quality was measured using Methylene Blue Reduction Test (MBRT) test and its relationship with antecedent characteristics of dairy farmers was measured. The study provides an insight into various factors influencing the practicing of CMP which in turn helps in improving raw milk quality.

RESULTS AND DISCUSSION

Relationship between Knowledge Level and Antecedent Characteristics of Dairy Farmers: Knowledge was selected as an intervening variable for the present study, for measuring relationship with farmers characters correlation analysis was carried out. Calculated correlation coefficient (r) for the different characters has been presented in Table 1. Result in the table clearly showed that variables such as family education status, experience in dairying, social participation, annual income and milk sale were positively correlated with knowledge level, which was found to be statistically significant at 1 percent level of significance. However, herd size and milk production were found positively correlated at 5 percent level of significance. On the other hand land holding and milk consumption were found to be negatively correlated with their knowledge level regarding CMP practices. The negative but significant correlation with knowledge level of these two variables might be due to the irrelevance of them with knowledge. These results are having similarity with the findings of Saha (2002), Meena *et al.* (2012) and Shibu and Anu (2013).

Relationship between Knowledge Level and Milk Quality: In order to find out the relationship between

Table 1: Relationship between knowledge level and antecedent characteristics of dairy farmers

Antecedent characters	Correlation coefficient (r)
Age	0.028
Education	0.108
Family education status	0.497**
Experience in dairying	0.257**
Family size	0.127
Social participation	0.571**
Land holding	-0.003
Herd size	0.191*
Annual income	0.328**
Milk production	0.186*
Milk consumption	-0.031
Milk sale	0.464**

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

knowledge level and milk quality, correlation analysis was carried out. Calculated coefficient (r) for milk quality has been presented in Table 2. Results in table clearly showed that milk quality at all levels of milk collection i.e. *pail*, DCS and dock were positively correlated with knowledge level of dairy farmers. The correlation was statistically significant at 1 percent level of significance. The relationship between milk quality and knowledge at *pail* and DCS level was high, but at *dock* level it was very less. This might be due to the more effect of temperature and time on milk quality rather than construct variables like knowledge (because the role of farmer and DCS secretary were over after loading of milk in milk van). These results are having similarity with the findings of Saha (2002), Shibu and Anu (2013), Kaur and Rathore (2014), Surkar *et al.* (2014).

Table 2: Relationship between knowledge level and milk quality

Milk quality	Correlation coefficient (r)
PAIL level	0.503**
DCS level	0.657**
Dock level	0.293**

**Significant at 0.01 level of probability

Relationship between Adoption Level and Antecedent Characteristics of Dairy Farmers: Adoption was also selected as an intervening variable for the present study, for fulfilling its existence correlation analysis was carried out. Calculated correlation coefficient (r) for the different characters has been presented in Table 3 Result in the table clearly showed that variables such as family education status, experience in dairying, social participation, annual income and milk sale were positively correlated with level of adoption, which was found to be statistically significant at 1 percent level of significance. However, herd size was found positively correlated at 5 percent level of significance. On the other hand age and land holding were found to be negatively correlated with their adoption level regarding CMP practices. The negative but significant correlation with adoption level of these two variables might be due to lack of knowledge for age and regular drought conditions in the study area. Saha (2002), Meena *et al.* (2012), Jaisridhar (2013) and Shibu and Anu (2013).

Relationship between Adoption Level and Milk Quality: In order to find out the relationship between adoption level and milk quality, correlation analysis was carried out. Calculated coefficient (r) for milk quality has been presented in Table 4. Results in table clearly showed that milk quality at all levels of milk collection i.e. *pail*, DCS and Dock was positively correlated with adoption level of dairy farmers regarding CMP practices. The correlation was statistically significant at 1 percent level of significance. The relationship between milk quality and adoption level at DCS level was to follow CMP practices high. It might be due to the more emphasis given by dairy secretary found adopter of more practices. It was also observed that, DCS level was the hub for gathering of all members and it was obvious that every one tried to improve their image by using good practices. Saha (2002), Shibu and Anu (2013), Gulkari (2014), Kumar (2014) and Surkar *et al.* (2014).

Table 3: Relationship between adoption level and antecedent characteristics of dairy farmers

Antecedent characters	Correlation coefficient (r)
Age	-0.014
Education	0.151
Family education status	0.473**
Experience in dairying	0.252**
Family size	0.170
Social participation	0.526**
Land holding	-0.020
Herd size	0.188*
Annual income	0.259**
Milk production	0.140
Milk consumption	0.001
Milk sale	0.448**

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

Table 4: Relationship between adoption level and milk quality

Milk quality	Correlation coefficient (r)
PAIL level	0.483**
DCS level	0.661**
Dock level	0.448**

**Significant at 0.01 level of probability

Relationship between Antecedent Characteristics of Dairy Farmers and Milk Quality at Different Levels of Milk Collection: In order to find out the relationship between milk quality and antecedent

characteristics of dairy farmers, correlation analysis was carried out. Calculated correlation coefficients (r) for different traits have been presented in Table 5 Results in the table clearly show that variables such as family education status, experience in dairying, social participation, land holding, herd size, annual income, milk production, and milk sale at *pail* level, family education status, experience in dairying, social participation, herd size, annual income, milk production, and milk sale at DCS level and milk sale at *dock* level of milk collection were positively correlated with milk quality, which was found to be statistically significant at 0.01 level of probability.

Table 5: Relationship between milk quality and antecedent characteristics of dairy farmers

Antecedent characteristics	Correlation coefficient (r) at different levels of milk collection		
	PAIL	DCS	DOCK
Age	0.128	0.032	-0.004
Education	0.142	0.071	-0.009
Family education status	0.371**	0.418**	0.120
Experience in dairying	0.301**	0.255**	-0.010
Family size	0.055	0.101	0.189*
Social participation	0.592**	0.645**	0.215*
Land holding	0.215*	-0.032	-0.264**
Herd size	0.352**	0.288**	0.120
Annual income	0.528**	0.447**	0.166
Milk production	0.337**	0.284**	0.072
Milk consumption	0.126	0.049	-0.126
Milk sale	0.502**	0.522**	0.252**

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

However, land holding at *pail* level and; family size and social participation at *dock* level were found positively significant at 0.05 level of probability. On the other hand land holding at *dock* level was found to be negative but significant at 0.01 level of probability. The negative but significant correlation of milk quality with land holding at *dock* level might be due to the fact that the land holding affects the milk quality at *pail* level by providing plenty of feed and fodder for animals but at *dock* level there will be no effect on milk quality.

The results of multiple regression analysis (Table 6) revealed the extent of social participation at *pail* and DCS level; and social participation and family size at *dock* level which were found positively significant at 0.01 level of probability. However, land holding at DCS level and; land holding and milk consumption at *dock* level were found negative but significant regression coefficient at 0.01 level of probability, which meant that these two variables were contributing negatively towards milk quality of the respondents. All the twelve characters selected for the study could explain a variation of about 46 percent at *pail* level, 57 percent at DCS level and 32 percent at *dock* level in milk quality as indicated by R^2 values at different levels (*pail* =0.467, DCS = 0.575, and *dock* = 0.322). The table showed R^2 value at *dock* level was very less. It might be due to the effect of temperature and time between transportation of milk from DCS to *dock*, which was not in the hand of farmer.

Table 6: Multiple regression analysis between milk quality at different levels of milk collection and antecedent characteristics of dairy farmers

Antecedent characteristics	Levels of milk collection		
	Pail	DCS	Dock
	b-value		
Age	-0.0562	-1.525	0.262
Education	2.566	-3.280	-1.318
Family education status	0.779	1.038	-0.373
Experience in dairying	0.713	1.624	-0.569
Family size	-2.435	1.031	5.133**
Social participation	4.069**	8.007**	1.975**
Land holding	-0.639	-7.346**	-5.206**
Herd size	0.491	-1.225	-0.438
Annual income	10.320	7.313	1.223
Milk production	0.492	0.875	0.550
Milk consumption	-0.774	-3.067	-4.161**
Milk sale	0.538	2.014	1.331
R Square value	0.467	0.575	0.322

**Significant at 0.01 level of probability

CONCLUSION

There is an urgency to improve the milk quality at all levels of milk collection, which can achieve by launching CMP programmes threw cooperatives milk federations, departments like agriculture, animal husbandry and dairy development. This is the time for milk quality with sustainable production, which can be achieved by adopting Community Milk Parlor system, (on the lines of Karnataka milk federation) which is more efficient in areas where, high yielder animals, dense population and a big amount milk collection at village level are in existence. It is utmost important to employ right person

at right place, which indicate that, good quality milk production at field level is the subject oriented towards dairy extension. All the milk route supervisors were having very less knowledge about extension activities. Hence, it is recommended that, the proper training about extension education and quality improvement is essential.

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Received on April, 2015, Revised on August, 2015

Journal of Community Mobilization and Sustainable Development Vol. 10(2), 168-170, July-December, 2015

Potato Aid Livelihoods Security in Ghazipur District Through front Line Demonstrations

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ABSTRACT

Potato is a good source of energy as they are rich in carbohydrates and therefore, is the fourth most important food crop after rice, wheat and maize. India is the second largest producer of potato in the world. Uttar Pradesh is the largest potato producing state in the country and accounts for 32% of total production. Potato is a very popular and important cash crop in district Ghazipurof U.P. but due to improper adoption of improved technology, its productivity is far below the average productivity of the state. Considering the scope of improvement in productivity through the recommended technologies, 32 Front Line Demonstrations (FLD) were conducted by Krishi Vigyan Kendra, Ghazipur, Uttar Pradesh during 2008-13 in three different villages at farmer's field. Farmers practices (FP) prevailing in the villages were treated as control for comparison with recommended practice like HYVs, recommended dose of fertilizers and need based plant protection measures. The highest yield (346.5 q/ha) was recorded in the year 2012-13. In front line demonstration, the yield was 32.40 per cent more over the farmers practice (261.70 q/ha), however the lowest yield (324.00 q/ha) was recorded in the year 2010-11 under FLD and 260.00 q/ha in farmers practice. The FLDs on potato an average yield of 339.00q/ha was recorded under demonstration plots as compare to farmers practice 268.74 q/ha. The average yield of potato increased 26.3 per cent more over local check while the year-wise variation in yield was to the tune of 21.05-32.40 per cent. The variation in the per cent increase in the yield was found due to variation in agro-climatic parameters and rhizosphere environment. The economics and cost-benefit ratio of both control and demonstrated plot was worked out. An average net profit of Rs 124158.00 was recorded under recommended practice while it was Rs 81278.40 under farmers practice. Cost-benefit ratio was 2.38 under demonstration, while it was 1.94 under control plots. By conducting FLDs of proven technologies, yield potential and net income from potato cultivation can be enhanced to a great extent which would lead to increase in the income level of the farming community.

Keyword: Potato, Front line demonstration, Improved technology, Livelihood security

INTRODUCTION

The country's urgent requirement is to enhance the production of nutritious food in a sustainable manner and improve the farm family income in order to ensure household food security, nutritional security and economic security. Potato is a very popular and important cash crop in India and the country produced 45.34 mt of potato from 1.99 mha land with average productivity of 22.80 tones/ha during 2012-13 (NHB, 2013). Uttar Pradesh is the largest potato producing state in the country and accounts for 32% of total production. The state produces 14.43 mt of potato from an area of 0.60 mha with productivity of 23.9 tones/ ha during 2012-2013 (NHB, 2013). This rapid growth under production (10.63 mt in 2008-09 to 14.43 mt in 2012-2013) of potato in Uttar Pradesh was possible through dissemination of the latest technology under real farming conditions. Potato cultivation has become highly commercialized in Uttar Pradesh, still there is a wide gap between current production and potential productivity. So efforts have to be made by researchers, policy makers and extension workers together to overcome these constraints. With the view to achieve a high level of production it is not enough to develop farm innovation but it is also necessary to transfer the

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latest technology from the research system to ultimate users i.e. farmers. Potato is a predominant *rabi* crop of Ghazipur district of Uttar Pradesh. But the fact that the average productivity of potato in Ghazipur district (207.2 q/ha) is substantially lower in comparison to other districts of the state i.e. Mathura (301.81q/ha), Mainpuri (271.37q/ha), Agra (263.77 q/ha), Farrukhabad (262.97 q/ha) and Etawah (235.49 q/ha) (Source: State Horticulture Mission, Government of Uttar Pradesh, 2011). There is ample scope for further improvement of production and productivity of potato for raising the income level of the farming community of the district. Yield loss under real farming condition can be attributed to several biotic and abiotic factors, imbalanced use of N:P:K fertilizers and indiscriminate use of plant protection measure. Therefore, a study was conducted to assess dissemination of recommended technology through FLDs.

MATERIALS AND METHODS

Thirty two FLDs on potato were conducted at farmers' field in district Ghazipur (UP) to assess its performance during Rabi season of the years 2008-09, 2009-10, 2010-11, 2011-12 and 2012-13. FLD on potato was purposively conducted in Karanda and Sadar blocks of Ghazipur district. Two villages were selected randomly from each block. The soil of the district is generally sandy loam in texture. The area under each demonstration was 0.2 ha. Through survey, farmers meeting and field diagnostic visit during the cropping period, low yield of potato was diagnosed due to imbalanced use of fertilizer and indiscriminate practice to manage the early and late blight diseases on potato. To manage assessed problem, improved and recommended technologies were followed as intervention during the course of front line demonstration programme. In case of recommended practice, balanced use of fertilizer i.e. N:P:K:: 180:80:110 kg/ha and use of suitable fungicidal i.e. Mancozeb 75% WP as suggested by Shiv Kumar *et al.* (2002) was used. Mancozeb 75% WP (2 gram/ liter) was sprayed as foliar at 30, 45 and 60 days after planting. Farmers practices included imbalanced use of N:P:K fertilizers, particularly lower dose of potassium (40-50 kg/ha) and nitrogen (100-120 kg/ha) and higher dose (100-120 kg/ha) of phosphorus and fungicide used like carbendazim (Bavistin), to manage early and late blight diseases. Well before the conducting the demonstrations, training to the farmers of respective villages was imparted with respect to envisaged technological interventions. Yield data was collected from control (Farmer's practice) and demonstration plots and cost of cultivation, net income and cost benefit ratio were computed and analyzed.

RESULTS AND DISCUSSION

The productivity and economic analysis of potato crop under FLD and FP are presented in Table 1. The data reveal that under demonstration plot, the performance of potato yield was found to be substantially higher than that under farmer practices during 2008 to 2013. The yield of potato under demonstration recorded was 335, 345, 324, 345 and 346.5 q/ha during 2008-09, 2009-10, 2010-11, 2011-12 and 2012-13, respectively. The percent increase in yield over farmer practices was 26.3%. The cumulative effect of technological intervention over five years, revealed an average yield of 339 q/ha higher over control 268.7 q/ha. The year-to-year fluctuations in yield and cost of cultivation can be explained on the basis of variations in prevailing social, economical and prevailing micro-climatic condition of that particular village.

Singh *et al.* (2013) revealed that the farmers felt difficulties in adaption of recommended technologies as such in most of the intervened technologies and preferred the refined technologies which were suitable in their farming systems as well as socio-economic condition and bio-physical situation. Yield enhancement in different crops in FLD has been reported by Tomer *et al.*(2003), Mishra *et al.* (2009), Dayanand *et al.* (2012) and Ojha *et al.* (2013). Economic analysis i.e. gross expenditure, gross returns, net returns and B: C ratio of FLDs are presented in Table 1. The data clearly revealed that the net returns from the recommended practice were substantially higher than farmers practice during 2008 to 2013. Average net return from recommended practice was observed to be Rs. 1,24,158.00 in comparison to farmer practices i.e. Rs. 81,278.40 is attributed to the technological interventions provided in demonstration plots, i.e. balanced dose of fertilizer and timely and appropriate dose of fungicides for control of blight diseases. The benefit-cost ratio of demonstration plots were observed significantly higher than farmer's practices. The average benefit-cost ratio was 2.38 in demonstration plots, which is significantly higher than farmer practices (1.94) during 2008 to 2013. Hence, favourable benefit-cost ratio proved the economic viability of the intervention made under

Table 1: Productivity and economic analysis of potato crop under FLD and FP at farmer's field

Year	Area under demo. (in ha)	Variety	No. of demo.	Average yield (q/ha)		% increase in yield	Gross expenditure		Gross Return		Net Return		B:C Ratio	
				Demo	FP		Demo	FP	Demo	FP	Demo	FP	Demo	FP
2008-09	1.0	Kufri Chipsona-02	10	335	265	26.41	43500	40200	134000	106000	90500	65800	2.08	1.63
2009-10	1.0	Kufri Chipsona-02	10	345	285	21.05	80636	75000	259000	199500	178364	124500	3.21	2.66
2010-11	0.5	Kufri Chipsona-03	02	324	260	24.61	95870	87645	194400	156000	98550	68355	2.03	1.77
2011-12	1.0	Kufri Chipsona-03	05	345	272	26.80	97350	88525	195250	149600	96400	61075	2.00	1.68
2012-13	1.0	Kufri Chipsona-03	05	346.5	261.7	32.40	99703	91293	256680	177956	156976	86662	2.57	1.95
Average	**-**	**-**	**32**	**339**	**268.7**	**26.3**	**83411.8**	**76532.6**	**207866**	**157811**	**124158**	**81278.4**	**2.38**	**1.94**

Demo: Demonstration plot with *recommended practice;* **FP:** *Farmers practice*; **B: C ratio:** *Benefit Cost Ratio*

demonstration and convinced the farmers on the utility of intervention. Similar findings were reported by Jethi (2008), Mishra *et al. (2009*), Dayanand *et al.* (2012) and Ojha *et al.* (2013). The data clearly revealed that the maximum increase in yield was observed during 2012-13 (356.5 q/ha), while maximum benefit-cost ratio was observed during 2009-10 (3.21%). The variation in benefit-cost ratio during different years may mainly be on account of yield performance and input-output cost in that particular year.

CONCLUSION

It can be concluded that the results of front line demonstrations boosted the yield of potato from 21.0% to 32.4% with the intervention on balanced dose of fertilizer coupled with the disease management in the Ghazipur district of UP. This also improved the relationship between farmers and scientists and built confidence between them.

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Received on April, 2015, Revised on September, 2015

Journal of Community Mobilization and Sustainable Development Vol. 10(2), 171-176, July-December, 2015

Training Needs of Farmers in Vegetable Production: A Study in North-Eastern Himalayas

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ABSTRACT

Training considered as a very effective tool for boosting up crop production and income generation of the farming community. It has been a very important activity undertaken by research and development organizations since inception of the new extension strategy for enhancing agricultural production in India. The present study was conducted to assess the training needs of vegetable growers and related problems of vegetable cultivation in North Eastern Himalayan region. Tawang district of Arunachal Pradesh was purposively selected as the locale of the study. A total of twelve villages were randomly selected under three blocks, four villages from each block of the district. The sample of the study comprised of one hundred and twenty vegetable growers, randomly selected from the twelve villages. Training need was measured on a three point continuum viz., 'very important', 'important', and 'not important'. Data were collected using a personal interview schedule. The findings revealed that even in the most popular area of training, nursery management, plant protection measures, irrigation and intercultural operation were the 'most training needs' of the farmers. Income generating activities for empowering of rural women's, formation and maintenance of SHG. It was observed in training related to improved package of practices of vegetable cultivation may be given preference for imparting training in the prioritized areas of training as identified.

Keywords: Improved technology, Training needs, Vegetable grower

INTROUDCTION

Vegetable production is one of the most sources of income and employment generation among the rural households of North Eastern Himalayas providing employment and in although it suffers from a number of disadvantages prevalent in the region. One way of increasing vegetable production is to adopt modern inputs and improved technology of production within the farms and examining how efficiently the farmers are using their resources. Also train them for efficient utilization of resources (Singh *et al.,* 2013).

Training is essential to induce motivation, create confidence and develop efficiency in an individual. Training is also inevitable for imparting new knowledge and updating the skill of the farmers. Training is the most important function that directly contributes to the development of the human resources (Tiwari *et al*., 2011). Training of farmers had assumed further importance and urgency in the context of high yielding varieties and improved practices in agriculture and allied fields. Thus training plays a very important role for human resource development. "The training is systematized tailor made programme to suit the need of particular group for developing certain attitude, action skills and abilities in individual respectively of their functional levels" (Bhattacharyya, 2006). The training is new skill, attitude and knowledge in the context of preparing for entry into a vocation or improving ones productivity in an organization or enterprise. Effective training requires a clear picture of how the trains will need to use information after training in place of local practices what the have adopted before in their situation. The kind of education

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we call as training is not for knowing more but behavior differently. the vegetable grower community is almost unknown to scientific production technology and has been left out from the main stream of economic development. In Tawang district, total area under vegetable cultivation 591 ha. As the outreach of SAUs and departments to the farmers has been minimal (Bhushan *et al*., 2013). Hence, identifying training needs involves establishing areas where individuals lack skills, knowledge and ability in effectively performing the vegetable cultivation (Mirza, 2005). Thus, KVK training is an essential component for the successful dissemination and adoption of latest agricultural technologies among farming communities in the region.

MATERIALS AND METHODS

The present study was conducted in purposively selected Tawang district of Arunachal Pradesh. Four villages each from three blocks- Tawang, Kitpi and Lumla of the district were selected randomly and from each selected village, ten respondents were randomly selected as sample of respondents. The sample of the study thus comprised of one hundred and twenty respondents. Personal interview method with a pre-tested structured schedule was used for data collection.

For the present study, a list of ten major activities, namely land preparation, selection of seeds and varieties, nursery raising, transplanting, irrigation, weed management, fertilizer application, plant protection measures, harvesting & post harvest management related to vegetable cultivation was prepared. Under each major activity, specific and relevant training need items were collected through review of available literature, discussion with extension functionaries, as well as investigators with field experiences and were systematically incorporated in the interview schedule. Responses were recorded in a 3-point continuum - very important, important and not important by assigning scores 3, 2 and 1 respectively. The collected data were analyzed with the help of statistical tools like frequency, percentage, arithmetic mean, standard deviation and chi-square.

RESULTS AND DISCUSSION

Training is important technique for improving the knowledge.

The data in Table 1 revealed that the average age of the respondents was 39.99 years and the majority (78.30 percent) of them was young to middle aged. Their average educational status was 1.03 year of the schooling and most of them (67.50) percent were literate but 32.5 percent of them could not exceed primary level.

Table 1: Socio- personal characteristic of the respondents (n=120)

Characteristics	Freq-uency	Perce-ntage	Mean	Std. devia-tion
Age				
Young age (20-30)	22	18.30		
Middle age (31-45)	72	60.00	39.99	14.489
Old age (above 45)	26	21.70		
Education status				
Illiterate (0-0.5)	39	32.50		
Primary (1-5)	43	35.80	1.03	0.879
Secondary (6-10)	33	27.50		
Above secondary (above 10)	5	4.20		
Family type				
Nuclear	89	74.2	1.26	0.440
Joint	31	25.8		
Family size				
Small family (up to 4 members)	33	27.5		
Medium family (5-6 members)	52	43.3	2.02	0.756
Large family (above 6)	35	29.2		
Land holding				
marginal- upto1 ha,	58	48.3		
small- 1-2 ha	48	40.0	1.63	0.685
Medium 2-4 ha	14	11.7		
Annual Income				
Very low income (up to 25000 per annum)	87	72.5		
low income (26000-50000 per annum)	33	27.5	1.28	0.448
High income (above 50000 per annum)	-	-		
Training Experience				
No training	30	25.0		
One day training	64	53.3	0.97	0.685
Two days training	26	21.7		
Organizational participation				
No participation	56	46.7		
Very low participation	48	40.0	0.67	0.702
Low participation	16	13.3		
Medium participation	-	-		
Mass media contact				
Radio	81	67.5	1.33	0.470
Television	39	32.5		

Average family type of the respondents was 1.26 and most of them 74.20 percent were belong to nuclear type and 25.80 percent joint family. Average family size of the respondents was 2.02 and most of them were belonged to medium to high categories. Average land holding of them was 1.63 ha and almost 88.30 percent of the respondents were landless and marginal category. The average annual income 1.28 thousand rupees and most of them 100 percent were placed in very low to low income categories. Average training 0.97 and most of them 53.3 percent respondent one day training experience, while 26 percent and 25 percent respondent had two days & no training experience. The organizational participation, average was 0.67 and almost all 86.7 percent of the respondent had no to very low participation in social organization while, 16 percent respondents had medium participation. Their average extension media contact score was 1.33 and majority 67.5 percent respondents use radio and 32.5 percent respondents had use television for information.

Table 2: Distribution of respondents according to overall training needs (n=120)

Categories*	Frequency	Percentage
Low (upto 61)	13	10.8
Medium (between 61 to 70)	91	75.8
High (more than 70)	16	13.3

*Low less than mean-sd; Medium between mean ± sd; High more than mean + sd

The Table 2 revealed that majority of the respondents 75.8 percent had medium level. While 13.3 percent and 10.8 percent had high and low level of training needs respectively

Land Preparation: The Table 3 revealed that the ploughing practice, highest number of respondents 46.7 percent perceived that training was 'not important' in the study area, while 41.7 percent and 11.7 percent respondents had important and very important training need respectively. In the study about 58.3 percent respondent perceived training important, while 22.5 percent and 19.2 percent respondent not important and very important respectively about the leveling. The important of training on FYM application raveled that 66.7 percent and 21.7 percent respondent training need as important and not important, while 11.7 percent respondent felt training as not important.

Selection of seeds and varieties: Table 3 depicts that about 58.3 percent and 31.7 percent respondents perceived training as important and very important respectively, while about 10 percent respondents not perceived as training is not important. In the study 48.3 percent and 35.8 percent respondents perceived training important and not important respectively, while 15.8 percent respondent felt training as not important about seed treatment. 63.3 percent & 26.7 percent respondent felt training need as important and very important respectively while 10 percent respondents replied not training about suitable variety in the study. Table 3 revealed that 55.8 percent and 35.7 percent respondent's perceived training as not important and important respectively while 6.7 percent respondents felt training as very important about sowing time.

Nursery Raising: Table 3 revealed that site selection for nursery highest number of respondents 50 percent perceived as training was important while 38.3 percent and 11.7 percent respondents had not important and very important respectively. 42.5 percent and 42.5 percent of the respondents perceived training as important and not important respectively while 15 percent respondent perceived the training is very important in knowing the preparation of seed bed. Seed sowing 62.5 percent and 23.3 percent respondents perceived training as important and most important respectively while 14.2 percent respondent felt training as not important in the study area. Depth of seed sowing 68.3 percent and 29.2 percent respondents perceived training as important respectively while 2.5 percent respondent replied training as not important .the table 3 revealed that 63.3 percent and 28.3 percent respondents perceived training as important and very important respectively while 8.3 percent respondent felt as not important about spray of fungicide. 62.5 percent and 27.5 percent respondents felt training as important and very important respectively while 10 percent respondent perceived training as not important about days required for keeping seedling in nursery before transplanting.

Transplanting: The Table 3 revealed that 75 percent and 20 percent respondent perceived training as important and very important respectively while 5 percent respondent felt training as not important knowing age of seedling. 65 percent and 24.2 percent

Table 3: Distribution of the respondents according to their needs in various activities:

Activities	Very Important		Important		Not Important	
	frequency	percentage	frequency	percentage	frequency	percentage
Land Preparation						
Ploughing	14	11.7	50	41.7	56	46.7
Leveling	23	19.2	70	58.3	27	22.5
FYM application	14	11.7	80	66.7	26	21.7
Selection of seeds and varieties						
Selection of quality seed & seedling of vegetable	38	31.7	70	58.3	12	10
Seed treatment	19	15.8	58	48.3	43	35.8
Suitable variety	32	26.7	76	63.3	10	10.0
Sowing time	8	6.7	45	35.7	67	55.8
Nursery raising						
Site selection for nursery	14	11.7	60	50.0	46	38.3
Preparation of seed bed	18	15.0	51	42.5	51	42.5
Seed sowing	28	23.3	75	62.5	17	14.2
Depth of seed sowing	35	29.20	82	68.3	3	2.5
Spray of fungicide and insecticide	34	28.3	76	63..3	10	8.3
Days required for keeping seedling in nursery before transplanting	33	27.50	75	62.5	12	10.0
Transplanting						
Age of seedling	24	20.0	90	75.0	6	5.0
Seedling transplanting	29	24.2	78	65.0	13	10.8
Spacing depth	28	23.3	78	65.0	14	11.7
Irrigation						
Guiding irrigation water	29	24.2	79	65.8	12	10.0
Cleaning channels	35	29.2	75	62.5	10	8.30
Weed management						
Spraying weedicide	31	25.8	78	65.0	11	9.2
Hand weeding	28	23.3	79	65.8	13	10.8
Fertilizer application						
Dose of fertilizer	30	25.0	85	70.80	5	4.2
Method of fertilizer application	33	27.5	83	69.20	4	3.3
Time of fertilizer application	27	22.5	82	68.30	11	9.2
Top dressing	36	30.0	72	60.0	12	10.0
Plant protection measures						
Identification of disease and pest and their control	22	18.3	79	65.8	19	15.8
Supply of water	35	29.20	75	62.5	10	8.30
Mixing chemical	37	30.8	72	60.0	11	9.2
Spraying chemicals	25	20.8	76	63.2	19	15.8
Harvesting						
Optimum time of harvesting	25	20.8	77	64.2	18	15.0
Method of harvesting	15	12.5	15	55.8	38	31.7
Post harvest management						
Drying of harvesting	04	3.30	4	55.0	50	41.7
Storage of harvested vegetable and marketing	31	25.8	31	69.2	6	5.0

respondent felt training as important and very important respectively, while 10.8 percent respondent perceived training as not important about seedling transplanting. 65 percent and 23.3 percent respondents perceived training as important and very important respectively while 11.7 percent respondent felt not important knowing about spacing depth.

***Irrigation*:** The Table 3 shows that 65.8 percent and 24.2 percent respondent felt training as important and very important respectively, while 10.0 percent respondent perceived training as not important about irrigation. 62.5 percent and 29.2 percent respondent perceived training as important and very important respectively while 8.3 percent were considered as not important training needs.

Weed management: The Table 3 shows 65.0 percent and 25.8 percent respondents perceived training as important and very important respectively while 9.2 percent respondents were considered as not important training needs about spraying weedicide. 65.8 percent and 23. 3 percent respondents felt as training as important and not important respectively while 10.8 percent respondents were considered as not important training needs about hand weeding.

***Fertilizer Application*:** The Table 3 reveled that among dose of fertilizer 70.8 percent and 25.0 percent were considered as important and very important training needs while 4.2 percent were considered as not important training needs. Method of fertilizer application 69.20 percent and 27.5 percent perceived training as important and very important respectively while 3.30 percent were considered as not important training needs. 68.3 percent and 22.5 percent respondent perceived training as important and very important respectively while 9.2 percent respondents felt training as not important about time of fertilizer application. Top dressing 60.0 percent and 30.0 percent perceived training as important and very important respectively while 10.0 percent were considered as not important training needs.

***Plant protection measures*:** The table 3 shows 65.8 percent and 18.3 percent respondents perceived training as important and very important respectively while 15.8 percent respondents were considered as not important training needs about Identification of disease and pest and their control. Supply of water 62.5 percent and 29.2 percent perceived training as important and very important respectively while 8.30 percent were considered as not important training needs. Mixing chemical 60 percent and 30.8 percent perceived training as important and very important respectively while 9.2 percent were considered as not important training needs. 63.2 percent and 20.8 percent respondent perceived training as important and very important respectively while 15.8 percent respondents felt training as not important about spraying chemical.

Harvesting: The Table 3 reveled that optimum time of harvesting 64.2 percent and 20.8 percent were considered as important and very important training needs while 15 percent were considered as not important training needs. Among method of harvesting 55.8 percent and 31.7 percent were considered as important and not important training needs while 12.5 percent were considered as very important training needs.

Post Harvest Management: The Table 3 shows 55.0 percent and 41.7 percent respondents perceived training as important and not important respectively while 3.3 percent respondents were considered as very important training needs about Drying of harvesting. 69.2 percent and 25.8 percent respondents perceived training as important and very important respectively while 5.0 percent respondents were considered as not important training needs about storage and marketing of vegetable.

The Table 4 shows that relationship between personal and socio economic characteristic with the training

Table 4: Association between training needs activities and their personal and socio-economic characteristics

Personal and socio-economic characteristic	χ^2 values
Age	6.97NS
Education status	5.49NS
Family size	12.07**
Family type	6.23**
Land holding	4.81NS
Annual income	1.39NS
Training experience	9.17*
Organizational participation	3.80NS
Mass media	3.07NS

*Significant at 0.05level of probability **Significant at 0.01 level of probability; NS= Non-significant

needs of the respondents. It was noted that family size, family type and training experience characteristic were positive and significant correlated with the training need of the respondents but Age, Education status, land holding, annual income, organizational participation and mass media among respondents were found positive and non significant relationship with training needs. It indicated training needs of the respondents which may be due to the fact, they realized the importance of training in vegetable production.

CONCLUSION

The study concluded that vegetable growers needed training on FYM application, selection of quality seed & seedling of vegetable, depth of sowing spacing depth, age of seedling, guiding irrigation water, hand weeding, dose of fertilizer, Identification of disease and pest and their control, Optimum time of harvesting and storage of harvested vegetable & marketing a greater extent to improve the production potential of vegetables. The vegetables growers preferred training of one day duration. Hence, Extension agencies should disseminate information based on training needs.

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Received on February, 2015, Revised on June, 2015

Journal of Community Mobilization and Sustainable Development Vol. 10(2), 177-189, July-December, 2015

Effectiveness of Self-Help Groups (SHGs) in Improving Livelihood of Rural Poor in Chhattisgarh

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ABSTRACT

Self help group has emerged as the most successful strategy, in the process of participatory development and empowerment of rural poor including women. Present study was conducted in randomly selected Kanker district of Chhattisgarh. A random sample of total 12 SHGs, three SHGs from each of four schemes *viz*. NABARD's SHG-Bank Linkage Programme (SBLP), National Rural Livelihood Mission (NRLM), Integrated Watershed Management Programme (IWMP), Agricultural Technology Management Agency (ATMA), were selected. From each of 12 SHGs a sample of 10 members were chosen as respondents in present study. Overall livelihood security of members was improved in all SHGs, the extent of improvement was comparatively more for members of SHGs under NRLM (34%) and IWMP (34%) followed by SBLP (29%) and ATMA (23%). Present level of livelihood security was also maximum in case of members of SHGs under NRLM (mean score of 24.93 out of 30) followed by NABARD's SBLP (22.17), IWMP (21.90) and ATMA (21.47). The level of livelihood of the members was improved in case of all SHGs, extent of improvement was highest in case of members under SBLP (31%) followed by IWMP (29%), NRLM (28%) and ATMA (24%). However, present level of living was highest for members of SHGs under NRLM (mean score of 20.23 out of 25) followed by NABARD's SBLP (19.27), IWMP (18.43) and ATMA (18.03). t-tests showed that there were no differences between perceptions of the respective members regarding their both livelihood security and level of livelihood on joining the SHGs formed under four different programmes. Chi-square (χ^2) test of independence also showed the same result.

Keywords: Impact, Members of SHG, Livelihood security, Level of living

INTRODUCTION

In India, majority of the people live in rural areas and are engaged in agriculture, earning a subsistence wage. Development which has been focused on them seems to have just passed by them. In India out of the 147.90 million rural households around 60 per cent are cultivation households. Eighty-eight per cent are headed by small/marginal farmers with holding less than 2 hectares (Throat, 2005). Therefore to finance this category of the poor, there is an obligation to create opportunities where credit can be used in a meaningful way.

Since Independence India has been changing in all fields including social systems but still a group of people still struggle to acquire equal rights in the society. All the so-called changes in the developing economy has not touched the major part of their lives as the social welfare programmes have not trickled down to certain parts of the society. It does not mean that the policy makers and the government have not drawn any welfare schemes but the schemes and programmes have not reached in whole for whom it was designed and hence it has lost its vigor and charm thus not bringing any benefits to the society for which it was planned and women sector is the most affected population of that society (Paramasivan, 2013).

In India, SHGs represents a unique approach to financial intermediation. The approach combines access to low-cost financial services with a process of self

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management and development for the rural poor including women. SHGs are formed and supported, usually, by NGOs or Government Agencies linking the SHGs not only banks but also for wider development programmes. This pattern has now shifted with greater involvement of Government agencies in promotion of SHGs. SHGs are seen to confer many benefits both economic and social and enable women to grow their savings and to access the credit along with formal banking services.

Though SHG movement is growing at a phenomenal pace and resulting in far reaching benefits to its members and also rural bank branches, it is facing a number of serious challenges. All these challenges could be summarized into two major challenges (APMAS & NABARD, 2009). These are uneven growth of SHGs in different parts and states of the country and uneven quality of SHGs across the country and issues related to their sustainability.

The success of SHG movement in South Indian States has augured well. However, the implementation of SHG approach is more demanding for rural poor of Eastern Indian States being the home of maximum below poverty line (BPL) families. Therefore, the effectiveness of SHGs in improving livelihood and empowerment of rural poor in Eastern Indian States hold paramount importance. On this backdrop, the present study was conducted in the state of Chhattisgarh.

MATERIALS AND METHODS

The present study was conducted in the State of Chhattisgarh that was purposively selected for present study having relatively more percentage of rural households with at least one person belonging to a farmer-based organization and/or self-help group (Birner and Anderson, 2007). Kanker district was randomly selected out of 27 districts of Chhattisgarh for the present study. Out of seven blocks in Kanker district, one block i.e. Kanker block was randomly selected. Stratified random sampling method was followed for the selection of SHGs. As the SHGs have been formed by different agencies under different programmes such as NABARD's SHG-Bank Linkage programme (SBLP), National Rural Livelihood Mission (NRLM), Integrated Watershed Management Programme (IWMP), Agricultural Technology Management Agency (ATMA), etc, the clusters of SHGs under SBLP, NRLM, IWMP and ATMA were considered as four strata/category of SHGs, thereby universe of the SHGs in this present study. Thereafter, three SHGs from each of the above mentioned four strata were selected following random sampling method. Thus, a total of 12 SHGs were considered as sample for present study inclusive of 10 SHGs of women and 2 SHGs of men. It is worth mentioning here that 90 per cent of SHGs are of women as reported by several studies in India. SHGs used to have members of 10-20 persons; therefore, a sample of 10 members from each of the selected SHGs was chosen as respondents following random sampling technique. Thus, a total number of 120 persons being SHG members were surveyed for their perceptions on the effectiveness of SHGs in improving their livelihood.

Impact of SHG on livelihood of members was assessed from their livelihood security and level of living point of view.

The livelihood security refers to food and nutritional security, economic security, habitat security, educational security, social security and health security. Food & nutritional security refers to qualities of foods for the family members. Economic security considers sources of income, savings, loan/credit availability, etc. Habitat security deals with condition of living, safety, insurance, adaptation at the time of any crisis/ emergency in family, etc. Educational security addresses to schooling of children, family members' literacy, communication ability, etc. Social security means recognition in society, membership in social organisations, etc. Health security indicates health condition, treatment of illness, readiness to meet health related expenditure, etc. Interval scale was used for the measurement.

Each of six indicators of livelihood security was included in an interview schedule developed for present study. During survey, the sampled respondents were asked to perceive each indicator on 5-point continuum i.e. very high (5), high (4), medium (3), low (2), very low (1) before and after joining the SHG.

The indicator-wise mean perception score was calculated by averaging scores of sampled members (10)

of each selected SHG before and after joining the SHG that might be varied between 1 to 5. Overall livelihood security was derived by adding mean scores of all six indicators which might be ranged from 6 to 30.

Level of living is the function of physical, social, financial, human and natural assets (DFID, 1999). Physical assets refer to type of housing condition, sanitation, conveyance, electric, cooking, communication facility, etc. Social assets mean recognition, social and political participation, involvement in developmental works, common services used, etc. Financial assets involve sources of income, kinds of savings and investments, lending, borrowing, etc. Human assets indicate language competencies, education/literacy, management skill, mobility, etc. Natural assets consist of natural resources holdings viz. farm size, irrigated land, livestock, poultry, fishpond, etc.

Each of five indicators of level of living was assessed on the basis of perceptions of sampled respondents on 5-point continuum interval scale i.e. very high (5), high (4), medium (3), low (2), very low (1) before and after joining the SHG with the help of an interview schedule.

The mean perception score of each indicator both before and after joining SHG was calculated by averaging scores of sampled members (10) of each selected SHG, which might be ranged from 1 to 5. Overall level of living was measured through summation of mean scores of five indicators which might be varied between 5 and 25.

RESULTS AND DISCUSSION

The livelihood security refers to food and nutritional security, economic security, habitat security, educational security, social security and health security. Livelihood is the function of physical, social, financial, human and natural assets. Therefore, impact of selected SHGs formed under SBLP of NABARD, NRLM, IWMP and ATMA was studied based on the perceptions of sampled SHG members on above-mentioned six

Table 1: Change in livelihood security on joining SHG as perceived by members of selected SHGs under NABARD's SBLP

Indicators of livelihood security	SHG 1(n=10)		SHG 2(n=10)		SHG 3(n=10)		Overall (N=30)	
	Mean score	SD	Mean score	SD	Mean score	SD	Mean score	SD
Food & nutritional security								
Before joining SHG	3.10	0.74	3.00	0.47	3.30	0.95	3.13	0.73
After joining SHG	3.90	0.57	3.90	0.57	4.00	0.82	3.93	0.64
Economic security								
Before joining SHG	3.00	0.82	3.00	0.67	3.10	0.74	3.03	0.72
After joining SHG	3.80	0.79	3.80	0.63	3.80	0.63	3.80	0.66
Habitat security								
Before joining SHG	2.70	0.67	2.50	0.53	2.90	0.57	2.70	0.60
After joining SHG	3.20	0.63	3.70	0.48	3.30	0.48	3.40	0.56
Educational security								
Before joining SHG	2.80	0.42	2.80	0.63	2.80	0.63	2.80	0.55
After joining SHG	3.30	0.48	3.60	0.52	3.60	0.70	3.50	0.57
Social security								
Before joining SHG	2.60	0.52	2.80	0.79	2.80	0.42	2.73	0.58
After joining SHG	3.50	0.53	3.90	0.74	3.60	0.52	3.67	0.61
Health security								
Before joining SHG	3.00	0.67	2.70	0.67	2.60	0.52	2.77	0.63
After joining SHG	3.80	0.92	3.90	0.57	3.90	0.57	3.87	0.68
Overall								
Before joining SHG	*17.20*	*1.93*	*16.80*	*1.69*	*17.50*	*2.07*	*17.17*	*1.86*
After joining SHG	*21.50*	*1.96*	*22.80*	*1.14*	*22.20*	*1.03*	*22.17*	*1.49*

Minimum and maximum possible scores of each indicator are 1 and 5, respectively

indicators of livelihood security as well as five indicators of livelihood.

Impact of SHGs under NABARD's SBLP on Livelihood of Group Members: Table 1 presents impact of SHGs on livelihood security as perceived by members of selected three SHGs viz. SHG 1, SHG 2 and SHG 3, all of which formed in 2011 under NABARD's SBLP in Kanker block of Kanker district, Chhattisgarh.

Overall livelihood security of the members was improved on joining the SHGs; maximum improvement was perceived for health security followed by social security. The extent of perceived improvement in overall livelihood security of members was maximum in SHG 2 (from 16.80 to 22.80) followed by SHG 3 (from 17.50 to 22.20) and SHG 1 (from 17.20 to 21.50). In case of SHG 1, improvement of social security of members was highest, while in both SHG 2 and SHG 3, health security of the members was most improved indicator. Even though there was improvement of all indicators of livelihood security, overall livelihood security was at 70-76 per cent level.

Further, impact of SHGs on level of livelihood was also realized based on the perceptions of sampled members of SHG 1, SHG 2 and SHG 3 with respect to the gains of five different assets (Table 2). Overall, maximum gain in human asset followed by social asset was visible for the selected SHG members. About 30 per cent improvement in level of livelihood of members was visible in all SHGs, maximum in SHG 2 that may also be attributed to maximum livelihood security of SHG 2 members. In case of both SHG 1 and SHG 3 members, maximum gain was in human asset. In case of SHG 2 members, maximum gain was in financial assets (from 2.40 i.e. below average to 3.70 on 5-point continuum scale). Thus, joining to SHG has improved both livelihood security (29%) and level of livelihood (31%) of rural women.

Impact of SHGs under NRLM on Livelihood of Group Members: The impact of the SHG on livelihood security and livelihood as perceived by members of selected three SHGs *viz.* SHG 4, SHG 5 and SHG 6 under NRLM in Kanker block is presented in Table 3 and Table 4, respectively.

Table 2: Change in level of livelihood on joining SHG as perceived by members of selected SHGs under NABARD's SBLP

Indicators of livelihood	SHG 1(n=10)		SHG 2(n=10)		SHG 3(n=10)		Overall (N=30)	
	Mean score	SD	Mean score	SD	Mean score	SD	Mean score	SD
Physical assets								
Before joining SHG	2.70	0.82	2.90	0.57	3.20	0.42	2.93	0.64
After joining SHG	3.70	0.82	3.70	0.48	3.90	0.32	3.77	0.57
Social assets								
Before joining SHG	2.80	0.63	3.00	0.67	3.20	0.63	3.00	0.64
After joining SHG	3.80	0.63	4.00	0.67	4.20	0.63	4.00	0.64
Financial assets								
Before joining SHG	2.90	0.99	2.40	0.52	3.10	0.32	2.80	0.71
After joining SHG	3.60	0.84	3.70	0.48	3.50	0.53	3.60	0.62
Human assets								
Before joining SHG	2.70	0.48	2.90	0.57	2.80	0.42	2.80	0.48
After joining SHG	3.80	0.42	4.10	0.57	4.00	0.67	3.97	0.56
Natural assets								
Before joining SHG	3.00	0.67	3.10	0.57	3.30	0.67	3.13	0.63
After joining SHG	4.00	0.82	3.90	0.32	3.90	0.57	3.93	0.58
Overall								
Before joining SHG	*14.10*	*2.56*	*14.30*	*0.95*	*15.60*	*1.35*	*14.67*	*1.83*
After joining SHG	*18.90*	*1.97*	*19.40*	*0.97*	*19.50*	*1.18*	*19.27*	*1.41*

Minimum and maximum possible scores of each indicator are 1 and 5, respectively

Table 3: Change in livelihood security on joining SHG as perceived by members of selected SHGs under NRLM

Indicators of livelihood security	SHG 4(n=10)		SHG 5(n=10)		SHG 6(n=10)		Overall (N=30)	
	Mean score	SD	Mean score	SD	Mean score	SD	Mean score	SD
Food & nutritional security								
Before joining SHG	3.10	0.88	2.90	0.57	2.90	0.74	2.97	0.72
After joining SHG	4.00	0.47	4.40	0.70	4.10	0.74	4.17	0.65
Economic security								
Before joining SHG	2.80	1.03	3.70	0.48	3.40	0.52	3.30	0.79
After joining SHG	3.60	0.52	4.70	0.48	4.40	0.52	4.23	0.68
Habitat security								
Before joining SHG	2.90	0.57	3.00	0.94	3.50	0.85	3.13	0.82
After joining SHG	4.00	0.67	4.20	0.42	4.60	0.52	4.27	0.58
Educational security								
Before joining SHG	3.00	0.67	3.30	1.25	2.90	0.88	3.07	0.94
After joining SHG	4.10	0.74	4.10	0.74	4.00	0.67	4.07	0.69
Social security								
Before joining SHG	2.90	0.88	3.10	0.74	2.90	0.57	2.97	0.72
After joining SHG	3.60	0.70	4.60	0.70	3.70	0.48	3.97	0.76
Health security								
Before joining SHG	2.70	0.82	3.60	0.70	3.20	0.63	3.17	0.79
After joining SHG	3.60	0.70	4.80	0.63	4.30	0.67	4.23	0.82
Overall								
Before joining SHG	*17.40*	*3.06*	*19.60*	*2.88*	*18.80*	*2.57*	*18.60*	*2.90*
After joining SHG	*22.90*	*1.79*	*26.80*	*1.93*	*25.10*	*2.13*	*24.93*	*2.49*

Minimum and maximum possible scores of each indicator are 1 and 5, respectively

The overall livelihood security of the members was improved in case of all the SHGs, maximum in SHG 5 (from 19.60 to 26.80). Overall, improvement in food & nutritional security and habitat security were perceived relatively high by the members of SHGs leading to livelihood security of members at about 83 per cent level with an improvement of about 34% after joining SHG. In case of SHG 4, both habitat security and educational security of members improved maximum. While in SHG 5, food & nutritional security and social security of members improved maximum. In SHG 6, food & nutritional security of members improved maximum. Thus, on joining the SHG, the members perceived an improvement on their livelihood security which varied from 25 to 37 per cent.

The level of livelihood of the members of selected SHGs before and after joining SHG was also studied on the basis of level of five types of assets holding (Table 4). It is quite evident that there were gains in all the assets with an overall improvement in livelihood of members (28%). Overall, the maximum gain (32%) was visible in human and social assets. In SHG 4, members perceived maximum gain in human assets with an overall livelihood improvement of about 31 per cent. Both in SHG 5 and SHG 6, social asset gained the most with an overall 26 and 29 per cent improvement in members' livelihood, respectively. Therefore, both livelihood security and livelihood of members of selected SHGs under NRLM improved to the extent of 34 and 28 per cent, respectively.

Impact of SHGs under IWMP on Livelihood of Group Members: Table 5 and Table 6 indicate the impact of SHG on livelihood security and livelihood as perceived by members of selected three SHGs *viz.* SHG 7, SHG 8 and SHG 9, which were formed in 2009, 2002 and 2006 respectively, under IWMP in Kanker block of Kanker district, Chhattisgarh. SHG 7 was male SHG, while SHG 8 and SHG 9 were female SHG.

Overall improvement of members' livelihood security is evident in case of all three SHGs; maximum being in SHG 8 (from 16.60 to 22.90) followed by SHG 7 and SHG 9, respectively. It is worth mentioning here that the livelihood was relatively more insecure for the

Table 4: Change in level of livelihood on joining SHG as perceived by members of selected SHGs under NRLM

Indicators of livelihood	SHG 4(n=10)		SHG 5(n=10)		SHG 6(n=10)		Overall (N=30)	
	Mean score	SD	Mean score	SD	Mean score	SD	Mean score	SD
Physical assets								
Before joining SHG	2.70	0.48	3.60	0.84	3.50	0.53	3.27	0.74
After joining SHG	3.70	0.67	4.20	0.63	4.40	0.84	4.10	0.76
Social assets								
Before joining SHG	2.80	0.92	3.40	0.52	3.10	0.57	3.10	0.71
After joining SHG	3.40	0.52	4.50	0.53	4.40	0.84	4.10	0.80
Financial assets								
Before joining SHG	3.20	0.79	3.40	0.84	3.20	0.79	3.27	0.78
After joining SHG	3.90	0.74	4.20	0.42	4.10	0.57	4.07	0.58
Human assets								
Before joining SHG	2.80	0.42	3.20	0.92	3.30	0.82	3.10	0.76
After joining SHG	3.90	0.32	4.20	0.63	4.20	0.42	4.10	0.48
Natural assets								
Before joining SHG	2.80	0.63	3.20	0.79	3.20	0.63	3.07	0.69
After joining SHG	3.60	0.52	4.00	0.47	4.00	0.82	3.87	0.63
Overall								
Before joining SHG	*14.30*	*2.45*	*16.80*	*3.16*	*16.30*	*1.49*	*15.80*	*2.62*
After joining SHG	*18.50*	*0.97*	*21.10*	*1.66*	*21.10*	*1.73*	*20.23*	*1.91*

Minimum and maximum possible scores of each indicator are 1 and 5, respectively

Table 5: Change in livelihood security on joining SHG as perceived by members of selected SHGs under IWMP

Indicators of livelihood security	SHG 7(n=10)		SHG 8(n=10)		SHG 9(n=10)		Overall (N=30)	
	Mean score	SD	Mean score	SD	Mean score	SD	Mean score	SD
Food & nutritional security								
Before joining SHG	2.9	0.32	2.80	0.42	2.30	0.48	2.67	0.48
After joining SHG	3.7	0.48	3.90	0.32	3.20	0.42	3.60	0.50
Economic security								
Before joining SHG	2.9	0.74	2.40	0.52	2.50	0.53	2.60	0.62
After joining SHG	3.6	0.70	3.80	0.42	3.20	0.42	3.53	0.57
Habitat security								
Before joining SHG	2.5	0.53	2.80	0.63	2.70	0.48	2.67	0.55
After joining SHG	3.5	0.71	3.90	0.57	3.50	0.53	3.63	0.61
Educational security								
Before joining SHG	2.9	0.57	2.80	0.42	2.70	0.48	2.80	0.48
After joining SHG	3.6	0.70	3.50	0.71	3.40	0.52	3.50	0.63
Social security								
Before joining SHG	2.8	0.42	2.80	0.63	2.60	0.52	2.73	0.52
After joining SHG	3.9	0.57	4.00	0.67	3.60	0.52	3.83	0.59
Health security								
Before joining SHG	3.1	0.32	3.00	0.67	2.60	0.52	2.90	0.55
After joining SHG	4	0.47	3.80	0.79	3.60	0.52	3.80	0.61
Overall								
Before joining SHG	*17.1*	*0.99*	*16.60*	*1.43*	*15.40*	*1.17*	*16.37*	*1.38*
After joining SHG	*22.3*	*1.64*	*22.90*	*1.37*	*20.50*	*1.27*	*21.90*	*1.73*

Minimum and maximum possible scores of each indicator are 1 and 5, respectively

women before joining SHG as evident from the perceptions of members of both SHG 8 and SHG 9. Overall, social security was improved the most as compared to other indicators of livelihood security. In SHG 7, the maximum improvement was in social security followed by habitat security of members. Economic security was the most improved after joining SHG as perceived by the women members of SHG 8. Social security and health security both improved to the similar extent in case of SHG 9 members. Overall livelihood security was improved more in case of women members of SHG 8 (37%) and SHG 9 (33%) as compared to men members of SHG 7 (30%).

The level of livelihood of the members of SHGs was also improved on joining SHG that varied from 32 per cent in SHG 7 (male SHG), 28 per cent both in SHG 8 and SHG 9 (both female SHG). Overall, human asset gain of the members was highest on joining SHG (Table 6). It is evident that in case of SHG 7, human and financial assets gain of members was more as compared to other assets; while human asset gain was highest in SHG 8 members. Physical asset gain was most in case of members of SHG 9. It is interesting to note here that SHG 8 having all female members showed higher livelihood security as compared to SHG 7 consisting of male members; in contrast, the gain in level of livelihood was more in members of SHG 7 as compared to that of SHG 8. Overall scenario of SHGs under IWMP showed that the overall livelihood security and level of livelihood of the members enhanced by 34 per cent and 29 per cent, respectively.

Impact of SHGs under ATMA on Livelihood of Group Members: The impact of the SHG on livelihood security and livelihood of members of selected three SHGs under ATMA in Kanker block is presented in Table 7 and Table 8. Out of three SHGs *viz.* SHG 10, SHG 11 and SHG 12, which were formed in 2011, 2011 and 2012, respectively, under ATMA in Kanker block, members of SHG 10 were male; where as members of both SHG 11 and SHG 12 were female.

Overall livelihood security of members was improved in all SHGs, maximum (49%) in SHG 10 that was male SHG followed by SHG 11 (22%) and SHG 12 (9%), both of which were female SHGs; however, the level of livelihood security was found relatively higher in case of women members of both SHG 11 and SHG 12 before as well as after their joining to SHG as compared to the male members of SHG 10 (Table 7).

Table 6: Change in level of livelihood on joining SHG as perceived by members of selected SHGs under IWMP

Indicators of livelihood	SHG 7(n=10)		SHG 8(n=10)		SHG 9(n=10)		Overall (N=30)	
	Mean score	SD	Mean score	SD	Mean score	SD	Mean score	SD
Physical assets								
Before joining SHG	2.90	0.57	2.70	0.48	2.50	0.53	2.70	0.53
After joining SHG	3.80	0.63	3.60	0.52	3.60	0.52	3.67	0.55
Social assets								
Before joining SHG	3.20	0.79	2.70	0.67	2.80	0.42	2.90	0.66
After joining SHG	3.90	0.74	3.50	0.71	3.70	0.48	3.70	0.65
Financial assets								
Before joining SHG	2.40	0.52	2.90	0.32	3.00	0.67	2.77	0.57
After joining SHG	3.50	0.71	3.50	0.53	3.60	0.70	3.53	0.63
Human assets								
Before joining SHG	2.90	0.57	2.90	0.32	2.70	0.67	2.83	0.53
After joining SHG	4.00	0.47	4.00	-	3.50	0.53	3.83	0.46
Natural assets								
Before joining SHG	3.10	0.74	3.00	0.47	3.10	0.57	3.07	0.58
After joining SHG	3.90	0.57	3.60	0.52	3.60	0.52	3.70	0.53
Overall								
Before joining SHG	*14.50*	*1.27*	*14.20*	*1.32*	*14.10*	*1.79*	*14.27*	*1.44*
After joining SHG	*19.10*	*2.02*	*18.20*	*1.03*	*18.00*	*1.89*	*18.43*	*1.72*

Minimum and maximum possible scores of each indicator are 1 and 5, respectively

Table 7: Change in livelihood security on joining SHG as perceived by members of selected SHGs under ATMA

Indicators of livelihood security	SHG 10(n=10)		SHG 11(n=10)		SHG 12(n=10)		Overall (N=30)	
	Mean score	SD	Mean score	SD	Mean score	SD	Mean score	SD
Food & nutritional security								
Before joining SHG	2.20	0.63	3.20	0.63	3.60	1.17	3.00	1.02
After joining SHG	3.80	0.63	3.80	0.42	3.70	0.67	3.77	0.57
Economic security								
Before joining SHG	2.00	0.47	3.00	-	3.50	0.53	2.83	0.75
After joining SHG	3.00	0.47	3.80	0.42	3.90	0.74	3.57	0.68
Habitat security								
Before joining SHG	1.90	0.32	2.80	0.92	3.50	0.85	2.73	0.98
After joining SHG	2.90	0.32	3.80	0.92	4.10	0.99	3.60	0.93
Educational security								
Before joining SHG	2.70	0.48	3.00	0.82	3.20	0.63	2.97	0.67
After joining SHG	3.60	0.52	3.30	0.82	3.80	0.79	3.57	0.73
Social security								
Before joining SHG	2.30	0.48	3.00	0.67	3.30	0.48	2.87	0.68
After joining SHG	3.30	0.48	3.70	0.82	3.40	1.03	3.40	0.81
Health security								
Before joining SHG	2.50	0.71	3.10	0.57	3.50	0.71	3.03	0.76
After joining SHG	3.60	0.84	3.60	0.70	3.60	0.97	3.57	0.82
Overall								
Before joining SHG	*13.60*	*2.17*	*18.10*	*1.37*	*20.60*	*1.71*	*17.43*	*3.41*
After joining SHG	*20.20*	*2.25*	*22.00*	*1.33*	*22.50*	*2.15*	*21.47*	*2.10*

Minimum and maximum possible scores of each indicator are 1 and 5, respectively

As ATMA mainly focus on development with respect to the agriculture and allied issues, the SHG of poor male famers felt more secured once they became part of SHG under ATMA. In SHG 10, food & nutritional security of members was improved the most. Habitat security of members was improved in case of SHG 11; while, educational security of members was increased in SHG 12. Overall, with respect to the members of SHGs under ATMA, habitat security improved the most followed by food & nutritional security, economic security, educational security, social security and health security. The extent of improvement in livelihood security of SHG members under ATMA showed relatively less as compared to that of others.

As evident from Table 8, the level of livelihood of the members was improved in case of all three SHGs, maximum being in SHG 10 (43%) followed by SHG 11 (20%) and SHG 12 (14%). In SHG 10, the gain of physical assets by members was highest as perceived by the sampled members of present study. Social, financial and human assets were equally gained by the members of SHG 11. In SHG 12, social asset was increased the most for the members. Thus, on joining the SHG overall livelihood security and level of livelihood were increased by 23 per cent and 24 per cent, respectively.

A comparison of impact on livelihood security of members of SHGs under NABARD's SBLP, NRLM, IWMP and ATMA is depicted in Figure 1. It is evident that the extent of impact was realized comparatively more by members of SHGs under NRLM and their present level of livelihood security was also maximum (mean score of 24.93). However, further room for improvement in livelihood security was still there which would be possible with sustainability of SHGs and efforts.

Comparative scenario of level of livelihood of members before and after joining of SHGs under NABARD's SBLP, NRLM, IWMP and ATMA is depicted in Figure 2. The extent of improvement was highest in case of members under SBLP. However, present level of living was highest for members of SHGs under NRLM (mean score of 20.23).

Table 8: Change in level of livelihood on joining SHG as perceived by members of selected SHGs under ATMA

Indicators of livelihood	SHG 10(n=10)		SHG 11(n=10)		SHG 12(n=10)		Overall (N=30)	
	Mean score	SD	Mean score	SD	Mean score	SD	Mean score	SD
Physical assets								
Before joining SHG	2.20	0.42	3.40	0.52	3.60	0.84	3.07	0.87
After joining SHG	3.30	0.67	3.70	0.67	3.80	0.79	3.60	0.72
Social assets								
Before joining SHG	2.40	0.70	3.10	0.57	3.30	0.82	2.93	0.78
After joining SHG	3.40	0.70	3.90	0.88	4.10	0.57	3.80	0.76
Financial assets								
Before joining SHG	2.10	0.57	3.10	0.88	3.30	0.82	2.83	0.91
After joining SHG	3.10	0.57	3.90	0.88	4.00	0.67	3.67	0.80
Human assets								
Before joining SHG	2.30	0.48	3.00	0.82	3.10	0.74	2.80	0.76
After joining SHG	3.30	0.48	3.80	1.03	3.50	0.97	3.53	0.86
Natural assets								
Before joining SHG	2.80	0.42	2.90	0.74	3.00	0.82	2.90	0.66
After joining SHG	3.80	0.42	3.30	0.95	3.20	0.63	3.43	0.73
Overall								
Before joining SHG	*11.80*	*1.93*	*15.50*	*1.90*	*16.30*	*1.70*	*14.53*	*2.67*
After joining SHG	*16.90*	*1.97*	*18.60*	*1.90*	*18.60*	*1.07*	*18.03*	*1.83*

Minimum and maximum possible scores of each indicator are 1 and 5, respectively

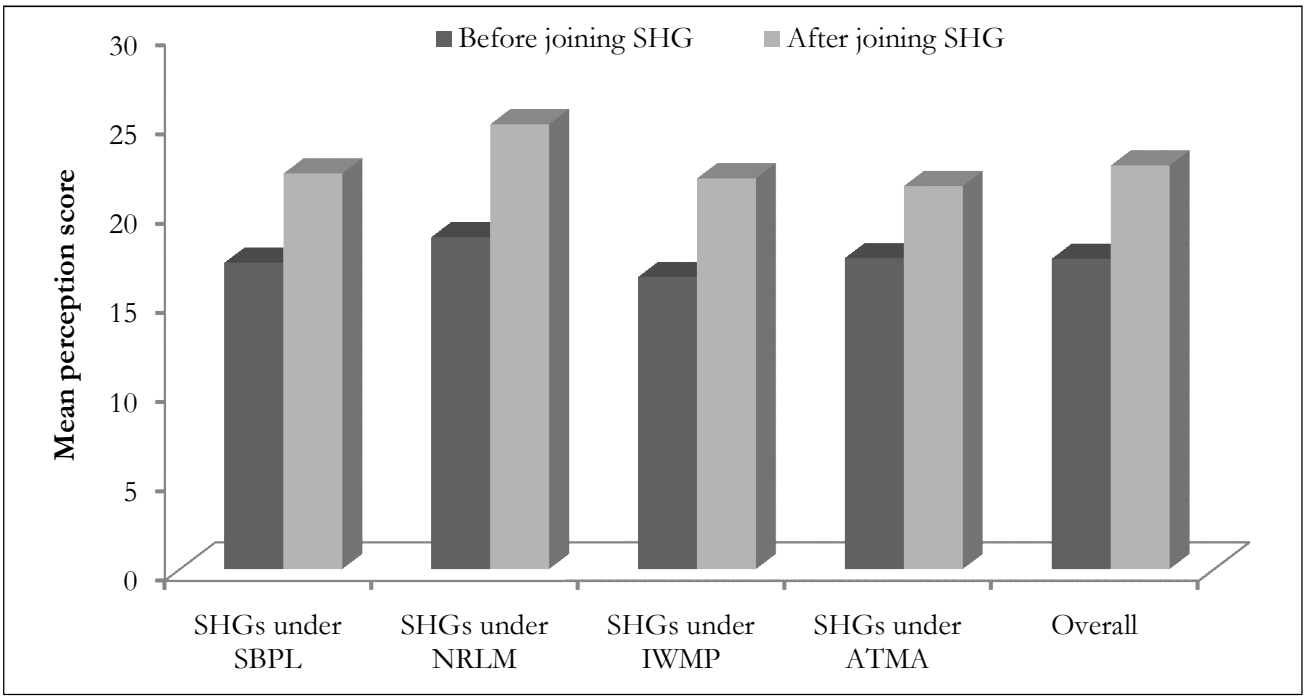

Figure 1: Comparison of impact on livelihood security of members of SHGs under NABARD's SBLP, NRLM, IWMP and ATMA

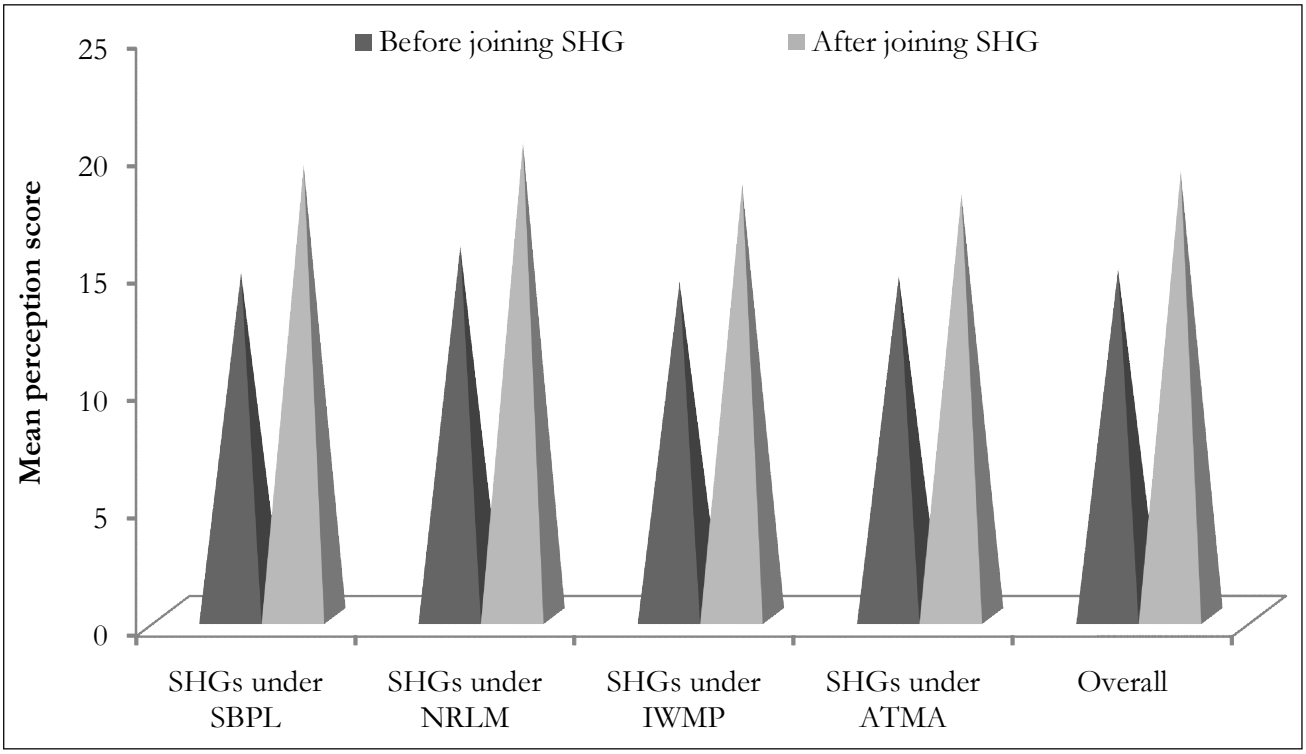

Figure 2: Comparison of impact on level of livelihood of members of SHGs under NABARD's SBLP, NRLM, IWMP and ATMA

t-tests were done to test difference between perceptions of the respective members regarding their livelihood security and level of livelihood on joining the SHGs formed under four different programmes *viz.* NABARD's SBLP, NRLM, IWMP and ATMA. The calculated values of t were less than the table value (2.045) at 5 per cent level of significance and thus there were no significant differences between perceptions of members of SHGs formed under four different programmes with respect to their improved livelihood security as well as level of livelihood on joining SHGs.

For the test of independence, also known as the test of homogeneity, 'Chi-square (χ^2) test' was conducted. The chi-squared statistic was found as 24.89 in case of livelihood security and 12.87 in case of level of livelihood, which were less than the table value at the 0.05 critical point; therefore, the null hypothesis was accepted. It interprets that the livelihood security as well as level of livelihood perceived by the members were independent of their SHGs formed under different programmes *viz.* NABARD's SBLP, NRLM, IWMP and ATMA.

It is immaterial for rural poor including women that what programme has been supporting them by forming their SHG. But they were satisfied being part of their SHG and have perceived the dynamics of their SHGs quite highly. Moreover, they realized the improvement in their livelihood security although the extent of improvement it varied across the SHGs. The level of their living or livelihood also improved with the gains of different assets *viz.* physical, social, financial, human and natural assets. Most of the members of SHGs perceived the extent of improvement more in case of human assets followed by social assets.

Comparison of improvement (%) in six types of indicators of livelihood security of members of SHGs under NABARD's SBLP, NRLM, IWMP and ATMA is depicted in Figure 3. Improvement in food & nutritional security, habitat security and educational security was highest for the members of SHGs under NRLM. Improvement in economic security and social security was highest for the members of SHGs under IWMP. Health security was improved maximum in case of members of SHGs under NABARD's SBLP. Thus,

improvement in overall livelihood security was maximum for members of SHGs both under NRLM and IWMP and minimum for members of SHGs under ATMA.

Gain in five different types of assets determining livelihood level of members of SHGs under NABARD's SBLP, NRLM, IWMP and ATMA is depicted in Figure 4. Physical assets gain was highest for the members of SHGs under IWMP. Gain in both social and human assets was highest for the members of SHGs under SBLP. Financial assets gain was maximum for the members of SHGs under ATMA. Natural assets gain was highest for members of both SHGs under SBLP and NRLM. Overall increase in human assets was higher as compared to other types of assets in case of members of SHGs under SBLP, NRLM and IWMP. Thus, improvement in overall level of livelihood was maximum for members of SHGs under SBLP and minimum for members of SHGs under ATMA.

Similar to findings of present study, Srinivasan (1995) illustrated that realization of the poor women that they can take charge of their lives was a significant gain of the SHGs. Puhazhendhi and Jayaraman (1999) reported an improvement in physical, financial and human assets after membership in SHGs. Pitt and Khandker (1998) observed that microfinance through SHG approach contributed to poverty alleviation and food security. NABARD (2002) reported perceptible and wholesome changes in the living standards of SHG members in terms of ownership of assets, borrowing capacities, income generating activities, income levels and increase in savings. Sharma *et al.* (2014) assessed the extent of effectiveness of SHGs in improving livelihood security and gender empowerment that took into accounts both male and female SHGs. Lalneihzovi (2007) considered SHGs as best engine of growth of human resource. The emergence of SHGs has been viewed as silent revolution in the spread of rural credit for rural development.

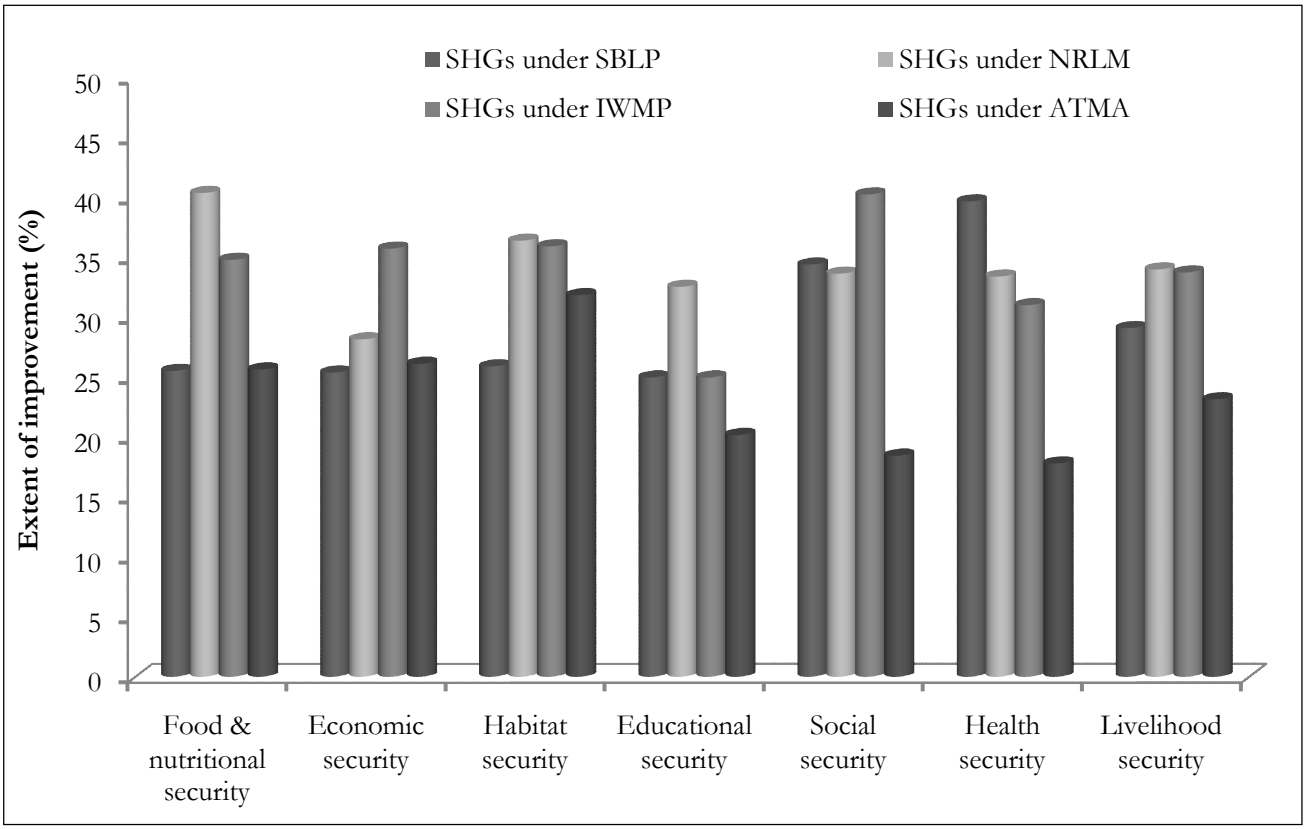

Figure 3: Comparison of improvement in six types of indicators of livelihood security of members of SHGs under NABARD's SBLP, NRLM, IWMP and ATMA

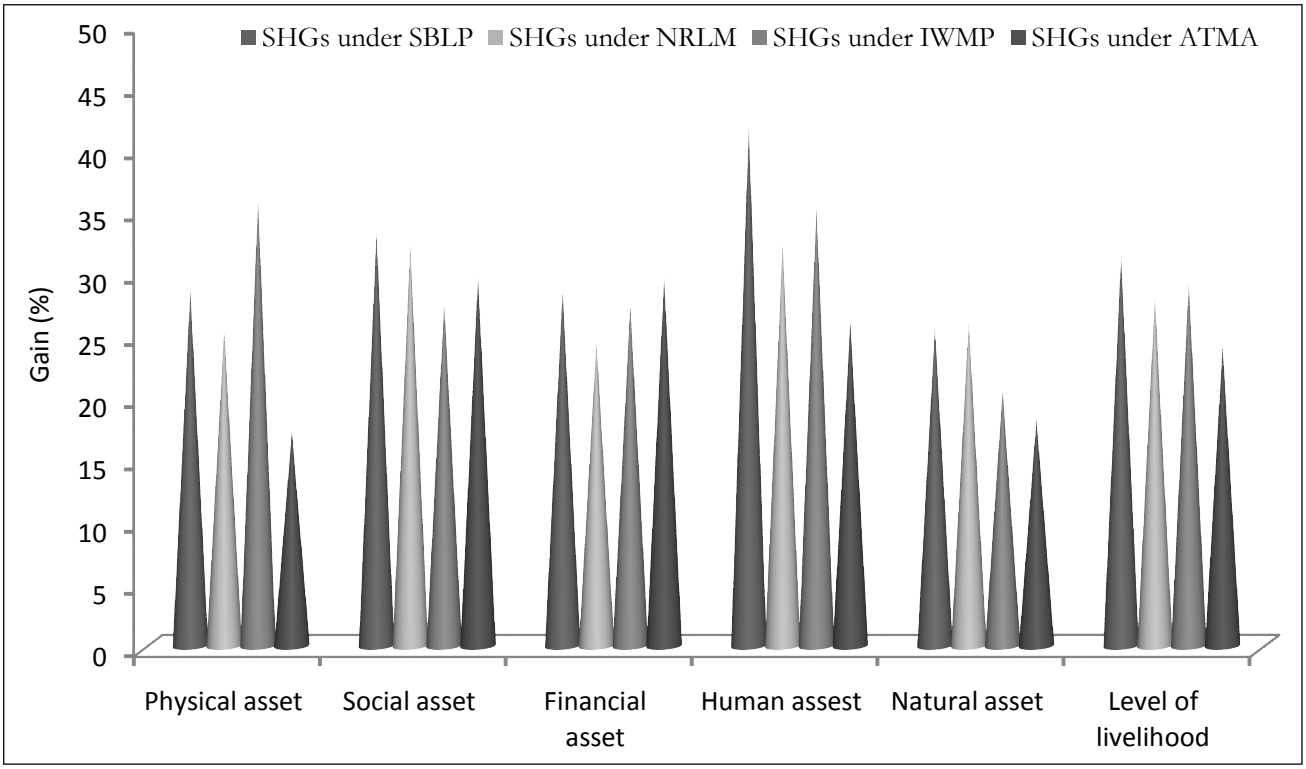

Figure 4: Comparison of gain in five different types of assets by members of SHGs under NABARD's SBLP, NRLM, IWMP and ATMA

CONCLUSION

It made no difference for rural poor including women that what programme have been supporting them to form their SHG. But they were satisfied being part of their SHGs and have perceived the improvement in their livelihood security after joining the SHGs, although the extent of improvement varied across the SHGs. The level of their living or livelihood also improved with the gains of different assets *viz.* physical, social, financial, human and natural assets on joining the SHGs. Most of the members of SHGs perceived the extent of improvement more in case of human assets followed by social assets. The impact of SHG on livelihood security and level of livelihood have been viewed as most demanding and motivating factor to spread SHG approach; therefore, present study reflected the achievements made in this regard by different SHGs formed under different programmes. A study like this would also guide future researchers and planners to deriving insight in understanding many aspects relevant particularly to SHG approach adopted under different schemes implemented by various government and non-government organizations in general and Chhattisgarh State in particular.

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Received on October, 2015, Revised on November, 2015

Journal of Community Mobilization and Sustainable Development Vol. 10(2), 190-194, July-December, 2015

Entrepreneurial Behavior of Dairy Farmers about Dairy Management Practices

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ABSTRACT

Dairy entrepreneur is the most important figure of economic activity and prime mover of development. The present study was conducted in surrounding area Gwalior city of Madhya Pradesh. A list of farmers who are practicing dairy and possessing minimum 5 dairy animals was prepared. From this list 200 dairy farmers were selected by random sampling method. The study revealed that majority 65.5 percent respondents had medium level of entrepreneurial behaviour about dairy management practices. The entrepreneurial behavior was positively and significantly related with education, dairy experience, land holding, livestock possession, occupation, annual income, material possession, extension contact, economic motivation, market orientation, scientific orientation, attitude of dairy farmers towards dairy farming and knowledge of improved dairy management practices found to have positive and significant relationship with entrepreneurial behavior. Coefficient of determination R^2 was 0.977 which indicates that 97.00 percent variation in the entrepreneurial behavior of dairy farmers was explained by sixteen independent variables which were selected for study.

Keywords: Coordinating ability and Self confidence, Dairy farmers, Dairy management practices, Entrepreneurial behavior, Planning ability

INTRODUCTION

India has emerged as the largest milk producing country in the world with present level of annual milk production estimated as 127.7 million tonnes with a per capita availability of 291 gms per day. We expect a production level of 135 million tonnes by the year 2015. India has a large livestock population base constituting 278 million livestock including 180.5 million cattle, 82.8 million buffaloes, 4 million sheep and 9.2 million goats. The livestock population is projected to increase to 322 million by the year 2015. Demand for dairy products in India is likely to grow significantly in the coming years, driven by more consumers, higher incomes and greater interest in nutrition. Consumption of processed and packaged dairy products is increasing in urban areas.

The entrepreneurs are key persons of any country for promoting economic growth and technological change. The development of entrepreneurship is directly related to the socio-economic development of the society.

The underlying source of entrepreneurial behavior is a relative preference for novel information over redundant information. Both types of information are important to the fight or flight response to a threat. Novel information reveals potential threats that result in automatic physiological responses, which is more satisfying to some than it is to others.

Entrepreneurial behavior is a preference for innovation and a change in existing institutions and the status quo. It can be as simple as the willingness to buy a new electronic gadget or as involved as rebelling against the existing political regime and starting a new nation. It often surfaces in the form of an entrepreneur undertaking the risk of organizing production and launching a new business venture. Keeping the above facts in view, the present study has been designed to analyze the entrepreneurial behavior of dairy farmers. The following specific objectives have been formulated for the study.

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- To study the profile of dairy farmers.
- To determine the entrepreneurial behaviour of dairy farmers.
- To analysis the relationship between entrepreneurial behaviour with profile of the dairy farmers.

METERIALS AND METHODS

The present study was conducted in surrounding area Gwalior city of Madhya Pradesh due to the maximum number of dairy farmers engaged in dairy farming. A list of farmers who are practicing dairy and possessing minimum 5 dairy animals was prepared. From this list 200 dairy farmers were selected by random sampling method. The primary data were collected from the respondents by using a semi-structured interview schedule, which was pre-tested before actual application. The respondents were interviewed individually by the investigator. Secondary data were collected from records & statistical office. Statistical tools like- mean, SD, percentage and Karl Pearson's coefficient of correlation and multiple regression analysis were used for analysis of data.

RESULTS AND DISCUSSION

Profile and entrepreneurial behaviour of dairy farmers: The data in Table 1 shows that most of the respondents (46%) belonged to middle age group and higher percentage (28.00%) of dairy farmers educated up to primary level followed by 21.50 percent of the respondents had education at high school level. Majority of the beneficiary respondents (52.50%) belonged to Other Backward Caste (OBC), followed by General Caste category (26.00%) and more than half of dairy farmers (42.50%) had high level of experience (above 10 years) in dairying. The data in Table 1 indicates that less than half of (45.00%) the dairy farmers possessed low level of livestock possession and maximum (42.50%) dairy farmers possessed up to 1 ha. of land. The data exhibits the distribution of dairy farmers according to their occupation. The data shows that most of the 41.50 per cent of the respondents engaged in farming + agriculture followed dairy farming. Majority (53.50%) of the dairy farmers had low level of annual income. It is apparent that majority (61.50%) of the dairy farmers possessed medium level of material possession. The perusal of data indicates that majority (53.50%) of the respondents had medium level of mass media participation and the majority 59.00 percent of respondents was from medium category of extension contact. The majority 59.00 percent of the dairy farmers had medium attitude towards dairy farming and majority of dairy farmers (71.00%) had medium level of scientific orientation. Majority 64.00 per cent of the dairy farmers had medium knowledge level about dairy farming while 23.00 per cent had low knowledge level. Almost similar findings were reported by Chaudhari Ratan Ranuji (2006) Gaur *et al.* (2014), Shah *et al.* (2010) and Pooja *et al.* (2014).

Entrepreneurial behaviour of dairy farmers: Entrepreneurial behaviour was operationally defined as a process of action an entrepreneur under taken to establish his enterprise. It is a composite skill, the resultant of mix of many qualities and traits. The entrepreneurial behaviour of dairy farmers comprised nine components, such as, innovativeness, achievement motivation, decision making ability, risk orientation, coordinating ability, planning ability, information seeking, cosmopoliteness and self confidence.

On the basis of entrepreneurial score obtained by dairy farmers were grouped in three categories i.e. low, medium and, high and their frequency distributions are given in Table 2.

Among the sample of respondents the mean score entrepreneurial behaviour was 76.09.The measure of standard deviation was 15.59 indicating lower dispersion among score. The frequency distribution of respondents on entrepreneurial behaviour appeared to fall in normal distribution with nearly 65.5 percent respondents had medium level of entrepreneurial behaviour, whereas, 18.00 percent respondents had high level of entrepreneurial behaviour and 16.50 per cent respondents had low level of entrepreneurial behaviour. The result was conformity with the findings of Tekale *et al.* (2013) and Pooja *et al.* (2014).

Correlation and regression analysis: The coefficient of correlation of each of the socio personal characteristics with their entrepreneurial behaviour of dairy farmers has been furnished in Table 4.

It could be revealed from Table 3 that socio-personal variables viz., education and dairy experience, showed positive and significant relationship at 0.01 level of probability, whereas remaining two variables namely

Table 1: Profile of the dairy farmers

Traits	Category	Frequency	Percentage	Mean	SD
Age	Young (below 35 yrs)	51	25.50	2.03	0.73
	Middle (35-55 yrs)	92	46.00		
	Old (above 55 yrs)	57	28.50		
Education	Illiterate	40	20.00	1.74	1.28
	Up to primary	56	28.00		
	Up to middle	40	20.00		
	High school	43	21.50		
	Higher sec. &above	21	10.50		
Caste	General	52	26.00	1.95	0.68
	OBC	105	52.50		
	SC/ST	43	21.50		
Farming experience	Low (below 5 yrs)	51	25.50	2.17	0.81
	Medium (5-10 yrs)	64	32.00		
	High (above 10 yrs)	85	42.50		
Livestock possession	Low (<0.99)	90	45.00	1.84	0.85
	Medium (0.99-2.69)	51	25.50		
	High (>2.69)	59	29.50		
Land holding	Marginal (up to 1 ha.)	85	42.50	2.09	1.40
	Small (1.1 to 2 ha.)	32	16.00		
	Medium (2.1 to 5 ha.)	37	18.50		
	Large (above 5.1 ha.)	46	23.00		
Occupation	Dairy Farming	73	36.50	1.85	0.75
	Dairy Farming + Agriculture	83	41.50		
	Dairy Farming + Agriculture + Other	44	22.00		
Annual income	Low (<0.87)	107	53.50	1.70	0.82
	Medium (0.87-2.53)	45	22.50		
	High (>2.53)	48	24.00		
Material Possession	Low (<15.52)	49	24.50	24.87	9.31
	Medium (15.52-34.14)	123	61.50		
	High (>34.14)	28	14.00		
Mass media participation	Low (<2.74)	65	32.50	4.79	2.06
	Medium (2.74-6.86)	107	53.50		
	High (>6.86)	28	14.00		
Extension contact	Low(<7.65)	46	23.00	11.0	3.35
	Medium (7.65-14.0)	118	59.00		
	High (>14.0)	36	18.00		
Attitude towards agriculture	Low (<29.44)	45	22.50	51.18	21.74
	Medium (29.44-72.92)	118	59.00		
	High (>72.92)	37	18.50		
Scientific orientation	Low (<4.94)	42	21.00	7.37	2.43
	Medium (4.94-9.8)	142	71.00		
	High (>9.8)	16	08.00		
Knowledge about improved dairy practices	Low (<17.62)	46	23.00	24.95	7.32
	Medium (17.62-32.28)	128	64.00		
	High (>32.28)	26	13.00		

Table 2: Distribution of the respondents according to their entrepreneurial behavior

Category	Frequency	Percentage
Low (<60.49)	33	16.50
Medium (60.49-91.69)	131	65.50
High (>91.69)	36	18.00
Total	**200**	**100.00**
Mean	76.09	
SD	15.59	

Table 3: Relationship between adoption behaviour of dairy farmers with their characteristics

Variable	Correlation coefficient (r)	t value
Independent variables		
Socio-personal variables		
Age	0.131 NS	1.859
Education	0.333**	4.969
Caste	-0.080 NS	1.129
Experience in dairy farming	0.264*	3.851
Socio-economic variables		
Livestock possession	0.338*	5.053
Land holding	0.322*	4.785
occupation	0.343*	5.138
Annual income	0.276*	4.040
Material possession	0.241*	3.494
Communication variables		
Mass media participation	0.017 NS	0.239
Extension Contact	0.220*	3.173
Psychological variables		
Economic motivation	0.227*	3.279
Marketing orientation	0.216*	3.112
Scientific orientation	0.213*	3.067
Attitude of dairy farmers towards dairy farming	0.278*	4.072
knowledge about improved dairy practices	0.670**	12.699

**Significant at 1% level; *Significant at 5% level; NS- Non Significant

age and caste did not establish any significant relationship with adoption behaviour. The coefficient of correlation of each of the socio economic characteristics with their adoption behaviour of dairy farmers has been furnished. It could be revealed that among five independent variables, viz., land holding, livestock possession, occupation, annual income and material possession showed positive and significant relationship with adoption behaviour at 0.01 level of probability.

Table 4: Optimum model of multiple regression analysis between profile of dairy farmers and their entrepreneurial behavior

Characteristics	Coeffi-cients	Std. error	't' stat
Age	2.751	1.248	2.203*
Education	1.038	0.787	1.319
Caste	2.239	1.216	1.840
Experience in dairy farming	0.440	1.228	0.358
Livestock possession	1.171	1.111	1.053
Land holding	0.2566	0.695	0.368*
occupation	3.261	1.2166	2.680
Grass Annual income	3.970	1.182	3.356*
Material possession	0.191	0.1061	1.805
Mass media participation	1.523	0.465	3.269*
Extension Contact	1.201	0.3012	3.988*
Economic motivation	0.1362	0.159	0.854
Marketing orientation	0.354	0.3902	0.907
Scientific orientation	0.645	0.367	1.759
Attitude of dairy farmers towards dairy farming	0.103	0.0496	2.080*
knowledge about improved dairy practices	0.258	0.139	1.850

R^2=0.977 F value=490.19 with 16 and 184 DFS

The correlation coefficient of each of the communicational characteristics of dairy farmers with their adoption behaviour has been furnished in. It could be revealed that among two independent variables, viz., extension contact showed positive and significant relationship with adoption behaviour at 0.01 level of probability whereas mass media participation had no significant relation with adoption behaviour. The correlation coefficient of each of the psychological characteristics of dairy farmers with their adoption behaviour has been furnished. It could be revealed from Table 3 that among five independent variables of all variables namely economic motivation, market orientation, scientific orientation, attitude towards dairy farming and knowledge of improved dairy management practices showed positive and significant relationship with adoption behaviour at 0.01 level of probability. Similar findings was also reported by Badodiya *et al.* (2010), Shah *et al.* (2010) and Pooja *et al.* (2014).

Multiple regression analysis of predictor variables with their entrepreneurial behavior: The Multiple regression analysis was carried out to find out the extent of influence of each variable towards the entrepreneurial behaviour of dairy farmers and the data were presented

in Table 4. The perusal of data revealed that out of fifteen variables taken for analysis of regression, six variables namely age, occupation, annual income, mass media participation, extension contact and attitude of dairy farmers towards dairy farming were found to have significant contribution to the entrepreneurial behaviour of dairy farmers.

Table 4 also shows that the coefficient of determination R^2 was 0.977 which indicates that 97.00 percent variation in the entrepreneurial behavior of dairy farmers was explained by sixteen independent variables which were selected for study.

CONCLUSION

The study revealed that majority 65.5 percent respondents had medium level of entrepreneurial behaviour about dairy management practices. The entrepreneurial behavior was positively and significantly related with education, dairy experience, land holding, livestock possession, occupation, annual income, material possession, extension contact, economic motivation, market orientation, scientific orientation, attitude of dairy farmers towards dairy farming and knowledge of improved dairy management practices found to have positive and significant relationship with entrepreneurial behavior. Coefficient of determination R^2 was 0.977 which indicates that 97.00 percent variation in the entrepreneurial behavior of dairy farmers was explained by sixteen independent variables which were selected for study.

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Received on May, 2015, Revised on November, 2015

Journal of Community Mobilization and Sustainable Development Vol. 10(2), 195-198, July-December, 2015

Adoption of Livestock Management Practices for Crossbred Cows by Members of Milk Cooperatives

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ABSTRACT

A study was undertaken to assess the adoption of livestock management practices for crossbred cows by members of Women Administered Milk Cooperatives in Valsad district of Gujarat state. Study revealed that majority of respondents (70.00%) belong to middle age (31-50 years) category . The heat detection in crossbred cows was based on visual sign and symptoms (100.0%). Moreover heat detection (94.00 %) was identified by the symptoms like bellowing and thin oily mucus discharge. Method of breeding adopted in area was mostly (100.00%) by Artificial Insemination (A.I.) within 12-18 hrs of heat (68.00%). About 70.00% of respondents observed more than three months dry period in crossbred cows in the study area as the repeat breeding observed in 35.00 % cows which showed adverse impact in milk production per crossbred cows in the study area. Vaccination was adopted by 96.00 per cent of the members . Regular de-worming was also practiced by 78.00% and 42.00% members for milch cow and calf respectively. Knuckling (84.00%) was common method of hand milking followed by stripping (14.00%). Teat dipping and testing of mastitis control were not followed in the study area. Large majority of members rearing crossbred cows have higher rate of adoption of most of the management practices.

Keywords: Milk cooperatives, Breeding, Health care, Management

INTRODUCTION

Dairying is a very important income generating occupation for rural people. As dairy occupation adds to the profits of the big farmer, it contributes to the survival and livelihood for the small ones. It requires very crucial knowledge for day to day livestock management practices for crossbred cows. The research evidences reported that cattle and buffaloes owners are not adopting scientific practices including breeding, health care and milking which ultimately reduce productivity at member's door step (Sabapara *et al.,* 2010). Calving Interval is very important aspect for sustainable production. As the clean and quality milk is need of the time. Keeping all these aspects in the view, the present research study was designed to assess the adoption of different aspects of breeding, health care and milking management practices of crossbred cows by members of milk cooperatives in valsad district of Gujarat.

MATERIALS AND METHODS

The study was conducted in Pardi blocks of Valsad district of Gujarat state. The women administered milk co operatives are strengthen in this area during last decade under the roof of Vasudhara Milk Producers Cooperative Union. From all women operated milk cooperatives, twenty milk cooperatives were purposively selected for the study. 10 members from each milk cooperative who are rearing at least two crossbred cows were selected randomly for the study. Thus, total 200 members were selected for the present study. The information regarding age, education, land holding, herd size, vocational diversification, milk productivity, and the detailed practices followed by members with respect to breeding, health care and milking were collected. The data were collected through personal interview and at the time of particular management practices going on. All the recorded data were averaged, analyzed and interpreted.

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RESULTS AND DISCUSSION

Socioeconomic profile of members: The majority of the members (80.00%) were in middle age group (31-50 years) as evident from Table 1. The young were less attracted to animal management, as they perceive this is hard and less prestigious job compared to factory jobs in industrial corridor of south Gujarat. The greater part of the members (72.00 %) belongs to primary and secondary level of education. Commonly the members (52.00%) owned up to 1.0 ha. of land followed by 38.00 % small farmers. The majority of the members (85.00%) had small herd size (1-5 animals). All the members (100.00%) followed agriculture and livestock system as a vocation for source of income and livelihood. The great majority of members (80.00 %) were maintaining crossbred cows, yielding 5 to10 litres milk per day.

Table 1: Socioeconomic characteristics of respondents (N=200)

Parameters	Frequency	Percentage
Age		
Young (≤30 yrs)	16	08.00
Middle age (31-50 yrs)	160	80.00
Old age (>50 years)	24	12.00
Education		
Illiterate	20	10.00
Primary	92	46.00
Secondary	52	26.00
Above	24	12.00
Land holding		
Marginal (up to 1.0 ha)	104	52.00
Small (1.0 to 2.0 ha)	76	38.00
Large (>2 ha)	20	10.00
Herd size		
Small (1-5 animals)	170	85.00
Medium (6-10 animals)	26	13.00
Large (>10 animals)	04	02.00
Vocational diversification		
Agriculture + livestock	200	100.00
Only Livestock	00	00.00
Milk yield (Lit/day)-Crossbred cow		
Less than 5 litres	32	16.00
5 to 10 litres	160	80.00
Above 10 litres	08	04.00

Breeding management practices: The results regarding various breeding management practices followed by members are presented in Table 2. It is revealed from the study that respondents detect heat in crossbred cows was based on sign and symptoms (100.0%) rather than using teaser bull. The main symptom of identification of heat in crossbred cows was bellowing and mucus discharge (72.00%) and only mucus discharge (22.00%) in all milk co operatives. The findings are in conformity with the findings of Solanki *et.al* (2011). As far as breeding of crossbred cows concerned, 100.00% of members adopted Artificial Insemination and (68.00%) members were observed to inseminate their crossbred cows within 12-18 hrs of heat, however (22.00 %) members inseminate before time. This result was in agreement with Sabapara *et.al.* (2010).

Table 2: Breeding management practices followed by members (N=200)

Parameters	Frequency	Percentage
Methods of heat detection:		
Sign and symptoms	200	100.00
Teaser bull	00	00.00
Symptoms of heat detection:		
Mucus discharge	44	22.00
Mucus plus bellowing	144	72.00
Frequent urination	08	04.00
Mounting	04	02.00
Breeding of crossbred cows:		
A.I.	200	100.00
Natural service	00	00.00
Insemination time:		
Immediately after heat	44	22.00
Within 12-18 hrs	136	68.00
After 18 hrs	20	10.00
Breeding after calving:		
2-3 months	12	06.00
3-5 months	128	64.00
After 5 months	60	30.00
Pregnancy diagnosis:		
Practiced	172	86.00
Not practiced	28	14.00
Dry period Crossbred cow:		
Less than 2 months	04	02.00
2-3 months	76	38.00
More than 3 months	120	60.00
Calving Interval		
12-13 months	12	06.00
13-15 months	88	44.00
> 15 months	100	50.00
Breeding records maintained:		
Yes	116	58.00
No	84	42.00

The low rate of conception with A.I. might be due to inability of members to detect exact time of ovulation and proper time of A.I. (Rao *et.al.* 2013). Time of insemination is very crucial aspect in conception. As far as breeding after calving is concerned the 64.00 % members breed their crossbred cows within 3 to 5 months and 30.00 % members breed their crossbred cows after 5 months respectively. Majority of respondents (86.00 %) were practicing the Pregnancy diagnosis (P.D.) in their crossbred cows as the services of para veterinary workers made available by Vasudhara Milk Cooperative Union at door step of members . In most of the crossbred cows (60.00%) the dry period is more than 3 months in the study area. In majority of crossbred cows (50.00%) the calving interval was more than 15 months observed in the study area. More calving interval might be due to low conception rate resulting in more repeat breeding. This was observed because of poor nutritional management by members. It was very interesting to know that 58.00% of members were keeping the breeding records, however the records was partially complete.

Health care management practices: The healthcare management practices followed by the members of milk cooperatives are presented in Table 3. Appraisal of result revealed that vaccination treatment against Foot and Mouth disease (FMD), Hemorrhagic Septicemia (HS) and Black Quarter (BQ) diseases were practiced by 96.00% of members in crossbred cows. High level of vaccination practiced in area might be due to facility for regular and free of cost vaccination provided by Vasudhara milk cooperative union to animals of members of milk co-operatives. Similar finding was also reported by Sinha *et al.* (2010). De-worming was practiced by majority of the members (78.00%) regularly for crossbred cows to protect from endo-parasites. Only 42.00% of members practiced de-worming in calves regularly and 58.00 % of members practiced it occasionally. Ecto-parasite control is practiced by 74.00% members in the study area. Similar finding of restricted deworming and higher level of ecto-parasite control was reported by Sinha *et al.* (2010). It was also observed that 54.00% of members still kept their animals in dirty (wet) shed where as 46.00 % members kept animal shed clean (dry). Similar finding was reported by Patel *et al.* (2014). The reason behind this

Table 3: Health care management practices followed by members (N=200)

Parameters	Frequency	Percentage
Vaccination against FMD, HS and BQ:		
Yes	192	96.00
Not	08	04.00
De-worming in milch animals:		
Regular	156	78.00
Occasionally	44	22.00
De-worming in calf:		
Regular	84	42.00
Occasionally	116	58.00
Practice to control ecto parasites:		
Yes	148	74.00
No	52	26.00
Sanitary condition of shed:		
Clean (dry)	92	46.00
Dirty (wet)	108	54.00
Treatment of sick animal by:		
Local knowledge	04	02.00
Livestock inspector	104	52.00
Veterinary officers	16	08.00
A.I. workers	76	38.00

Table 4: Milking management practices followed by members (N=200)

Parameters	Frequency	Percentage
Frequency of milking:		
Once in a day	00	00.00
Twice in a day	200	100.00
Splashing of water on udder before milking:		
Yes	196	98.00
No	04	02.00
Washing hand before milking:		
Yes	196	98.00
No	04	02.00
Milking habit:		
Dry hand	24	12.00
Wet hand	176	88.00
Milking methods:		
Full hand	04	02.00
Knuckling	168	84.00
Stripping	28	14.00
Teat dipping followed:		
Yes	00	00.00
No	200	100.00
Testing of mastitis control:		
Yes	00	00.00
No	200	100.00
Washing of milking utensils:		
Hot water	04	02.00
Tap water	196	98.00

is that majority members has no alternative place for keeping their animals. As far as treatment of sick animal is concerned it was practised by Livestock inspector (52.00%), A.I. workers (38.00%), and Veterinary officers (8.00%) respectively. Animals treated by Veterinary officers were very less because of frequency of Veterinary officers is limited. Similar finding of paravets were preferred by 40% respondents for treatment of sick animals was reported by Yadav *et al.* (2013).

***Milk production practices*:** The result of the milk production management practices followed by the members is presented in Table 4. Perusal of data revealed that the frequency of milking was practiced twice a day by all (100.0%) of the members. Splashing of water on udder or teats and washing of hand before milking was followed by most (98.00%) of the members. Milking habit pursued by respondents in survey area was mostly (88.00%) wet hand type whereas only 12.00% of members followed dry hand type milking. Dry hand type milking is advisable in clean and hygienic milk production at members door step. Therefore members should be made acquainted to follow dry hand milking. Great majority of members (84.00%) followed knuckling type method of milking in area. Full hand type milking is best method of milking with respect to udder health however full hand milking followed by only 2.00 % of members, this show their less understanding towards quality milk production. Similar finding was also reported by Patel *et al.* (2014). Teat dipping and testing of mastitis control were not followed in the study area. Washing of milking utensils was followed by most of the members by tap water.

CONCLUSION

A good number of members of study area belonged to middle age, educated, small and marginal farmers category having small herd size. The heat detection was solely based on sign and symptoms. The Artificial Insemination was practised within 12-18 hrs of heat. The pregnancy diagnosis and vaccination against FMD, HS and BQ in cows were followed by majority of members. De-worming was practiced regularly in cows but occasionally in calves. Control of ecto parasites adopted by members. Clean milk production was well adopted by the members, however milking method was challenging as they were using knuckling method for milk extraction. Post milking teat dipping and testing of mastitis control were not at all practiced by the members. Therefore there are some areas in breeding, healthcare and milking practices need to be improving for increasing productivity of crossbred cows in the study area.

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Received on May, 2015, Revised on August, 2015

Journal of Community Mobilization and Sustainable Development Vol. 10(2), 199-205, July-December, 2015

Knowledge Up-gradation of Extension Functionaries on Non Timber Forest Produce i.e. Lac via Model Training Course

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ABSTRACT

Model Training Courses" (MTCs) scheme has been implemented since 1996 by Directorate of Extension, Ministry of Agriculture, Government of India. Its major emphasis is demand driven capacity building of extension managers, marketing managers and extension functioning of State development department. These training programme are organized on priority areas of agriculture, horticulture and allied subjects. In the similar fashion a MTC was organized at ICAR-Indian Institute of Natural Resins and Gums (IINRG) Ranchi especially for the Extension functionaries of the Government. The investigation aimed to study the impact of model training course on lac production, processing, product development and value addition in term of knowledge level, level of satisfaction of trainees, usefulness of the topics covered and overall grading of training. The study was conducted at ICAR-IINRG Ranchi and all participants who attended Model Training Course 2014 were selected as respondents for this study. A questionnaire containing multiple choice questions on different aspect of Lac Production technology was given to the trainees before and after conduct of training. The knowledge level was obtained from the overall mean score of the respondents and based on the mean score, standard deviation was calculated. On the basis of overall mean score and standard deviation the knowledge level of the respondents were classified. Data was tabulated and analyzed. It was observed that a majority of participants were middle age group (35-45 years) and belonged to male gender. It was found that 37.05 percent, 22.22 per cent, 7.40 per cent and 33.33 per cent participants belonged to general caste, backward caste, scheduled caste and scheduled tribe respectively. Majority of the respondents i.e. 51.85 per cent were post graduate and above. It was found that 51.85 per cent belongs to small family. It was found that 44.44 per cent of the respondents had low work experience. Majority of the respondents i.e. 59.26 per cent had not participated in any training programme on lac. Majority of the respondents were having their family monthly income Rs 30,001 and above. Majority of the respondents i.e. 51.85 per cent were not aware about social participation in any organization. It is evident from the study that knowledge level of trainees had increased significantly in all aspect of lac cultivation. The result implies that the trainees were mostly satisfied with the course content as well as the manner in which training was imparted. It can be said that this model training course included nearly all the topics required by the trainees and most of the trainees felt that facilities provided during training were very good.

Keywords: Extension functionaries, Knowledge, Lac, Model training course, Non timber forest produce

INTRODUCTION

India is the major producer of lac, accounting for more than 50% of the total world production. Today an average of about 15-20 thousand tons of stick lac (raw lac) is produced in the country per year. Usually host trees standing on '*Rayyati'* lands are used for lac cultivation and in some areas trees on government land are taken on lease or rental basis. The country's production of lac was 19,577 tonnes in 2012-13 (Yogi *et al.,* 2014).

Non Timber Forest Produce (NTFP) i.e. lac is a natural resinous substance of profound economic importance in India. It is the only resin from animal origin lending itself to diverse applications e.g. as a

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protective and decorative coating in the form of thin films, adhesives and plastics. It makes a small but significant contribution to the foreign exchange earning of the country, but the most important role that lac plays in the economy of the country is that roughly 3-4 million tribal people, who constitute the socio-economically weakest link of Indian population earn a subsidiary income from its cultivation. Stick lac (crude lac) produced in the country is processed in a large number of factories organized on a cottage industry scale to produce either the seedlac or shellac, before it is exported. These manufacturing centres are distributed throughout the lac-growing areas and handle maximum portion of the country's production. The process of refining is simple and manual labour is employed for the purpose. A fairly large number of skilled workers depend on this industry for employment. Lac cultivation is known as a good source of livelihood resource for poor farmers and assured source of income during drought years.

Lac cultivators are not following scientific practices, thus compromising with quality and optimum productivity. The ICAR-Indian Institute of Natural Resins Gums, Namkum, Ranchi regularly organizes capacity building programme on scientific lac cultivation, processing and its uses. It is trying hard to convert more number of cultivators from conventional to modern lac producer by upgrading their knowledge and temperament. Besides farmers' training, the pre-service and in-service training of extension functionaries is also equally important for effective extension system. "Model Training Courses" (MTCs) scheme has been implemented since 1996 by Directorate of Extension, Ministry of Agriculture, Government of India. Its major emphasis is demand driven capacity building of extension managers, marketing managers and extension functionaries of state development department. These training programmes are organized on priority areas of agriculture, horticulture and allied subjects. In the similar fashion, a Model Training Course was planned & organized at ICAR -Indian Institute of Natural Resins and Gums (IINRG), Ranchi especially for the extension functionaries of the Government. The programme was sponsored by Directorate of Extension, Department of Agriculture and Co-operation, Ministry of Agriculture, Govt. of India, New Delhi.

ICAR-IINRG, Ranchi generates modern technologies for lac production, processing, product development, value addition and also organizes transfer of technology activities for lac cultivators and extension workers and other officers of Government Organization (GOs) & Non Government Organization (NGOs). These training programmes need to be evaluated time to time in order to know the effectiveness of training in bringing desired changes amongst the trainees behavior. Keeping this in view, current study was planned to the knowledge up-gradation of extension functionaries on advances in lac production, processing, product development, value addition.

MATERIALS AND METHODS

The study was conducted at ICAR-IINRG, Ranchi and all participants who attended Model Training Course 2014 were selected as respondents for this study. The respondents were government officials i.e. scientists, subject matter specialists, forest officials and extension workers.

In this study, impact of training programme refers to the manner and extend to which training has influenced the knowledge level of extension officers in respect to their activities in the organizations. Impact of training was measured in term of knowledge level, level of satisfaction of trainees, usefulness of the topics covered and overall grading of training. A questionnaire containing multiple choice questions on different aspects of lac production technology was given to the trainees before and after completion of training. The knowledge level was obtained from the overall mean score of the respondents and based on the mean score, standard deviation was calculated. On the basis of overall mean score and standard deviation, the level of the respondents was classified into three categories-below average, average and above average knowledge.

Level of satisfaction of trainees was measured using a scale having 5 points continuum ranging from 'very well satisfied' to 'partially satisfied', 'partially dissatisfied', dissatisfied' and 'highly dissatisfied'. Opinion from trainees on degree of availability of resources and facilities during training was also studied along with their suggestions to improve the training delivery mechanism. Descriptive statistics were used to arrive at conclusion.

RESULTS AND DISCUSSION

Socio-economic characteristics: The background of the trainees was studied and results are given in Figure 1. It was observed that a majority i.e. 66.66 per cent of participants were middle age group (35 to 45 years) whereas 22.22 per cent and 11.11 per cent of respondents belong to the old age group (more than 45 years) and young age group (less than 35 years) respectively. It was found that 96.3 per cent and 3.70 per cent participants belonged to male and female gender respectively. It was found that 37.05 per cent, 22.22 per cent 7.40 per cent and 33.33 per cent participants belonged to general caste, backward caste, scheduled caste and scheduled tribe respectively. Majority of the respondents i.e. 51.85 per cent were Post Graduate and above whereas 29.63 per cent and 18.52 per cent belong to Graduate and Intermediate, respectively. It was found that 51.85 per cent and 48.15 per cent belong to small family (i.e. ≤4 families members) and large family (i.e. >4 families members) respectively. It was found that 44.44 per cent of the respondents had low work experience (0-10 years), 14.81 per cent had medium work experience (10-20 years) and 40.74 per cent had high work experience (>20 years). It was found that majority of the respondents i.e. 59.26 per cent were not participated in any training programme on lac. It is inferred that majority of the respondents were having their family monthly income Rs 30,001 and above. Majority of the respondents (77.77%) had monthly income above Rs.30001 followed by 11.11 per cent with monthly income Rs. 10001-20000, 7.40 per cent with monthly income Rs. 20001-30000 and 3.70 per cent with monthly income upto Rs. 10000. Majority of the respondents i.e. 51.85 per cent were not member of any social organization. The finding is in line with the findings of Singh *et al.* (2012).

Degree of knowledge towards lac cultivation: The knowledge level was obtained from the overall mean score of the respondents and based on the mean score, standard deviation was calculated. On the basis of overall mean score and standard deviation, the knowledge levels of the respondents were classified into three categories- below average, average and above average knowledge.

Knowledge level of respondents towards Lac cultivation before training-

In reference of Figure 2, it revealed that

(i) The respondents who obtained the mean score below and equal to 5.4 were classified as having below average knowledge towards the lac cultivation before attending the training programme and their frequency and percentage were 16 and 59.25%, respectively.

(ii) The respondents who obtained the mean score between 5.5 to13.2 were classified as having average

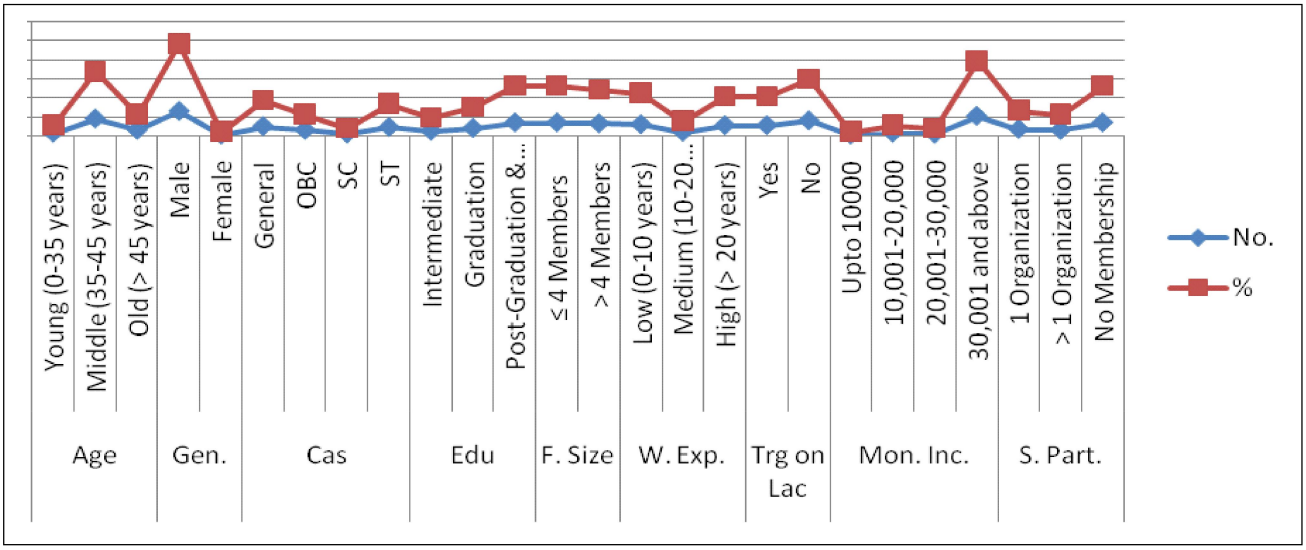

Figure 1: Socio-economic profile of the respondents

knowledge towards the lac cultivation before attending the training programme and their frequency and percentage were 6 and 22.22%, respectively.

(iii) The respondents who obtained the mean score more than or equal to e"13.3 were classified as having above average knowledge towards lac cultivation before attending the training programme and their frequency and percentage were 5 and 18.51%, respectively.

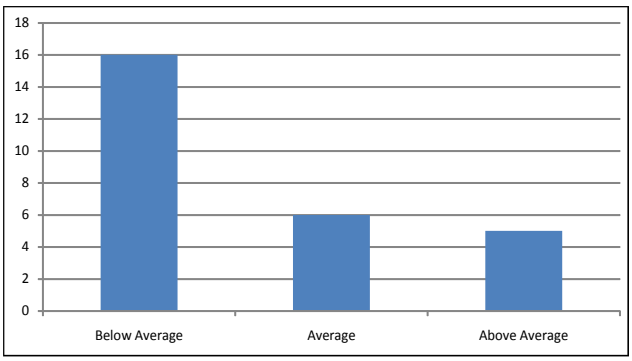

Figure 2: Knowledge level of respondents towards lac cultivation before training

Knowledge level of respondents towards lac cultivation after training-

In reference of Figure 3, it revealed that

(i) The respondents who obtained the mean score below and equal to 17.55 were classified as having below average knowledge towards the lac cultivation after attending the training programme and their frequency & percentage were 8 and 29.62%, respectively.

(ii) The respondents who obtained the mean score between 17.56 to 25.84 were classified as having average knowledge towards the lac cultivation after attending the training programme and their frequency & percentage were 11 and 40.74%, respectively.

(iii) The respondents who obtained the mean score more than or equal to ≥25.85 were classified as having above average knowledge towards lac cultivation after attending the training programme and their frequency & percentage were 8 and 29.62%, respectively.

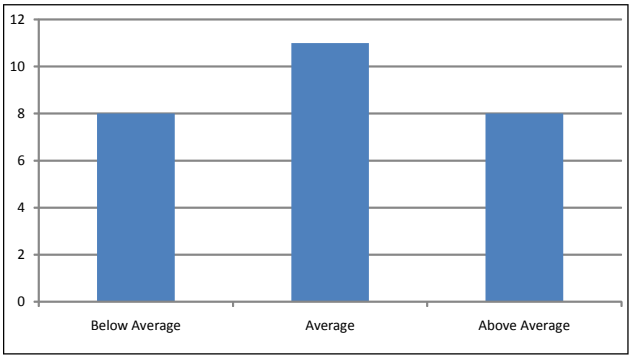

Figure 3: Knowledge level of respondents towards lac cultivation after training

Changes in knowledge level of respondents towards lac cultivation-

In reference of Figure 4, it revealed that

(i) The respondents who obtained the mean score changes in after & before training below and equal to 6.2 were classified as having below average knowledge towards the lac cultivation and their frequency and percentage were 6 and 22.22%, respectively.

(ii) The respondents who obtained the mean score changes in after & before training between 6.3 to 14.7 were classified as having average knowledge towards the lac cultivation and their frequency & percentage were 12 and 44.44%, respectively.

(iii) The respondents who obtained the mean score changes in after & before training more than or equal to ≥14.8 were classified as having above average knowledge towards lac cultivation and their frequency & percentage were 9 and 33.33%, respectively.

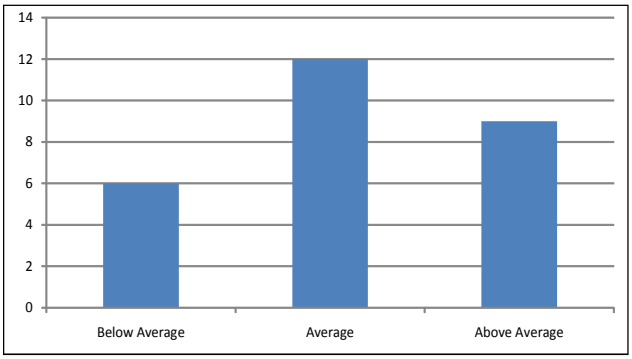

Figure 4: Changes in degree of knowledge level of respondents towards lac cultivation

The above tables and figures shows that majority of the selected respondents have average knowledge towards the scientific lac cultivation and after that respondents have above average knowledge, it means respondents have very optimistic views towards scientific lac cultivation and few respondents have below average knowledge level towards scientific lac cultivation. It also revealed that training programme has positive and

Table 1: Distribution of respondents based on their degree of satisfaction on delivery mechanism (N=27)

Particular	Very well satisfied		Partially satisfied		Partially dissatisfied		Dissat-isfied		Highly dissatisfied	
	No.	%	No.	%	No.	%	No.	%	No.	%
Course content	24	88.88	3	11.11	0	0	0	0	0	0
Coordinator's skill & support	26	96.30	1	3.70	0	0	0	0	0	0
Expression of faculty	20	74.07	7	25.92	0	0	0	0	0	0
Relevance to your needs	21	77.77	6	22.22	0	0	0	0	0	0
Overall learning from the course	20	74.07	6	22.22	0	0	0	0	0	0
Course in general	20	74.07	7	25.92	1	3.70	0	0	0	0

Table 2: Distribution of respondents based on their degree of satisfaction on different aspects of training content and delivery mechanism (N=27)

Particular	Very well satisfied		Partially satisfied		Partially dissatisfied		Dissat-isfied		Highly dissatisfied	
	No.	%	No.	%	No.	%	No.	%	No.	%
Expectation from the course were mostly fulfilled	16	59.25	10	37.03	0	0	1	3.70	0	0
I will recommend this programme to others	21	77.77	4	14.81	2	7.40	0	0	0	0
Proportion of exercises/case studies/ examples was adequate	13	48.14	13	48.14	0	0	1	3.70	0	0
Topics were updated to suit the present scenario	13	48.14	12	44.44	1	3.70	1	3.70	0	0
Additional knowledge was gained due to the programme	23	85.18	3	11.11	0	0	1	3.70	0	0
Resource materials were well organized, useful and adequate	20	74.07	6	22.22	0	0	1	3.70	0	0
Teaching aids used were well prepared and comfortable in viewing	21	77.77	5	18.51	0	0	1	3.70	0	0
Speakers were clear in their presentation & trainees were giving relevant information	24	88.88	2	7.40	0	0	1	3.70	0	0
Participants had enough opportunities to interact with the trainers	16	59.25	10	37.03	0	0	1	3.70	0	0
Training methodologies used were interesting and relevant for the purpose	19	70.37	7	25.92	0	0	1	3.70	0	0
I can use the information learned and skills acquired	21	77.77	4	14.81	2	7.40	0	0	0	0
Medium of instruction	21	77.77	6	22.22	0	0	0	0	0	0
Timely information of day to day action	20	74.07	7	25.92	0	0	0	0	0	0
Atmosphere to exchange idea	19	70.37	8	29.62	0	0	0	0	0	0
Extent to field experience	19	70.37	3	11.11	5	18.5	0	0	0	0

significant effect on extension functionaries' knowledge on scientific way of lac cultivation /practices. The finding is in line with the findings of Kayensuza *et al.* (2014), Khadre *et al.* (2009), Kumar & Jaiswal (2015), Savita *et al.* (2011) and Upadhyay *et al.* (2014).

Level of satisfaction: It was measured in terms of degree of satisfaction of trainees on course contents, methods of training and expression of faculties.

Data from Table 1 showed that more than 85 per cent trainees were very well satisfied with the training contents and Coordinator's skill & support. More than 70 per cent of trainees were well satisfied with expression of faculty, relevance to their needs, overall learning from the course and course in general whereas only one of the trainees was partially dissatisfied with course in general and none of them were dissatisfied or highly dissatisfied. This result implies that the trainees were mostly satisfied with the course content as well as the manner in which training was conducted. The finding is in line with the findings of Singh *et al.* (2012).

Data from Table 2 showed that trainees were very well satisfied and partially satisfied i.e. they had very optimistic views (satisfactory level) towards the programme. More than 80 per cent trainee's expectation from the course were mostly fulfilled, They recommend this programme to others, proportion of exercises/ case studies/ examples was adequate, topics were updated to suit the present scenario, additional knowledge was gained due to the progrmme, resource materials were well organized, useful and adequate, teaching aids used were well prepared and comfortable in viewing, speakers were clear in their presentation & trainees were giving relevant information, Participants had enough opportunities to interact with the trainers, training methodologies used were interesting and relevant for the purpose, use the information learned and skills acquired, medium of instruction, timely information of day to day action, atmosphere to exchange idea, extent to field experience are upto their very well and partially satisfactorily level. Only few trainees was partially dissatisfied or dissatisfied with delivery mechanism of course and none of them were highly dissatisfied. This result implies that the trainees were mostly satisfied with the delivery mechanism of course and manner in which training was conducted. The finding is in line with the findings of Singh *et al.* (2012).

Opinion on support services: Table 3 revealed that Most of the trainees felt that facilities provided during training were satisfactorily in nature. More than 80 per cent of trainees perceived that the support services like food, accommodation, transport, reception at arrival, medical facilities, library facilities, cleanliness, lighting, air- conditioning, teaching equipments are upto their expectations and satisfied during the training programme. This implies that ICAR-IINRG Ranchi had made an adequate arrangement during model training course for trainees. This result implies that the trainees

Table 3: Distribution of respondents based on their degree of satisfaction on support services (N=27)

Particular	Very well satisfied		Partially satisfied		Partially dissatisfied		Dissat-isfied		Highly dissatisfied	
	No.	%	No.	%	No.	%	No.	%	No.	%
Food	8	29.62	14	51.85	5	18.51	0	0	0	0
Accommodation	14	51.85	10	37.03	2	7.40	0	0	1	3.70
Transport	18	66.66	7	25.92	2	7.40	0	0	0	0
Reception at arrival	20	74.07	6	22.22	0	0	0	0	1	3.70
Medical facilities	14	51.85	11	40.74	1	3.70	0	0	1	3.70
Library facility	14	51.85	10	37.03	2	7.40	0	0	1	3.70
Training venue is neat, clean, comfortable and well maintained	20	74.07	5	18.51	2	7.40	0	0	0	0
Lighting was adequate in the venue	22	81.48	5	18.51	0	0	0	0	0	0
Air-conditioning is working well in the venue	12	44.44	10	37.03	3	11.11	1	3.70	1	3.70
The computer, projection and audio facilities in the venue are appropriate for the teaching- learning purpose	25	92.59	1	3.70	1	3.70	0	0	0	0

were mostly satisfied with the delivery mechanism of course and manner in which training was conducted. The finding is in line with the findings of Singh *et al.* (2012).

Opinion on support services: Table 3 revealed that Most of the trainees felt that facilities provided during training were satisfactorily in nature. More than 80 per cent of trainees perceived that the support services like food, accommodation, transport, reception at arrival, medical facilities, library facilities, cleanliness, lighting, air- conditioning, teaching equipments are upto their expectations and satisfied during the training programme. This implies that ICAR-IINRG Ranchi had made an adequate arrangement during model training course for trainees. This result implies that the trainees were mostly satisfied with the course content as well as the manner in which training was conducted. The finding is in line with the findings of Singh *et al.* (2012).

CONCLUSION

Knowledge and experience gained during model training courses will improve the job performance of the participants and ultimately lac cultivars of the country will get benefitted. It is evident from the study that knowledge level of trainees had increased significantly in all aspect of lac cultivation. Meager participation of young trainees in the studied MTCs indicated that extension organizations are deputed middle and senior extension personnel in large number. However, young officers need such training more urgently and encouragement of such participants in these training will be more productive for the nation. Further, the impact of such MTCs on actual adoption of technologies learnt and transferred by the extension professionals need to be assessed for their better refinement in field.

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Received on May, 2015, Revised on August, 2015

Journal of Community Mobilization and Sustainable Development Vol. 10(2), 206-208, July-December, 2015

Role Performance of Rural Women in Agricultural Activities

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ABSTRACT

In Indian society, women have a multi-dimensional role. Rural women play a significant role in agriculture activities such as seeding, transplanting, weeding fertilizer application, plant protection, harvesting, processing, storage etc. The present study was conducted in Morar block of Gwalior district, Madhya Pradesh. Total 120 rural women were selected for the study.Large majority (62.50%) of the respondent had medium level of participation. The finding leads to conclude that participation of rural women in agriculture activities were significant positive relationship with education, farming experience, annual income, extension participation, source of information,attitude toward agriculture and knowledge about agriculture activities. Age and marital status did not exert any association with level of participation in agriculture activities.

Keywords: Role performance, Rural women, Participation and Agriculture activities

INTRODUCTION

Women play pivotal role in agriculture and in rural development.In developing countries among the poor, rural women are the poorest and more vulnerable. For the last few years, programmes for women have been receiving particular attention under community and rural development programmes. The desirable socio-economic development can be achieved only when women in large are stimulated and motivated to accept and adopt new techniques.

The largest number of women in India is engaged in farming operations either as cultivators or as supervisors or as agricultural labourers. They are the main decision makers and participants in various agricultural operations like seed sowing, transplanting, and weeding, harvesting, threshing, application of manure, storage of seeds and food grains and post-harvest home level processing.Apart from all these they also involve in bringing fodder from field, chaff cutting, feeding and cleaning of cattle, maintaining cattle shed, compost making etc. Several of these operations are carried out by women only. Their involvement in agriculture activities varies from region to region and even within a region, their involvement varies widely among different farming system, castes, classes and socio-economic status families. Keeping this view, the present study was under taken with the objectives of to determine the participation of rural women in agriculture activities, toanalyze the relationship between personal traits and participation of rural women in agriculture activities and to find out the suggestions of rural women for enhancing the participation in operation of agriculture activities.

MATERIALS AND METHODS

The research work was carried out in Morar block in Gwalior district of Madhya Pradesh (MP) A list of villages where maximum farm women engaged in agricultural activities was prepared and 10 villages were selected randomly by using the simple random sampling methods. After the selection of the villages, a village wise list of farm women was prepared and 12 farm women from of each village were randomly selected. Thus, the total sample was consisted of 120 farm women.The data were collected through a well structured and pre-tested interview schedule. The statistical tests and procedures were used for analyzing the data, included percentage, mean, Karl Pearson's coefficient of correlation and multiple regressions.

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RESULTS AND DISCUSSION

Participation of rural women in agriculture activities: Participation of rural women in agriculture activities was analyzed of five major activities. Before sowing activities, after harvesting, household activities, livestock activities, marketing activities. In before sowing activities maximum participation was in weeding (72.81 MPS) and it ranked first closely followed by harvesting (57.80 MPS) and sowing in the field (40.23). Similarly finding has been reported by Singh (2011). In before sowing activities maximum participation was found in winnowing (55.81 MPS) and it ranked first closely followed by storage (35.80 MPS). Similarly finding has been reported by Tripathi (2007). In household activities maximum participation was found in cooking (45.80 MPS) and child care (42.60 MPS). Such finding has been by Singh (2011).

Table 1: Participation of rural women in different agricultural activities

Activities	No. of rural women (N=120)	
	M.P.S.	Rank
Before sowing		
Land ploughing	64.12	IV
Selection of seed	40.85	V
Sowing	79.83	III
Manure & Fertilizer	55.43	VI
Irrigation	37.45	VII
Weeding	97.62	I
Plant protection	32.62	VIII
Harvesting	95.59	II
After harvesting		
Winnowing	89.12	I
Storage	69.24	II
Marketing	30.05	III
Household activities		
Cooking	72.25	I
Knitting & stitching	45.42	III
Child care	70.28	II
Livestock activities		
Cleaning cattle shed	85.25	II
Animal vaccination	30.25	IV
Treatment of animal disease	31.25	V
Milking	78.25	III
Dung cake	88.26	I
Marketing activities		
Selling of crops	42.65	III
Selling of agriculture products	69.21	II
Selling of dairy products	74.32	I

Figures in MPS = Mean per cent score

Distribution of the respondents according to their extent of participation in overall agricultural activities: The respondents were categorized into three groupslow, medium and high. The data reveal that large majority (62.5 %) of the respondent had medium level of participation.Similar findings were also reported by Chaudhary and Singh (2003).

Table 2: Participation of rural women in agriculture activities

Category	Frequency	Percentage
Low	25	20.9
Medium	75	62.5
High	20	16.66
Total	**120**	**100.00**
Mean	39.75	
SD	14.95	

Relationship between socio-personal, socio economic, communicational and psychological traits with their participation of rural women in agriculture activities: In this study the relationship of socio-personal, socio-economic, communicational and psychological traits of rural women with their level of participation in agricultural activities, the values of zero order correlation coefficient was calculated and are presented in Table 3. The Table 3 depicts the variables viz., education (0.34**), farming experience (0.22**), annual Income (0.33**), extensionparticipation (0.26**), source of information (0.28**) attitude towards agriculture (0.26**) and knowledge about agricultural activities (0.33**) was found to exercise significant bearing on level of participation in agricultural activities.Age (0.049^{NS}), marital status (0.025^{NS}) did not exert any association with level of participation in agricultural activities. Similar findings were also reported by Tripathi (2007).

Suggestions given by rural women for enhancing their participation in agriculture: A question was asked to rural women for obtaining their suggestion, if any, so they can increase their existing level of participation in agriculture out of 120 respondents 57.64 per cent rural women felt the need of subsidy on seeds, fertilizer and pesticides etc. 22.92 per cent rural women felt the need of irrigation facility on their field, 65.97

Table 3: Correlation coefficient of extent of participation of rural women in agricultural activities with their selected traits

Traits	Correlation coefficient 'r' value
Age	0.04^{NS}
Education	0.34**
Marital status	0.02^{NS}
Farming experience	0.22**
Annual Income	0.33**
Land holding	0.33**
Extension participation	0.26**
Source of information	0.28**
Attitude towards agriculture	0.26**
Knowledge about agriculture activities	0.27**

** Significant at 1% level of probability; * Significant at 5% level of probability

per cent rural women suggested that loan should be granted for farm activities, 60.42 per cent respondents needed training in plant protection measures, 43.06 per cent respondents needed proper and timely supply of inputs like improved seeds, fertilizers and pesticides etc. through co-operative society at village level and 67.36 per cent respondents, demanded for the regular visit of RAEOs in their villages for giving them latest information about agricultural innovations so that they could understand their problems and provide necessary guidance.

Table 4: Suggestions given by rural women for enhancing their participation in agriculture

Suggestions of rural women	Respondents (%)
Subsidy on seeds, fertilizer, pesticides, etc.	57.64
Irrigation facilities on their field	22.92
Loan should be granted for farm activities	65.97
Training in plant protection measures	60.42
Supply of inputs through co-operative society at village level	43.06
Provide latest information about agricultural innovation	67.36

CONCLUSION

The study concluded that the majority (62.5%) of the rural women had medium level of participation in agriculture activities and most of women had always participate in some activities in agriculturesuch as weeding, harvesting, winnowing, storage, making dunk cake, cleaning cattle shed, selling of dairy product. Correlation analysis indicated all the socio-personal, socio economic, communicational and psychological traits factor had significantly positive relationship with education, farming experience, annual income, extension participation, source of information, knowledge about agriculture activities. Expect age, marital status. The reveals that major constraints faced by rural women in agriculture is male dominance, no knowledge about improved technologies was the most important problem. Thus suggestion for enhancing the capabilities of participation of rural women, the problem of rural women in India are multifarious and multidimensional these problem can be solved by enhancing the attitude of family society and nation toward the women.

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Received on May, 2015, Revised on November, 2015

Journal of Community Mobilization and Sustainable Development Vol. 10(2), 209-211, July-December, 2015

Arecanut Market in West Garo Hills District, Meghalaya

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ABSTRACT

Arecanut is an important plantation crop of India. Arecanut plays significant role in the livelihood of the people. It provides income and livelihood security to many people in Meghalaya. In West Garo Hills district most of the villages do arecanut cultivation either for own consumption or for generating income. From selling seedlings to harvested nut, raw as well as fermented nut (*Moja*) they earn their living. The arecanut agents play an important role in trading and marketing of arecanut in West Garo hills district, Meghalaya. The study found that areca nut farmers doesn't have own transport system, no organised market nearby, non availability of systematic information on cultivation, mechanical harvesting tools, frequent fluctuation of price etc. makes the farmers more helpless and their market are limited. Adding value to arecanut and by products can expand the market. Analysis each part of the areca nut plant, one can utilise the by-products of areca nut for making crafts items. Moreover the demand of eco-friendly products is gaining important in global market. The banning of pan-masala, ghutka, areca containing products may make the value added crafts products from areca nut more feasible and may be an option.

Keywords: Arecanur, West garo hills, Value addition

INTRODUCTION

India is the largest producer and consumer of areca nut in the world. It is chewed, both as raw nut and after processing. It occupies a prominent place among the cultivated crops in the states of Kerala, Karnataka, Assam, Meghalaya, Tamil Nadu and West Bengal. Arecanut (*Areca catechu* L.) or commonly known as betel nut is a tropical palm cultivated for its nuts. The plant is tall with slender erect, unarmed and solitary stems living for 60-100 years. Arecanut trees start bearing within five to seven years of planting. Arecanut is also one of the important plantation crops of north eastern states, especially in Meghalaya and Assam, and also plays significant role in the livelihood of the people.Assam stands first in area and production followed by Meghalaya, Mizoram, Tripura and Nagaland (Sandip, 2013). It provides income and livelihood and economic security to many people in Meghalaya. In Meghalaya nuts are harvested either green or when ripe.In West Garo Hills district most of the villages do areca nut cultivation either for own consumption or for generating income. From selling seedlings to harvested nut rawas well as fermented nut (*Moja*) they earn their living.

MATERIALS AND METHODS

The investigation was carried out in West Garo Hills district, Meghalaya. The areca nut of this region is highly demanded because of its taste. The Gambegre block and Rongram block was covered under the study. A total of ninety areca nut farmers from ten villages were taken for the study by random sample technique (Table 1). From each village nine (samples) areca nut farmers were randomly selected for detailed study. A pre-tested interview schedule was used as a tool to collect the primary data from the samples. Secondary data were also collected from concerned and related departments. The areca nut farmers having land holding between two to eight hectares were studied to meet the set objectives of the research.

RESULTS AND DISCUSSION

Arecanut among Garo tribe: Arecanut also known as *Gue* in Garo is being mainly used for chewing the tender or ripe mature nutalong with betel leaf and lime by the

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Table 1: Distribution of number of samples, blocks and villages

Blocks	Villages	No. of samples (%)
Gambegre Block	Lower Darenggre Chengkhuri Darenagal Upper Darenggre Nawalggre	5 x 9 = 45 (50)
Rongram Block	Rongkhongre Meggonggre Lower Rongkhon Edenbari Soragre	5 x 9 = 45 (50)
Total		90 (100)

Source: Primary data

Garo community in West Garo hills district. Offering visitors arecanut with betal leaf is a common social practice among them. Areca cultivation is one of the traditional indigenous agricultural activities in the region. The plant is considered to be as old as the history of the tribes or communities in the region. Arecanut, a palm species grows in a heavy rainfall areas or where frequent irrigation is available. Meghalaya is among the wettest places on earth and is the home of an extra ordinary diversity of people that includes the *Khasis, Jaintia* and *Garo* tribes (Jeeva 2006).

Arecanut Farmers are earning their livelihood from the crop every year. Some of the farmers are getting more than one lakh rupees and above in a season. Major arecanut markets in Meghalaya are Baghmara, Dadengiri, Garobadha, Tura (Sandip 2013). They are again exported to neighbouring states's cities such as Shillong, Silchar, Cherapunji, Lakhimpur and Guwahati. Some farmers used to sell their produce in the local market and weekly market namely Tura, Najing, Rongram.

Marketing: In West Garo Hills District harvesting of the arecanut starts from the month of April to June. The fermented nut *(moja)*is commonly sold in the month of August. When the nuts are fully ripe, matured orange in colour, harvesting is done. For harvesting one to two skilled labours is required to harvest the nut manually and collecting the nuts for a day.

The important factor affecting the quality of arecanut are colour, tenderness, gleam, shape weight, etc. (Kolur, 2012). These are again dependent on the fertility of the soil and timely availability of irrigation/ rain. The arecanut of Darengre village in Gambegre Block is famous because of its taste, size and other quality. Raw fully ripe mature arecanut is more common in West Garo Hills district. 88 percent of the surveyed farmers sell their produce in a raw form. Only 12 percent of farmers do value addition i.e. fermentation of arecanut, these farmers also sell raw nuts. All the farmers sell their produce through arecanut agents. The agents used to collect the nuts from the farmers in their own transport as the farmers doesn't have own transport facility. The agents used to bring own trained labour for harvesting the nuts from the tall arecanut tree. They also bring bag/*bosta* for storing the nuts. The system of marketing arecanut is a bag (*bosta)* system, one *bosta* comprises two bags each bag weighs 50 kg, which is also a quintal system.

Problems: All the studied farmers sell their produce through the arecanut agents since they do not have own transport system. The transportation cost was the highest component accounting for over 45% of the total marketing costs (Chinnappa, 2009). Arecanut agent in West Garo hills district plays a major role in marketing and pricing the arecanut. The arecanut agents act like all in one mobile man in the trading of arecanut. The local farmers felt easy and quite convenient because of the unavailability of own transport system, lack of skilled labour in all the villages, selling raw ripe mature nut is common form of marketing, frequent price fluctuation, price differences within the district, pricing are sometimes decided by the agents etc. Above theses the arecanut trading is mainly done in Mankachar, a regulated market located 53 km away from the main district head quarter. The farmers who sell their produce in local and weekly market is in local *pon* system. One *pon* consist of 80 pieces of arecanuts. Price fluctuation of arecanut in the district is a problem to the arecanut farmers. They are not able to forecast the price independently. The unavailability of transport facility to the arecanut growers make the farmers to sell their produce through middle men/agents.Here the farmer has no role to play to earn more profit rather the deduction of bag/*bosta* price, skilled labour wages etc. by the agents make the farmers more helpless.

Only very few farmers do fermentation (Table 2) process, fermentation of arecanut is a value addition to the products. Value added products have more potential market than traditional ones. The price is more and requires few raw material/investment. The nuts which

Table 2: Distribution of marketing form of arecanut

Form	Frequency (%)
Raw Form	79 (88)
Fermented (*Moja*) form	11 (12)
Total	90 (100)

Source: Primary Data

are fermented in a tank are highly demanded because of its taste. The identified problems for fermentation are time consumption, ants, treatment process etc. Fermentation is done in big bucket, basket or a tank. The time required for fermentation is three to four months. The price is much more as compared to a raw ripe mature nut. Farmers wants to have income as soon as the harvesting of the crop, the reason may be there is no other alternatives for them to earn or any side income. Even if they opt for tank fermentation, the investment on tank is a money question to them. Ants and others insect pests are common in a basket system because the basket is kept under the soil.

Value addition, a potential market: Palms offer a multiplicity of uses in a rural agrarian economy. They provide fodder for cattle, edible fruits, building materials, fuels and fibres (Croucherand Islam, 2002). Arecanut being a palm species has multiple uses. Adding value to arecanut and by products can expand the market. Analysis each part of the arecanut plant many crafts products can be made. Moreover the demand of eco-friendly products is gaining important in global market. The present vibrant e-market or virtual market in the country does add significant advantage for the products.

Starting from the nut, the fermented *(moja)* nuts are highly demanded in the region itself. Farmers should incline towards the products *(moja)* to gain more price and profit. During the study it was found that twenty to twenty five of the nuts are not germinated. They used to throw away those nuts. These nuts can be dried and made into crafts products such as arecanut carving, dolls, traditional miniatures, hair bands, garland, top, bracelet, curtain dangler etc. These products can be made by using simple raw material and small tools. The husk of the nut can also be used for making dry flowers. The product will give a traditional and natural aesthetic look. The leaf of arecanut tree can be used to make disposable plates, bowls, cup, glass etc. Few entrepreneurs already started the venture in the district. The products are highly demanded and can be exported to other neighbouring states such as Manipur, Nagaland, Sikkim etc. Still the large number of leaves is not been fully utilised, It can be made into flower by drying it properly. This also requires simple tools and not much huge investment. The stem of the arecanut tree are used as firewood, poles, irrigating water by slitting in the middle half longitudinally in the district. Some of the stem can be value added for making vase, scale and other decorative items. The interior strips of the stem may be utilised to make incense stick.

CONCLUSION

Arecanut being a perennial plantation crop, its produce should be utilised to the maximum. The farmers in the region can form Cooperative Societies so that the production and market is somewhat organised under the Cooperative Society standards and norms. The Government should developed organised and regulated market for arecanut in all the districts. The banning of pan-masala, ghutka, areca containing products may make the value added crafts from arecanut more feasible. Training on alternatives uses of the arecanut plant should be planned and implemented keeping in mind the easily, cheaply, locally available resources. Such alternative uses namely in crafts should be encouraged. The availability of scientific knowledge of cultivation, variety, pest control, mechanical harvesting machine information, transport system etc. may help the farmers to increase their production and income.

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Received on June, 2015, Revised on November, 2015

Journal of Community Mobilization and Sustainable Development Vol. 10(2), 212-216, July-December, 2015

Extent and Scope of Agriculture Diversification in Baghpat District of Uttar Pradesh

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ABSTRACT

Diversification in agriculture meant for alternative farm production pattern to provide stability in farm income, employment along with minimizing the risk factor. This study was conducted in Baghpat district of Uttar Pradesh, represents the agro-eco-socio situation of western Uttar Pradesh. A total of 300 respondents were taken for the study. Analyzed data revealed that animal husbandry and dairy, vegetable production, floriculture were the main choices of the farmers for diversification, however spices, medicinal plants and pulse were also focused by the sufficient number of farmers for diversification. Major problem in diversification perceived and expressed by the farmers were supporting price, technical guidance, transportation of produce, non availability and adulteration in inputs and lack of developed marketing infrastructure. Farmers suggested that more skill-oriented trainings are required in field of medicinal plants, flowers, vegetables and spices with special reference to plant protection measures, marketing intelligence and post harvest management. How ever some of the farmers were also suggested requirement of regular training on veterinary aspects in animal and poultry.

Keywords: Diversification, Backyard poultry, Crop Intensification and market-led extension

INTRODUCTION

Diversification in agriculture is generally seen as increasing the alternative farm production pattern so that it can provide stability in farm income, regularity in employment generation and minimizing the risk factor. Commercially, the decision of the farmers to grow a particular crop or go for particular farm enterprises depends on price, yield, infrastructure and availability of marketing opportunity. Thus, cropping pattern prevailing at a point of time is a reflection of farmers' decision as directed by facilities, technology and market. The problem faced by the farmers towards diversification confined on assessment of the profitability, possibilities and practicality of diversified component. Farmers have different views about diversification on crop level as well as enterprises level like dairy, poultry and other. But they have a common view that diversification can play a vital role in increase the productivity per unit area with employment generation, it was also stated by Saha *et al.* (2012) and suggested that farmers household with diversified source of income have higher agriculture productivity, input management and human capital like education, communication and awareness which influence for more participation in non farm activities. Diversification is not only important for increase in income and employment generation but it is highly relevant to sustainility of our agriculture production system and environment, it was also noticed by Gill *et al.* (2009) and suggested that Integrated Farming System aims is to increased productivity, profitability along with sustainability, balanced food, generating family income and employment generation round the year, recycling of farm wastes ,clean environment, solving of energy, fuel and fooder crises, increasing in input use efficiency and enhanced oppourinity for agriculture

MATREIAL AND METHODS

The study was conducted in Baghpat district of Uttar Pradesh, all 06 blocks were selected to get the wider representation. Thus finally 50 farmers were selected from each block. Thus 300 farmers whose are cultivating 780 hectare lands were comprises as

respondents for the study, view of the farmers were calculated on the base of choice of farmers expressed by them. A well structured schedule was used to collect the information and opinion of farmers. The trend of diversification was operationalised according to deviation from the base year 1992-93 for measuring the trend and direction of diversification, the data between 1992-93 to 2002-03 and 2002- 03 to 2012-13 were compared and draw the conclusion. The choice of diversification of farmers was opertionlised as an expression about selected diversified component by them like dairy, vegetable, floriculture etc. It was measured in terms of change in area and percentage. Internal diversification towards existing cropping pattern was also quantified. Crop wise area was calculated to measure the trend and extent of diversification with in cropping pattern, same methodology was used by Yadav *et al.* (2000) to quantify the trend and extent of diversification through changing area in different cropping system.

RESULTS AND DISCUSSION

The cropping pattern of Baghpat district by and large is sugarcane based followed by wheat and fooder, all the three crops occupies three fourth of total cultivable area. The area under sugarcane increased from 76000 to 78500 ha and in wheat from 22000 to 22230 ha. However in case of fodder area was slightly decreased 16500 to 16230 ha between 1992-93 to 2012-13 (Sankhayakhi Patrika of Baghpat district) other crops like jawar, bajara, pulses and millets to have lost their relevance in the cropping pattern. The study reveled that farmers are not interested to shift towards orchard even some of the case they are cutting of their established orchard for cultivation purpose that is because management problem and low return from orchard resulting area under orchard decreased upto7.55% and 24.86% during 1992-93 to 2002-03 and 2002-03 to 2012-13 respectively. However they are shifting towards vegetable followed by floriculture. Spices and medicinal plant are the new emerging areas where farmers are focusing due to suitability of these crops in existing cropping system and ruminative price. The data presented in Table 1 and 2 reveals that the farmers tried to diversify towards vegetable and flower during the last two decade. The area under these crops increased up to significant extent. Area under spices and medicinal plants is increasing slowly, however there is slightly increase in agro forestry while area under orchard especially mango orchard decreased drastically. Table 3 and 4 reveals that area under sugarcane and wheat are almost constant during last two decades but significance increase were noticed in area of rice because of popularization of basmati varieties with charming market price. Area under jawar, bajra and other millets decreased drastically while area under potato and other

Table 1: Area and percentage under different direction of diversification between 1992-93 to 2002-03

Crop/ diversification	Total cultivated area (ha) 1992-93	Total cultivated area (ha) 2002-03	% increase
Vegetable	3.36	9.04	188.09
Fruits	15.84	14.64	-7.57
Flower	0.16	1.04	550.00
Medicinal plants	0.04	0.12	200.00
Spices	0.04	0.2	400.00

Table 2: Area and percentage increased under different direction of diversification between 2002-03 to 2012-13

Crop/ diversification	Total cultivated area (ha) 2002-03	Total cultivated area (ha) 2012-13	% increase
Vegetable	9.04	26.40	192.03
Fruits	14.64	11.00	-24.86
Flower	1.04	1.95	87.50
Medicinal plants	0.12	0.14	16.66
Spices	0.20	0.52	160.00

Table 3: Area and percentage increased under different crop through diversification/intensification between 1992-93 to 2002-03

Crop/ diversification	Total cultivated area (ha) 1992-93	Total cultivated area (ha) 2002-03	% increase
Sugarcane	52.20	51.50	-1.3
Wheat	21.00	21.75	3.5
Rice	08.20	09.50	15.85
Fooder	19.80	17.25	-13.28
Potato	3.25	4.20	29.23
Mustard	4.50	4.35	-3.33
Pulses	6.32	6.85	8.38
Any other crop	11.20	14.55	29.91

Table 4: Area and percentage increased under different crop through diversification/intensification between 2002-03 to 2012-13

Crop/ diversification	Total cultivated area (ha) 2002-03	Total cultivated area (ha) 2012-13	% increase
Sugarcane	51.50	54.20	5.24
Wheat	21.75	19.42	-10.71
Rice	09.50	17.50	84.21
Fooder	17.25	14.35	-16.81
Potato	4.20	4.50	7.14
Mustard	4.35	5.50	26.43
Pulses	6.85	6.25	-8.75
Any other crop	14.55	21.55	48.11

vegetable crops increased up to significant level. In case of oilseed and pulses it is almost constant. Some of the farmers successfully adopted more than one component at a time many of them put their view as requirement of multiple choice for diversification, so that they can choose better option as per their resources, intrest and availability of market. Importance of multioption diversification was also suggested by Singh *et al.* (2010) and highlighted that Integrated Farming system model is a basket of option and farmers can choose appropriate combination of enterprises as per their resources and family need. He was also highlighted that marginal and small farmers can integrate less land required enterprises as mushroom, backyard poultry and other like bee keeping in their farming system.

Farmers' choice for diversification: The study revealed that farmers are mostly interested in diversification towards dairy followed by vegetable, floriculture and poultry. Cultivation of spices and medicinal plants is the other choice for diversification. In pulse crops, farmers are growing green gram and black gram as a catch crop between the main crop of kharif and Rabi season. Farmers are very much interested to grow medicinal plant and spices but in lack of knowledge, procurement facility and assured market they are not doing so. During last two decades some farmers show the interest in agro-forestry as popular plantation with their existing cropping system. Choice of farmers is very for diversification as per their resources and availability of market. Most of them have preference for dairy and animal husbandry being a traditional occupation.Vegatable cultivation and floriculture are another preferable area for diversification. Land less farmers show keen interest in less land required occupation like backyard poultry. Importance of backyard poultry for land less farmers was also found by Aahirer *et al.* (2015) and suggested that diversification in agriculture with component like backyard poultry can help in enhance the family income, employment generation with insured the enrich diet for family member and promote the gender equity

Status of livestock: Diversification and mechanization in agriculture directly and indirectly effecting in number of livestock. In last four decades the population of buffaloes almost same as before. But the population of cattle declined from 1913 to 2012 the population of poultry and pig is just increased. The reason behind decreasing the number of cattle is mechanization in agriculture; due to mechanization farmers are frequently replacing the bullock power by tractor. Numbers of buffalos are all most constant because of their utility in draw the bluck cart and high yielding milk capacity as compare of cattle (Table 6).

Table 5: Trend of crop diversification through various agronomic mechanism between 1992-93 to 2002-03 and 2002-03 to 2012-13

Crop/diversification	Total diversified area (ha) 1992-93 to 2002-03	% share in diversification	Total diversified area (ha) 2002-03 to 2012-13	% share in diversification
Complete Diversification	72.50	9.93	86.00	11.02
Through Intensification	5.00	0.64	22.00	2.82
Through Intercropping	4.80	0.61	9.75	1.25
Through Agro forestry	1.25	0.16	1.80	0.23
Through Multicropping	2.80	0.35	4.80	0.61
Total diversified area	86.35	11.59	124.35	14.93
Total area-780 hectare				

Table 6: Status of livestock

Livestock	Year				
	1972	1982	1992	2002	2012
Cattle	1913	1705	1228	504	312
Buffalo	1404	1509	1603	1511	1573
Piggery	38	42	37	28	13
Goat	106	96	88	90	73
Sheep	36	48	43	41	33
Poultry	54	64	72	108	218

Diversification with in crop production: Diversification with in crop production is a continuous process runs with crop cultivation. Farmers are using much way to do so as Complete Diversification, Intensification, Intercropping and Multicropping pattern. Among those agronomic techniques Complete Diversification covered maximum Diversified area that is 9.93 % during 1992-93 to 2002-03 and 11.02 during 2002-03 to 2012-13. But now Intensification and Intercropping of high ruminative crops with main crop are being popularize. Because of this practice farmers are getting additional return with the same cost of cultivation. Same thing was noticed by Kumar *et al.* (2015) and concluded that intercropping of onion with autom planting sugarcane provided more than one lack additional monitory gain without any extra cost of cultivation (Table 7).

Training needs assessment: It is revealed in Table 8 that farmers indicated relatively more need of training in vegetable crops, floriculture, medicinal plants, spices and post harvest technology. They required relatively more emphasis on the aspect of plant protection, input management and marketing inelegancy especially in case of flower, vegetable, spices and medicinal plants. Farmers who are associated with animal husbandry and poultry are highly interested for training on veterinary aspect and vaccination. Kumar *et al.* (2013) draw the conclusion that every component of farming system has necessity of specific training so that diversified component can take place as an economically viable and sustainable enterprise. Quality training not only required for farmers but also has to be arrange for extension personal so that they can equip them self with new advancement for further transfer of gained knowledge. The importance of training for extension workers was highlighted by Sodengi *et al.* (1991) and suggested it must be future thrust for extension system.

Table 7: Choice of farmers for diversification (N=300)

Kind of diversification	Frequency	Percentage	Ranking
Vegetable	162	21.95	II
Fruit	18	2.43	VII
Mushroom	12	1.62	X
Flower	86	11.65	III
Spice	56	7.58	V
Medicinal plants	42	5.69	VI
Pulses	76	10.29	IV
Dairy	202	27.37	I
Fisheries	16	2.16	VIII
Beekeeping	12	1.62	X
Piggery	14	1.89	IX
Poultry	42	5.69	VI
Sericulture	-	-	-
Total	738	100	

Constraint in diversification: Majority of the farmers is convinced by advantage of diversification but they

Table 8: Training needs of farmers in different diversified area (N=300)

Kind of diversification	Frequency	Percentage	Ranking
Vegetable and Fruit	126	17.16	I
Dairy and animal husbandry	74	10.08	V
Crop based technology	85	11.58	III
Flower and ornamental plants	78	10.62	IV
Spice and medicinal plants	54	7.35	VII
Poultry and Fisheries	26	3.54	XI
Marketing Intelligence	52	7.08	VIII
Procurement and post harvest management of produced	103	14.03	II
Integrations of various component in a single farming system	39	5.31	IX
Vaxination in animals and birds	34	4.63	X
Mechanization part of agriculture	63	8.58	VI
Total	734	100	

Table 9: Constraint facing by farmers in diversification (N=300)

Kind of constraint	Frequency	Percentage	Ranking
Financial	216	20.70	I
Technical	162	15.53	III
Extension	105	10.06	IV
Transportation	42	4.02	IX
Marketing	192	18.40	II
Storage	76	7.28	VI
Grading and packaging	35	3.35	X
Input Management	28	2.68	XI
Wild Animal	49	4.69	VIII
Initiation	84	8.05	V
Theft and any other kind of damage	54	5.17	VII
Total	1043	100	

are not in action mode because of constraints facing by them. Lack of financial and marketing support are the major hurdle in diversification (Table 9). However lack of sufficient knowledge about desirable diversified area and extension support were also identified by most of the farmers as another serious problem. It was also noticed by Udai *et al.* (2012) and Kumar *et al.* (2010).

Suggestion for diversification: Following suggestion can be made for promote the diversification as given below:

1. Starting of marketing hub in rural area.
2. To open the chain of cold storage and go down in near by production zone.
3. Strengthen of specific and commodity based extension service.
4. Frequently and need based skill oriented training.
5. Insured the availability of credit.
6. Networking of transport and communication facilities.
7. Risk covers policy like crop and animal insurance.
8. Promote the post harvest technology.
9. Promote the market-led extension instead production based extension.

CONCLUSION

The study indicated that farmers are convinced about necessity of the diversification in present challenging scenario, most of them feel that diversification is only way to increase the productivity per unit area with opportunity of employment generation. Most of the farmers think that being a part of NCR they have bright opportunity for diversification same time they feel that they are not utilizing that opportunity. Therefore, the diversification is the need of the hour and needs serious attention to implement it at the wider scale.

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Received on June, 2015, Revised on December, 2015

Journal of Community Mobilization and Sustainable Development Vol. 10(2), 217-220, July-December, 2015

Credit Utilization Pattern of Members of Women SHGs and their Involvement in Decision Making in Udaipur, Rajasthan

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ABSTRACT

Despite progress in several key indicators, women generally have no control over land and other productive assets, which largely excludes them from access to institutional credit and renders them dependent on high-cost informal sources of credit to secure capital for consumption and/or production purpose. To address to this pressing problem, the concept of Self Help Groups (SHG) gained momentum with thrift and credit activity in the last three decades and many SHGs have emerged in India. On this backdrop, present study attempted to explore the involvement of women members on these aspects. The study was conducted in Udaipur district of Rajasthan covering 20 SHGs (10 each organization formed by government and non-government organisation). The results highlighted that majority of the respondents from both GO and NGO (91.11 and 87.77%, respectively) availed credit from the groups for purchase of agricultural inputs, entrepreneurial activities, purchase of household items and animals.Cent per cent members from both GO and NGO had involvement 'to a great extent' in decisions related to credit requirement. The utilization of credit for entrepreneurial activity was relatively low (29-31%), that needs to be addressed so that the credit could be utilized to increase the participation of women into productive ventures, thereby increasing their sources of income and making women economically self dependent.

Keywords: SHGs, Rural Women, Credit utilization

INTRODUCTION

Women are vital part of the Indian Economy, constituting one–third of the national labour force and a major contributor to the survival of the family, especially in rural areas. Credit provision is one of the principal components of rural development, which helps to attain rapid and sustainable growth.There is no doubt about the crucial roles of credit in economic development (Sllase and Teklehaimanot, 2013). "Access to credit" for under privileged groups (rural and urban poor, women, tribal, youth) has always been a major concern in the development field. Despite the existence of formal financial institutions, the issue has not been resolved. In many developing countries, policy makers and planners have conceived and formulated variety of programmes to provide easy access to credit, especially micro-credit.

India has taken the initiative by evolving specific micro-credit programmes to cater to the needs of the poor populations (rural/tribal/urban slum). Since micro-credit provides self-employment opportunities and awareness for self-reliance to people, it has undoubtedly become a very useful tool for economic development, especially at the grassroots level.Over the last few decades, efforts have been made to increase the credit flow to the poor through several micro-credit initiatives. However, very little is known about the credit flow to the poor through these initiatives. Amongst these, the creation of women's self-help groups (SHGs) has been the most prominent and widespread programme in action. These programmes attempt to mobilize savings through group formation, followed by a focus on making the groups able to manage themselves. Non-government organizations (NGOs) have successfully supported thousands of such SHGs

all over the country. Most of these groups are satisfying their consumption needs through management of their savings, and a few women have taken up micro-enterprises/business with financial support from their SHGs.

MATERIAL AND METHODS

The present research was conducted in purposively selected villages of Udaipur district, Rajasthan as maximum number of NGOs are working in this region and have formed SHGs. Groups have also been formed by government organizations (GO) in this area. Two organizations, one Government [District Women Development Agency] and one Non-Government [Indian Farm Forestry Development Cooperative Ltd.] having maximum number of SHGs formed under them, were taken up for study purposely.

The selection of women SHGs from these organizations was purposive on the basis of maximum number of years of standing. In all, 20 SHGs (10 from GO and 10 from NGO) were taken up. From each group, 8 members and one group leader were drawn on random basis. The respondents constituted of 10 group leaders and 80 women members from each GO and NGO. Thus, the sample size constituted of a total of 180 respondents (20 group leaders and 160 members). Interview schedule was used for data collection which was standardized with the help of experts and pre-tested. Reliability and validity of the tool was tested using applicable scientific methods. Data were collected with the help of personal interview. Besides, available literature i.e. benchmark survey report, quarterly and annual reports of the identified organizations, were also referred to. The data were analysed using distribution statistics.

RESULTS AND DISCUSSION

Credit facilities availed from group: It is apparent from Table 1 that majority of the respondents from both GO (91.11 per cent) and NGO (87.77 per cent) had availed credit from the group. It indicates that the SHG helps to meet out the credit demands of respondents. Moreover, it is one of the important motivating factors for women to become a member of SHG. There were a very few respondents (8.88 and 12.22 per cent) from GO and NGO, respectively, who did not avail this facility. Further, when these respondents were asked the reasons for not taking up credit, the major reasons reported were that they did not feel the need for credit (8.88 per cent), and were satisfied with monthly saving (8.88 and 12.22 per cent).

Table 1: Distribution of respondents on the basis of availing and not availing the credit facilities from the group (N=180)

Aspect	Beneficiaries	
	GO(n=90) F(%)	NGO(n=90) F(%)
Credit Availed from Group		
Yes	82(91.11)	79(87.77)
No	8(8.88)	11(12.22)
Reasons for not availing credit facilities		
Did not feel the need	8(8.88)	8(8.88)
Satisfied with monthly savings	8(8.88)	11(12.22)
Did not take up entrepreneurial activity	3(3.33)	7(7.77)

Purpose of availing credit from SHG: Information pertaining to this aspect is presented in Table 2. It was observed that the credit needs of rural women are basically diversified and mostly they need credit for consumption purpose rather than production. From the data presented in Table 2 it is apparent that the women from government SHG took loans mainly for purchase of agricultural inputs (28.88 per cent), entrepreneurial activity (28.88 per cent), purchase of household items

Table 2: Purpose of availing credit facilities by the members (N=180)

Purpose of availing credit	Beneficiaries	
	GO (n=90) F*(%)	NGO (n=90) F*(%)
Marriage	12(13.33)	0(0.00)
Medical treatment of family members	10(11.11)	11(12.22)
Construction and repair of house	6(6.66)	2(2.22)
Purchase of household items	20(22.22)	5(5.55)
Purchase of agricultural inputs	26(28.88)	15(16.66)
Purchase of land	0(0.00)	12(13.33)
Purchase of animals	19(21.11)	44(48.88)
Education of children	5(5.55)	4(4.44)
At the time of birth/death in family	7(7.77)	0(0.00)
For entrepreneurial activity	26(28.88)	28(31.11)
Deepening of well, construction of manger, wage payment	2(2.22)	3(3.33)
To clear old debts	17(18.88)	4(4.44)

* Multiple response

(22.22 per cent) and purchase of animals (21.11 per cent). On the other hand, the loans were basically taken for purchase of animals (48.88 per cent) and for entrepreneurial activity (31.11 per cent) by women members of NGO.Valentina (2014) also brought to light the fact that in India there is a skewed rise in the number of SHGs formed and government programmes schemed in favour of women but the ground realities are that they are not successful in establishing and organising their enterprises and their income levels remain paltry sums.

Extent of involvement of members of SHG in decision making: Decision making as an important indicator of empowerment has greatly been emphasized by various scholars (Srinath and Thangamani, 1993; Chamberlin, 1999; Singh and Sharma, 1999; Singh and Jhamtani, 1999). In the present study, the extent of involvement of members of SHG in decision making with regard to credit requirement was assessed. The responses of the members of SHG in credit requirement were recorded in three categories i.e. 'to a great extent', 'to some extent' and 'no involvement' and accordingly the members were distributed. It was found that the sense of belonging to a group and having some money on her name had added to the confidence of women members. Women feel more confident and assertive when decisions on matters related to the way to spend her saving comes. Having been motivated to start enterprise has also been on her will since the SHG have opened new avenues to her and the exposure she has got has helped her become a chooser.

Table 3:Extent of involvement of members of SHG in decision making with respect to credit requirement (N=180)

Type of SHG	Extent of involvement of members in decision making		
	To a Great Extent F (%)	To some extent F (%)	Not at all F (%)
GO (n=90)	90(100.00)	0 (0.00)	0 (0.00)
NGO (n=90)	90(100.00)	0 (0.00)	0 (0.00)

The Table 3 presents extent of involvement of members of SHG in decision making with respect to credit requirement. It indicates an encouraging picture that clearly portrays that when it came to decisions on credit requirement, all the members of GO (100.00 per cent) and NGO (100.00 per cent) were involved in the decision making to a great extent.It is imperative to note that the SHG women members had savings in their name. Due to these savings, it gave them a sense of ownership on this money. Therefore, the exemplification of which was visible by the cent per cent responses of women members on decision making with regard to credit requirement.

CONCLUSION

The SHGs have opened up doors for rural women to avail credit from their groups without cumbersome formalities and collateral. Majority of the women respondents from both government and non government SHGs took loans from their groups. There were very few respondents who did not avail credit. This clearly highlights the importance of SHGs in fulfilling the credit demands of the rural women. The loans were basically utilized by nearly one fourth of the respondents in both the groups for purchase of agriculture inputs, entrepreneurial activity, purchase of household items and animals, etc. The utilization of credit for entrepreneurial activity was low. Thus, there is an urgent need to ponder on these aspects so that the credit could be utilized to increase the participation of women into productive ventures, thereby increasing their sources of income and making women economically self dependent. The rural women need to be educated, trained, supported and promoted in the functioning of SHGs, banks transactions and all aspects of entrepreneurial activities so that women can run these activities on sustainable basis as they have easy access to credit facilities through the SHGs.

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Received on June, 2015, Revised on November, 2015

Journal of Community Mobilization and Sustainable Development Vol. 10(2), 221-224, July-December, 2015

Development of Scale to Measure Attitude of Farmers towards Rapeseed Mustard Crop

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ABSTRACT

This paper dealt with the steps involved in developing and standarizing a scale for assessing the attitude of farmers towards rapeseed mustard crop based on Rensis Likert's summative rating technique (1932) in Jammu division of Jammu & Kashmir.The scale consisted of final 16 items out of the initially selected 40 items in which positive and negative statements were arranged on five point continuum. These five points were strongly agree, agree, undecided, disagree and strongly disagree comprising score 5,4,3,2,1, for positive statements and 1,2,3,4,5 for negative statements.The reliability and validity of the scale indicates its consistency and precision of the results. Reliability of the scale was tested using split half method and reliability coefficient was 0.96.This scale can be used to measure farmers' attitude beyond the study area with suitable modifications.

Keywords: Attitude, Rapeseed Mustard, Likert's Summated Rating, Reliability, Validity

INTRODUCTION

Among the nine edible oilseed crops in India, rapeseed mustard possesses a significant position. Rapeseed mustard group mainly consists of toria *(brassica rapa)*, raya *(brassica juncea)* and gobhi sarson *(brassica napus)*. In India, it contributes nearly 80% of the total *rabi* oilseed production. Area under rapeseed mustard is 6.3 million ha with a production of 7.4 metric tonnes and productivity of 11.76 q/ha (Directorate of Rapeseed Mustard Research, 2013). In terms of rapeseed mustard productivity, global ranking of India is 28th (Bhardwaj, 2013). There is variation in the production and productivity of rapeseed mustard in different states. In Jammu & Kashmir (J&K) state, rapeseed mustard production scenario is not very encouraging despite its paramount importance for human beings and animals. The productivity of rapeseed mustard in J&K is 6.98 q/ha. (Department of Agriculture, 2013), which is far less than the national average. It has been proved by researchers that attitude is a single factor which is responsible for adoption or rejection of any new idea. Attitude has been defined "as the degree of positive or negative affect associated with some objects" (Edwards 1969). The object for the present study has been conceptualized as rapeseed mustard crop. The success or failure of any programme or activity to a large extent depends on the favourable attitude of its clientele towards the proposed programme. Measuring this variable provide basis for desirable change in existing system. Considering this, an attempt has been made to develop a scale to measure attitude of farmers towards rapeseed mustard crop which may be used by researchers and extension workers as well.

MATERIALS AND METHODS

Attitude is an organized predisposition to think, feel, perceive and behave towards a cognitive object. Attitude in this study was operationalized as the degree of positive or negative feeling of farmers towards rapeseed mustard crop. There are several techniques available for constructing attitude scale but all of them were not equally useful for the present study. While, looking into the need of present investigation and effectiveness of

the available techniques of scale construction, only Likert's summated rating scale (1932) was considered most appropriate, as it requires less number of items and judges to start with. The steps for Likert's summated rating scale construction are as under:-

Item collection: The items making up an attitude scale are known as statements. A statement may be defined as anything that is said about a object. As a first step, for developing attitude scale, a large number of statements about rapeseed mustard crop collected from books, bulletins, magazines and by holding discussion with subject matter specialists as well as personnel of agriculture department. A tentative list of 40 statements was prepared keeping in view the availability of statements suited to the area of study.

Editing of items: The statements so collected were carefully edited, revised and restructured in the light of informal fourteen criteria suggested by Edwards (1969). These statements were framed in such a way that they expressed the positive or negative attitude. In order to get a five point judgment five alternative response categories ranging from strongly agree to strongly disagree were assigned to each statement. The statements collected about rapeseed mustard crop were further discussed with extension specialists. They were asked to add, delete or modify any statement which they deemed fit for inclusion or deletion. Again the statements were rewritten in the light of comments of the experts. After editing, total numbers of 27 statements were retained for further analysis. These statements were classified as positive and negative. These statements were found to be nonambiguous and non-factual.

Translation of edited statements into local dialect: Before administering these statements to farmers, all the final edited statements were translated into local dialect to avoid any misunderstanding on the part of respondents in understanding the content of each statement. This process also helps in avoiding ambiguity if any in the statements and helps in proper understanding of the attitude of the respondents towards object.

RESULT AND DISCUSSION

Item analysis (Computation of t-value): Analysis of the statements is really an important step in the construction of a valid and reliable scale. For this purpose selected 27 statements were subjected to item analysis to delineate the items based on the extent to which they can differentiatethe respondent with favorable attitude than those with unfavorable attitude towards rapeseed mustard crop. For computation of t-value list of 27 selected & translated statements was administered to 52 non-sampled farmers from study area. The farmers were taken as judges in the present study. The responses from them were elicited on a five point continuum namely, strongly agree, agree, undecided, disagree and strongly disagree. If the item was positive (favorable to the subject under study) strongly agree was given the numerical value of strongly agree 4, agree 3, undecided 2, disagree 1 and strongly disagree 0. While in case of negative items (unfavorable to the subject under study) the scores were reversed. The score for each individual respondent was obtained by summing up the scores over all items. Considering the total score earned by each respondent they were arranged in descending order. Then 25 percent i.e. 13 of non-sampled farmers with the highest total score and also 25 percent i.e.13 of them with the lowest total score were selected. These two groups provided the criterion groups as "high" and "low" groups to evaluate the individual item. 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).

$$t = \frac{X_H - X_L}{\sqrt{\frac{\Sigma(X_H - X_H)^2 + \Sigma(X_L - X_L)^2}{n\,(n-1)}}}$$

Where,

$$\Sigma(X_H - X_H)^2 = \Sigma X_H^2 - \frac{(\Sigma X_H)^2}{n}$$

and $$\Sigma(X_L - X_L)^2 = \Sigma X_L^2 - \frac{(\Sigma X_L)^2}{n}$$

Whereas,

ΣX_H^2 = Sum of the squares of the individual scores in the high groups.

ΣX_L^2 = Sum of the squares of the individual scores in the low groups.

X_H = the mean score on a given statement for the high group.

X_L = The mean score on a given statement for the low group.

n = Number of respondents in each group.

Table 1: List of Attitude statements towards mustard cultivation with their't' value

Statements	t – value
Rapeseed mustard is an important crop in cropping pattern.	1.58
Rapeseed mustard crop fulfills the oil requirement of the family.	1.80
Rapeseed mustard cultivation is economical as compared to other crops grown in the same season.	2.26
Rape seed mustard crop is more prone to attack of insects.	2.07
Rape seed mustard crop is more prone to attack of diseases.	1.27
Farmers are more interested in cultivation of improved rapeseed mustard varieties.	2.19
Un-riped rape seed mustard is nutritious.	1.27
Rape seed mustard cultivation is beneficial for those farmers having assured irrigation facility.	1.60
Rape seed mustard cultivation depends upon size of land holding.	3.34
Rape seed mustard cultivation is not being properly promoted by Govt.	2.84
Rape seed mustard cultivation affects the income of the farmer.	0.67
Rape seed mustard crop affects the fertility of the soil.	1.17
There is less advantage in rapeseed mustard crop as compared to other grain crops grown in the same season.	2.38
Farmers are not cultivating rapeseed mustard crop due to other beneficial crops.	2.00
There is no surety of higher prices of rapeseed mustard crop.	1.68
Good rapeseed mustard cultivators can motivate the fellow farmers to adopt its cultivation.	2.33
Rape seed mustard crop cultivation is costly.	3.33
Rape seed mustard alone is a good source of green fodder.	0.31
Rapeseed mustard stubbles are good source of fuel.	1.48
Rapeseed mustard cultivation is not safe.	0.00
Rapeseed mustard cultivation needs technical skill.	2.40
Future of rapeseed mustard cultivation is bright.	1.02
Rapeseed mustard cultivation requires less Inter-cultivation practices.	2.23
Farmers with small family size do not cultivate rapeseed mustard crop.	1.87
Rapeseed mustard cultivation is possible in rain fed areas also.	2.33
Inputs required for rapeseed mustard cultivation is not easily available.	1.83
Rapeseed mustard cultivation is complex.	1.96

Selection of items for inclusion in final scale: The value of critical ratio 1.75 was observed to be significantly differentiating between "high" and "low" group. The statements having t- value equal to or greater than 1.75 were selected for inclusion in the final format of the attitude scale. By this procedure 16 items were retained and included in the final format of attitude scale as shown in Table 2.

Standardization of the scale: For the purpose of standardization, validity and reliability of the scale was ascertained as following.

Reliability of the scale: A scale is reliable only when it gives consistently the same results when applied to the same sample. There are various methods to determine the reliability of the scale but here split-half method was used for this purpose. The scale was administered to 26 respondents and was divided into two halves based on odd and even numbers of statements. The total score obtained for odd and even numbered items were subjected for the calculation of correlation coefficient (r) on the scores of even numbered items and the scores of odd numbered items. The resulting value of r is considered as split half reliability. It was observed that split half reliability was .To adjust the reliability into full test reliability, Spearman Browns prophecy formula (Kerlinger, 1973) was used .The full test reliability was 0.98.Hence the scale was considered to be reliable.

$$\text{Correlation coefficient}(r) = \frac{N\ \Sigma X_i Y_i - \Sigma X_i \Sigma Y_i}{\sqrt{N\Sigma X_i^2 - (\Sigma X_i)^2}\ \sqrt{N\Sigma Y_i^2 - (\Sigma_i)^2}}$$

Validity: Validity of a scale is the property that ensures that the obtained scale measures the variable it is supposed to measure. The validity of the scale was tested in the following way.

Table 2: Final standardized scale to measure the attitude of farmers towards rapeseed mustard crop

Statements	t-value
Rapeseed mustard cultivation is economical as compared to other crops grown in the same season.	2.26
Farmers are not cultivating rapeseed mustard crop due to other beneficial crops. (-ve)	2.00
Rapeseed mustard crop fulfills the oil requirement of the family.	1.80
Rape seed mustard cultivation is not being properly promoted by Govt. (-ve)	2.84
Rape seed mustard cultivation depends upon size of land holding.	3.34
Farmers are more interested in cultivation of improved rapeseed mustard varieties.	2.07
There is less advantage in rapeseed mustard crop as compared to other grain crops grown in the same season.(-ve)	2.26
Rape seed mustard crop is more prone to attack of insects.	2.07
Farmers with small family size do not cultivate rapeseed mustard crop. (-ve)	1.87
Rapeseed mustard cultivation requires less Inter-cultivation practices.	2.23
Inputs required for rapeseed mustard cultivation is not easily available. (-ve)	1.83
Rapeseed mustard cultivation needs technical skill.	2.40
Progressive rapeseed mustard cultivators can motivate the fellow farmers to adopt its cultivation.	2.33
Rape seed mustard cultivation is costly.-ve	3.33
Rapeseed mustard cultivation is possible in rain fed areas also.	2.33
Rapeseed mustard cultivation is complex.(-ve)	1.96

Content validity: The scale was examined for the content validity by determining how well the content of the scale represented the subject matter under study. As all the possible items covering the universe of content were selected by discussions with experts, subject matter specialists and from all the available literature on the subject, the scale satisfied the content validity.In this way the scale for measuring the attitude of the respondents towards rapeseed mustard crop is ready for its final use.

Standardized final scale: The final scale consists of 16 statements about rapeseed mustard crop. The responses had to be recorded on a five point continuum representing strongly agree, agree, undecided, disagree, and strongly disagree with scores of 4, 3, 2, 1 and 0 for 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 maximum obtainable score according to the present attitude scale is 64, whereas minimum obtainable score is 0.

CONCLUSION

Attitude is the enduring system of cognitive component. Attitude plays vital role in influencing behavioural components. Item analysis, reliability and validity test are the important statistical tests for developing and standardizing attitude scales. Item analysis is to be done for selection of statistically appropriate subjects which can differentiate the respondents with positive attitude to negative attitude. Thus it can be concluded that finally selected items are highly statistically fit for the measuring attitude of farmers towards rapeseed mustard crop. The reliability and validity values of the scale show the precision and consistency of the scale therefore, it can be concluded that the entire scale is highly reliable and valid for further application. This scale can be used to measure the attitude of farmers towards rapeseed mustard crop beyond the study area with suitable modifications.

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Received on August, 2015, Revised on December, 2015

Journal of Community Mobilization and Sustainable Development Vol. 10(2), 225-228, July-December, 2015

A scale to measure the attitude of Veterinary Officers and Livestock Extension Officers under State Department of Animal Husbandry Towards Rendering the Services to the Women Livestock Farmers

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ABSTRACT

Livestock extension service delivery is under the control of State Department of Animal Husbandry (SDAH) and the services are provided through vast network of veterinary hospitals, A.I. centres and rural livestock units which employ large number of Veterinary professionals, Livestock Extension Officers and other para-veterinary staffs. One major approach to determine the effectiveness of livestock extension service delivery by Veterinary Officers and Livestock Extension Officers is starts with the attitude of these personnel towards livestock extension service delivery. The present study has been carried out to develop and standardize a scale for measuring the attitude of livestock extension service providers under State Department of Animal Husbandry towards rendering the services to the women livestock farmers in central plain zone of Uttar Pradesh. The scale was constructed by following Likert (1932) summated rating scaling technique. Data were collected by personal interview from 120 State Department of Animal Husbandry personnel (60 Veterinary Officers and 60 Livestock Extension Officers). The study revealed that majority of the personnel had moderately favorable attitude towards rendering the livestock extension services to women livestock farmers.

Keywords: Livestock extension services, Attitude, State department of animal husbandry, Summated rating scale

INTRODUCTION

Livestock extension services play an important role to empower farmers with appropriate technological knowledge and skills through various extension education and training programmes. The livestock extension services, unlike agricultural extension, have not been well organized and often, are inseparable from the ongoing field activities such as veterinary health care and breeding services. These services include transfer of technology (Research institutions to Farmers) and strengthening of various infrastructure and support services, while building the capabilities of the stakeholders. These services aims to assisting farmers through an educational process to improve livestock farming methods and techniques, strengthen the infrastructure and services to increase production efficiency, income and enable them to enhance their quality of life. In India, since independence, the livestock extension service delivery is under the control of State Department of Animal Husbandry (SDAH) and the services are provided through vast network of veterinary hospitals, A.I. centres and rural livestock units, which employ large number of veterinary professionals, livestock extension officers and other para-veterinary staff. One major approach to determine the effectiveness of livestock extension services delivery by Veterinary Officers (VOs) and Livestock Extension Officers (LEOs) is starts with the attitude of these personnel. As technology improves by the day, several approaches have evolved and been applied to ensure

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effective dissemination of livestock extension services, so as to improve the livelihood of women farmers. Hence, the present study was contemplated with the objective of developing and standardizing a scale for measuring the attitude of livestock extension service providers under State Department of Animal Husbandry towards rendering the services to the women livestock farmers.

MATERIALS AND METHODS

Attitude was operationalized as the degree of positive or negative feeling of State Department of Animal Husbandry personnel towards rendering the livestock extension services to women livestock farmers. Summated rating method as suggested by Likert (1932) was followed in the development of scale. The following points were considered for measuring the attitude of SDAH personnel towards rendering the livestock extension services to women livestock farmers. Steps followed in the development of attitude scale:

Collection and editing of statement: A list of 102 statements was made after thorough review of literature on livestock extension service delivery. The statements were carefully edited in light of criteria suggested by Edwards. After editing out of 102 statements, 87 statements were retained.

Relevancy of statements: List of 87 selected statements was sent to panel of judges. Judges comprised experts in the field of extension education of various ICAR institutes, veterinary and agriculture universities. The statements were sent to 100 judges with request to critically evaluate each statement for its relevancy to measure attitude of SDAH personnel towards delivering the livestock extension services to women livestock farmers.

The Judges were requested to give their response on a five point continuum *viz.,* highly relevant, relevant, neutral, irrelevant and highly irrelevant with scores 5, 4, 3, 2 and 1 respectively.

Out of 100 judges only 67 responded in a time span of 2 month. The relevancy score of each statement was ascertained by adding the scores of all the 67 judges responses. Based on the scores given by the judges to each statement, mean value of each statement was calculated. From mean value of each statement, mean value of all statements were calculated which was found to be 3.02. All the statement having mean value greater than 3.65 were selected in the first step. To increase the relevancy a second step was incorporated as indicated by Kavitha (2007). In the second step, the mid-point of the five points continuum ranging from 67 to 335 the minimum and maximum possible score for each statement respectively, was found out and this point was assumed as the cut off for the final selection of statements. The mid point being 201 the item having score above 201 were taken for evaluation of 't' value. After this 40 statements were retained.

Item Analysis, Scoring and Calculation of 't' value: The items selected (40 statements) were used to collect responses from 60 SDAH personnel from non-sample area through direct interview. The respondents were asked to indicate the degree of agreement or disagreement on a five point continuum namely strongly agree, agree, undecided, disagree and strongly disagree with the weightages of 5, 4, 3, 2 and 1 for positive statements and 1, 2, 3, 4 and 5 for negative statements, respectively. The score were summed up to get the total score of each statement for all respondents. Thus, the obtained scores were arranged in the descending order. For the purpose of item analysis, 25 per cent of the respondents with highest total scores and 25 per cent of the respondents with lowest total scores were selected. These two groups provided the criterion groups in terms of which item analysis was conducted. The 't' value (critical ratio), a measure of the extent which a given statement differentiates between high and low groups of subjects for each statement was calculated using the formula given by Edwards (1969).

$$t = \frac{\bar{X}_H - \bar{X}_L}{\sqrt{\frac{S_H^2}{n_H} + \frac{S_L^2}{n_L}}}$$

X_H = The mean score on a given statement for the high group

X_L = The mean score on the same statement for the low group

S^2_H = the variance of the distribution of responses of high group to the statement

S^2_L = the variance of the distribution of responses of low group to the statement

n_H= the number of subjects in the high group

n_L= the number of subjects in the low group

All statements having 't' value equal to or greater than 1.75 were selected as indicating by Edwards (1969). Thus the final scale consisted 12 items.

Reliability of the Scale: The split half method for testing reliability was employed. The scores were split into two halves on the basis of odd and even numbers of statements and administered to 60 selected respondents in non-sample area. The Pearson Product Moment Correlation Coefficient analysis was employed to determine the degree of relationship between the two halves. It was found to be 0.70 which was the reliability coefficient measure of half items of the scale. The stepped up reliability coefficient of the entire scale was calculated using Spearman brown formula.

$$\text{Stepped up reliability} = \frac{2(\text{correlation found between two halves})}{1+ (\text{correlation found between two halves})}$$

The reliability coefficient of entire scale was found to be 0.82 which was between 0.8 to 0.9 the ideal measure for reliability coefficient (Clark and Watson 1995; De Vellis, 1995).

Content validity: Since the statements were reviewed and validated by the experts, content and face validity was measured.

Method of scoring: For each positive statement the score ranged from 1 to 5 with 1for strongly disagree, 2 for disagree, 3 for undecided, 4 for agree and 5 strongly agree. Scoring pattern was reversed for negative statements. The scale consists of 12 items having 6 positive and 6 negative statements. The attitude score of a respondent calculated by adding up the scores obtained by the respondent on all items. Based on the scores the respondents were categorized into 3 classes *viz.,* less favourable, moderately favourable and highly favourable attitude using class interval methods between the minimum and maximum scores.

Table 1: Final set of attitude items selected with corresponding t-value and nature of statements

S.No.	Statements	t-value	Nature of statements
1	SDAH is not good in providing livestock extension services to women farmers as compared to other agencies	3.88	-
2	Communication with women farmers is difficult while delivering the livestock extension services	4.03	-
3	Unfavorable attitude of SDAH personnel is one of the factor responsible for poor dissemination of livestock extension service to women farmers	4.99	+
4	Providing livestock extension service to women farmers must be made mandatory with fixed targets to SDAH personnel	4.09	+
5	It is difficult to deliver livestock extension services regularly because of over burdened with the paper work	3.47	-
6	We cannot think the livelihood security of women farmers without providing the livestock extension services	3.79	-
7	Provision of incentives to SDAH personnel may improve the access of livestock extension service to women farmers	4.70	+
8	I believe that women are not enough aware of existence of livestock extension activities and programmes of SDAH	3.15	-
9	Women farmers never come forward for availing the information related to livestock managements	3.09	-
10	I feel that a separate wing of livestock extension is required for delivering the livestock extension services at grass root level	4.44	+
11	Engagement of more women extension workers may improve the delivery of livestock extension services to women farmers	3.45	+
12	Coverage of women farmers in extension services may be increased if provided by the para-vets and other personnel of their own social system	4.13	+

After developing an attitude scale the scale was used in measuring the attitude of Veterinary Officers and Livestock Extension Officers hailing from four different districts of central plain zone of Uttar Pradesh. It included the Sitapur, Hardoi, Unnao and Lucknow districts. Data were collected through interview schedule.

Data shown in the Table 2 revealed that most of the SDAH personnel (49.2%) had moderately favorable attitude towards rendering the livestock extension services to women farmers followed by about 29 per cent, who had highly favorable and the rest 21. 7 per cent respondents revealed for less favorable attitude.

Table 2: Attitude of SDAH personnel (VOs and LEOs) towards rendering the livestock extension services to the women farmers (N=120)

Attitude Score	Frequ-ency	Perce-ntage
Less favorable (40-44.67)	26	21.7
Moderately favorable (44.67-49.34)	59	49.2
Highly favorable (49.34-54)	35	29.1

Data on the correlation analysis of some socio-personal variables of SDAH personnel and their attitude towards livestock extension services are presented in Table 3. Significant and positive relationship was found between SDAH personnel age, education and job experience at one per cent level of significance ($p<0.01$) with their attitude towards rendering livestock extension services. No significant relationship was found between SDAH personnel attitude work load. This implies that with the increase in age, education and job experience of SDAH personnel develops the favourable attitude towards rendering the livestock extension services. Ravikumar *et al.* (2005) revealed that attitude of Veterinary Assistant Surgeons towards the livestock extension education programme, found that 75 per cent of the Veterinary Assistant Surgeons possess neutral attitude whereas 15 and 10 per cent possess unfavourable and favourable attitude, respectively towards the livestock extension education programme

Table 3: Relationship between socio-personal variables of SDAH personnel and their attitudes towards rendering livestock extension services to women farmers

Variables	Correlation coefficient 'r' value
Age	0.66**
Education	0.72**
Job experience	0.67**
Work load	0.02 NS

**Significant at 1per cent level of significance

NS = Not significant

CONCLUSION

Study concluded that the attitude of Veterinary Officers and Livestock Extension Officers may be made favourable by providing incentives, vehicle allowance, sufficient budget allocation for livestock extension services, transport facilities, adequate infrastructure, adequate veterinary staff and time to time in-service training on new advanced extension methodologies for SDAH personnel are highly needed. So that these SDAH personnel can deliver the need based livestock extension services to women livestock farmers more efficiently.

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Received on May, 2015, Revised on November, 2015

Journal of Community Mobilization and Sustainable Development Vol. 10(2), 229-232, July-December, 2015

Analyses of Kisan Mobile Advisory Services in Hazaribag, Jharkhand

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ABSTRACT

Kisan Mobile Advisory Service (KMAS) was launched for sending agriculture information through message service (SMS). The content of message was typed in Hindi language including information related to Agronomy, Horticulture, Plant Protection, Animal Science, etc. and was sent to the users. A total of 150 farmers were randomly surveyed to know their reaction about the KMAS. Results of the survey showed that majority of the farmers found information on agriculture in the form of SMS through mobile phone useful (69.3%), comprehensible (74.7%), and timely (64.7%). About 15 percent farmers who registered for KMAS did not utilize the service. About 9 per cent of the users could not decode SMS due to language barrier. Lack of the interest of the beneficiary due to excessive length of the content was reported by 12.7 per cent of the farmers.

Keywords: Kisan mobile advisory service, Hazaribag, SMS, T.V., Newspaper, Radio

INTRODUCTION

Agriculture in India comprising of crops, dairy, fishery, horticulture, agro-forestry along with small enterprises like beeping, mushroom growing, etc. Farmer's need is to harness productivity along with sustainability, minimize post harvest losses and getting appropriate prices for the produce. For this extension has to play expanded role including improved access to market, research, advice, credit, infrastructure, farmer organization development and business development service (Sulaiman, 2003). The information and Communication technologies like radio, T.V., Newspaper, telephones and magazines are playing a major role in sustainable agriculture development since early decades and now the modern ICTs as mobile and computers and home created a revolution. In the present era, cost effective and efficient communication technologies are required to take lead in changing agricultural scenario. The use of KMAS scheme in main line extension system of KVKs is now one of the ICT initiatives for the farmers. The growing information needs of farmers due to diversification and commercialization requires to be addressed immediately but at the same time extension system should evaluate ICT initiatives to improve and improvise the delivery of information. The objectives of the present study were to know the level of comprehension and the extent of usefulness of agricultural information sent in the form of SMS.

MATERIAL AND METHODS

For collection of the information, a semi structured interview schedule was designed and farmers responses on KMAS along with their socio-personal profile was recorded. A three point continuum scale was used to know the level of comprehensible. Similarly usefulness of the SMS was studied on three point continuum i.e. very useful, not useful and useful. It was hypothesized that education level have bearing on comprehension while education level, age and land holding may have bearing on usefulness of the SMS, which were also tested during the study.

RESULT AND DISCUSSION

KMAS was started with the aim of disseminating the agricultural information to maximum number of

farmers to give them timely advice without any distortion of message in the shortest and cheapest way. Initially, SMS were sent in local language font (Hindi) for passing information in local language. A total of 104 SMS were sent pertaining to different discipline related with agriculture. Maximum 31 (29.8%) SMS were sent in the field of Agronomy followed by Plant protection 18(17.3%). Similarly, information related to Soil Science, Animal Science, Horticulture, and Home Science related information as well as the information pertaining to training programmes was sent to farmers.

Socio-personal profile: Majority of the respondents i.e. 56.7 percent were young (less than 30 years of age) and 18% percent of the farmers belonged to middle age category while one fourth were of more than 45 years of age. More them 1/3rd of respondents (70.6%) were having medium land holding (land between 2 to 10 hectares), while 18.0 percent were small and marginal farmer and 11.3 percent large category farmers. As far as education level was concerned, majority of the respondents (65.3%) were of medium category having education between 10th to secondary. About one fourth of the respondents (22.2%) had higher education level while 12.0 percent were of low educational level. Agriculture was the major enterprises for 2/3rd of the respondents, 22.0 percent were engaged in horticulture (including vegetables growers, orchard, bee keeping, mushroom growing, etc.) while 11.33 percent were dairy farmers.

Table 1: Number of SMS sent pertaining to different disciplines

Area	No. of SMS
Agronomy	31(29.8)
Plant Protection	18 (17.3)
Horticulture	16(16.1)
Animal Science	14(14.4)
Soil Science	12(13.7)
Home Science	9(9.8)
Miscellaneous	0(0)
Total	**100**

Figures in parenthesis are percentages.

Table 2: Socio-personal profile of the respondents (N=150)

Socio-economic profit	No. of respondents	Perce-ntage
Age		
Young(< 30 years)	85	56.6
Middle (between 30 to 45 years)	27	18.6
Old (>45 year)	38	25.3
Land holding		
Marginal and Small (<2 ha)	27	18.6
Medium(2-10ha)	106	70.6
Large(>10 ha)	17	11.3
Education		
Low(< 10th class)	18	12.6
Medium(10th-12th class)	98	65.3
Higher (Graduate or abroad)	34	22.6
Enterprises		
Agriculture	100	66.6
Dairy	17	11.3
Horticulture	33	22.0

Level of comprehension: The data presented in the Table 3 revealed that more than 80 percent of the respondents having medium level of education were able to comprehend the information sent via mobile set as SMS. While in low education category group, only 16.6 percent could comprehend the information easily. The 85.2 percent respondents with high education level were able to comprehend the information. Nearly 80respondents reported information was not so comprehensible. About 2/3rd (77.7%) of the respondents in low education category could not comprehend the information sent via SMS.

Usefulness of Information: About 12% of the farmers who got registered for KMAS were from small and marginal category. Majority of medium category farmers (73.5%) reported the information as useful followed by large farmers (64.7%). More than 50 per cent small and

Table 3: Comparison between level of education and level of comprehension (N=150)

Education level	Level of comprehension		
	Comprehensible	Not so Comprehensible	Not Comprehensible
Low (<10th class)	3(16.6)	01(5.5)	14(77.7)
Medium(10th-12th class)	80(81.6)	16(16.3)	02(2.0)
Higher (Graduate or abroad)	29(85.3)	05 (14.7)	00(8.0)

Figures in parenthesis are percentage

marginal farmers also found the information as useful. About 15 per cent small and marginal farmers found the information as not useful as it was oriented towards main crops. The information was missing on vocational occupation like beekeeping, mushroom, poultry farming adopted by the farmers. Respondents with medium level of education (75.5%) and high level of education (64.7%) reported the information via text message through mobile useful. Nearly 1/5th of the respondents with medium level of education reported information was not so useful (Table 4). Lack of interest due to lengthy SMS was reported by 12.6 per cent of the farmers. Higher percentage of respondent (74.17%) in the middle age category found KMAS useful as compared to other young (69.4%) and old age category (65.8%) respondents. This may be due to the lack of interest of young farmers in agriculture and less education level and less participation of old age farmers in practicing agriculture.

In totality agriculture information via text message through mobile was reported as comprehensible, useful and timely by 74.6%, 69.3% and 64.6% respondents, respectively (Table 5). Low level of education was the major reason for low comprehension or lack of comprehension.

Majority of the respondent found the information useful but few reported that lack of interest due to lengthy text and lack of specific information were reasons for finding the information as not so useful. Few respondents reported the information as not useful as they did not get information pertaining to their enterprise.

CONCLUSION

The information dissemination via text message through mobile can play important role in enhancing efficiency of extension system by reaching to large number of people. Farmers are finding this source of information as timely and of great use but the extension system has to regularly evaluate the response of target group to eradicate the problems in delivery of message. The information has to be tailored to enterprises, crops adopted by the farmers and based on the assessment of felt needs of the stakeholders. The information sent should be as per the interest of the target group.

Table 4: Relationship between education and land holding with usefulness of information (N=150)

Parameter	Usefulness		
	Useful	**Not so useful**	**Not useful**
Land holding			
Marginal and Small (<2 ha)	15(55.5)	08(29.6)	04(14.8)
Medium(2-10 ha)	78(73.5)	24(22.6)	04(3.7)
Large(>10ha)	11(64.7)	04(23.5)	02(11.7)
Education			
Higher (Graduate or abroad)	11(64.7))	04(17.6)	03(17.6)
Medium (10th-12th class)	74(75.5)	19(19.4)	05(5.1)
Low (<10th class)	19(55.8)	13(38.2)	02(5.8)
Age			
Young (< 30 years)	59(69.4)	23(27.1)	03(3.5)
Middle (between 30 to 45 years)	20(74.1)	5(18.5)	02(7.0)
Old (>45 year)	25(65.8)	8(21.0)	05(13.2)

Figures are parenthesis are percentages.

Table 5: Overall analysis of the KMAS (N=150)

Indicator	Comprehensible	Difficult to comprehensible	Not Comprehensible
Comprehension	112(74.6) Useful	22.4(14.6) Not so useful	16(10.6) Not useful
Usefulness	104(69.3) Timely	36(24.0) Sometimes	10(6.6) Often late
Timeliness	97(64.6)	46(30.6)	07(4.6)

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Received on May, 2015, Revised on October, 2015

Journal of Community Mobilization and Sustainable Development Vol. 10(2), 233-236, July-December, 2015

Ergonomic Evaluation of Farm Women through Improved Serrated Sickle for Harvesting in Wheat

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ABSTRACT

The study was carried out at village Lasudawan and Changli, under the adopted cluster area of KVK Mandsaur (M.P.), in *rabi* season (2009-2010, 2010-2011) to determine the physical fitness, time and activity profile and physiological stress of Farm women at the time of harvesting of wheat activity. Use of improved serrated sickle "Naveen" was compared to traditional sickle was tested on farm women to improve work efficiency and to reduce the drudgery of women. The results revealed that 24.56% of working efficiency was increased by using improved serrated sickle as each farm women harvested and bundled an average of 56 bundles by using serrated sickle while only average of 41 of wheat was harvested and bundled through local sickle. Physiological stress revealed that output recorded by improved serrated sickle was average of 51.03 m^2/h as compared to local serrated sickle by which 37.52 m^2/h area was harvested. During harvesting with local sickle, the average ΔHR was 33.93 beats/min and energy expenditure was 12.33 kJ/s while by improved serrated sickle, it was recorded as 17.46 beats/min and 8.40 kJ/s. The average cardiac cost of work (CCW) was 55.41 beats/m^2 local sickle while 20.51 beats/m^2 by improved serrated sickle. So the serrated sickle saves 35% cardiac cost of worker per unit of output and increases efficiency 36.63%. Use of improved sickle requires less effort for cutting and reduces the drudgery in farm women compared to local sickle for harvesting wheat crop.

Keywords: Drudgery, Ergonomic, Farm women, Serrated sickle

INTRODUCTION

Women in India are the major work force in agriculture and perform almost all the agricultural activities. As per Census 2011, women constitute 25.51% of the total workforce in the country. The percentage share of women as cultivators, agricultural labourers, workers in household industry and other workers stood at 24.92, 18.56, 2.95 & 47.20%, respectively. In India, out of 30 million women work force, 20 million live in rural areas. The rural women play a vital role in agriculture and other agro based processing activities. The daily work schedule of rural women is very demanding and tough as per Hasalkar *et al.* (2005). It is estimated that during peak period, women work every day for about 8-9 hours in agriculture and 4 hours in household activities and there are certain agricultural operations in which female agricultural workers are considered better than male workers as studied by Bhople and Pattai (1998). Women carry out many jobs as weeding, transplanting, harvesting, threshing and storing grains, tending animals and providing fuel and water etc. According to Jyotsna *et al.* (2005) during wheat harvesting activity in farm women, from morning till evening usually adapts squatting posture and they continue to work in this posture for long duration without adapting any other posture due to which they reported severe pain in lower back and knees. According to United Nations Human Development Report only 32.8% of Indian women formally participate in the labor force, a rate that has remained steady since 2009 statistics by comparison men constitute 81.1%. It is not an exaggeration that women in India are the backbone of food security. But

it is most unfortunate that the role of women in agriculture has not highlighted. By and large they have remained invisible workers. Agriculture since time immemorial has been a way of life and family occupation of the Indian people. Chauhan (2013) Women played and continue to play a key role in agricultural sector in India. India is a country where 90 per cent of the agricultural practices are performed by using primitive tools and methods, which have been in use for centuries, and this may be due to their limited knowledge and skill in application of science and technology to daily living, resulting in fatigue and drudgery at every moment (Rajamal *et al.,* 1991). Many women also participate in agricultural work as unpaid subsistence labor. Similarly wheat, the major cereal crop, is harvested manually with sickles. In spite of advent of reapers, movers and combines, sickle is the most popular harvesting tool in Indian farms. Manual harvesting of cereals require 110 to 140 man-hrs per hectare, therefore causes peak labour demand during harvesting season, thus an improved sickle would help in increasing the labour efficiency and reducing some drudgery during harvesting operation. Devnani (1982) reported that the serrations of the serrated edged sickle act as small pointed chisels which tear the outer layer of the stems thus helps in easier cutting of plants. Harvesting is a major problem for farmers and farm women. Majority of the farm women do harvesting of wheat by using hand tool like locally made traditional sickle. This method demanding labor and is full of drudgery was performed by that resulted in women moderate pain in palms, elbows, shoulders and lower back. This research was carried out in Mandsaur district to reduce drudgery and increase working efficiency of farm women during wheat harvesting by introducing improved serrated sickle through the heart rate method. Heart rate is one of the most accurate means of studying the energy expenditure while performing any activity.

MATERIAL AND METHODS

The study was conducted at village Lasudawan and Changli, under the adopted cluster area of KVK Mandsaur (M.P.) 15 farm women of 20-48 years of age were selected, with normal health, without any major illness who exclusively performed the farm activities. During on farm Trials (OFT) and Frontline Demonstrations (FLD) trials were conducted for reducing drudgery of farm women In *rabi* season (2009-2010, 2010-2011) at the time of harvesting of wheat, comparative study was carried out with improved technology (Naveen Sickle) and existing tool (local sickle) for assessing the drudgery involved in harvesting of wheat crop. Well prepared scheduled Performa was carried out for collecting the data. While assessing the data especial attention was given to the selected sample size as regards to their physical fitness and prevalence of any serious health hazard. The grading of health status of women was done on the basis of BMI. The BMI scores were interpreted as per the classification given by Garrow (1987). The anthropometric rod and weighing balance were used to measure the physical characteristics like height and weight. Stop watch was used for recording the time. The heart rate was recorded by using the heart rate monitor sphygmomanometer (Digital), based on the heart rate records, the following parameters were calculated. Average heart rate during rest and work. The energy expenditure per minute was estimated from the heart rate with the help of formulae given by Varghese *et al.* (1994). The results were analyzed using Mean and standard deviation

Energy expenditure (kj/min) = 0.159 x Average heart rate (beats/min) – 8.72

ΔDHR (beats/min) = Average working heart rate / average heart rate during rest

Output (m^2/hr) = Average of harvesting area x duration/ average time

Cardiac cost of worker per unit of output (beats/m^2) = ΔDHR x duration / output

Blood pressure and heart rate was measured with the help of sphygmomanometer (Digital) in mm. Hg.Systolic-120 + 10 (range 110-130) and Diastolic 80 + 10 (range 70-90)

Criteria of age group were selected below 40 years purposively.

Time: One hr. (60 minutes) observations were made in both the practices for assessing and for comparing the data.

Drudgery Reduction percentage: ΔHR = Working Heart Rate – Rest Heart Rate

Improved Technology:

Especially designed farm tool for harvesting of wheat

– Naveen Sickle (source CIAE 1998) was used for the study. It was compared with the existing practice (local sickle).

Specification of the Naveen Sickle

- Light in weight,
- Serrated blade,
- Economic,
- Easy to handle,
- Covers more area,
- More suitable to wheat crop, vegetables and green fodder etc.
- Specially designed handle cuts the crop from bottom level,
- Saves time
- Women friendly farm tool

RESULTS AND DISCUSSION

Physical characteristics of the respondents: Basic anthropometric data of the subjects have been presented in Table 1. As shown in the table, the mean age of the selected farm women was 35.4 the average height was 152.4 cm and gross body weight was in the 52.4 kg. The mean body mass index was calculated to be 22.53 which meant that they were in the normal category. Physiological stress of the wheat harvesters was determined on the basis of various parameters like average heart rate during work and rest, energy expenditure and physiological cost of work while performing the activity. Table 2 depicts that 24.56% of working efficiency was increased by using improved serrated sickle as one farm women harvested and bundled an average of 56 bundles each by using serrated sickle while only average of 41 bundle of wheat was harvested and bundled through local sickle. Physiological stress revealed that the output recorded by improved serrated sickle was at the average of 51.03 m^2/h as compared to local serrated sickle by which 37.52 $m^{2/}$h area was harvested. Gite and Agarwal (2000) concluded that improved sickle with serrated edge reduced drudgery of farm women by about 16.5% as compared to local sickle for harvesting wheat crop. Mishra *et al.* (2013) also stated that improved sickle resulted in higher field capacity than simple sickle, because of less pushing force required to operate the sickle which resulted in higher cutting speed and also found increased output with better harvesting efficiency and reduced drudgery by using serrated sickle. During harvesting with local sickle, the average ΔHR was 33.93 beats/ min and energy expenditure 12.33 kJ/s while by improved serrated sickle, it was recorded as 17.46 beats/ min and 8.40 kJ/s. The average cardiac cost of work (CCW) was 55.41 beats/m^2 with local sickle while 20.51 beats/m^2 by improved serrated sickle. So the serrated sickle saves 35% cardiac cost of worker per unit of output and increases efficiency 36.63%. Gite and Agarwal (2000) and Sharma (2013) concluded that improved sickle with serrated edge reduced drudgery of farm women by about 16.5% as compared to local sickle for harvesting wheat crop. They also revealed that

Table 1: Physical Characteristics of selected respondents (N=15)

Physical characteristic	Mean ± S.D.
Age (yrs)	35.4 ± 7.94
Height (cm)	152.4 ± 5.32
Weight (kg)	52.4 ± 4.10
BMI	22.53 ± 1.91

Table 2: Evaluation of drudgery reductions of farm women through improved Sickle in wheat (N= 15)

Particular	Mean ± S.D.	
	Local Sickle	Serrated Sickle
No. of bundles harvested	41 ± 2.5	56 ± 3.0
Average heart rate during rest (beats/min)	77.40 ± 2.97	77.40 ± 2.97
Average Working Heart Rate (beats/min)	111.33 ± 5.80	96.20 ± 7.00
ΔHR (beats/min)	33.93± 5.36	17.46 ± 4.67
Area covered/ output (m^2/hr)	37.52 ±4.34	51.03±5.02
Energy Expenditure (kJ/min)	12.33±1.38	8.40 ± 1.35
Cardiac Cost (beats/m^2)	55.41±12.81	20.51±5.26
Reduction in drudgery (%)	-	65.53
Increase in efficiency (%)	-	36.63
Labour req. men hr/ha	34.02 ± 5.62	24.56 ± 2.98

Table 3: Feed back of the farm women regarding Local and Improved technology

Local Sickle	Serrated Sickle
Feed back	Feed back
Heavy to handle	Light weighted
Frequently sharpness of blade is required	Easy to handle
Maximum stress on handmuscles	It cuts the crop frombottom level
Squatting posture for longperiod leads to leg musclesproblem	Practice is required
Poor output at the end of day	Frequent sharpness ofblade is not required
Constraints-	Economic
Covers minimum area	Serrated blade cuts the crop easily
Squatting posture for longtime creates health hazardskeletal problems	Covers more area
	Saves time and money
	Squatting posture for shorter period
	Constraints-
	Unusable to left handed person
	Easily not available in market

improved sickle requires less effort for cutting and it reduces the drudgery in harvesting. Labour required men hr/ha was also reduced in improved serrated sickle which was found at the average 24.56 compare to local sickle. Singh (2012) also compared improved and local sickle for paddy harvesting and stated that there is potential demand of improved serrated sickle in the country.

CONCLUSION

It is clear from the findings that the improved serrated sickles are really helpful in minimizing the drudgery of farm women while harvesting of crops. It was observed that Naveen Sickle is better than the local sickle because it covers more area, minimizes the drudgery (reduces by 65.53 per cent), and increases the efficiency by 36.63 per cent, it saves time and money spend on labour, minimizes body muscular problems and it is very easy to handle. The chances of the injury are eliminated and it is safe to use due to its better construction and it is a low cost harvesting tool. This advanced technology could be adopted by the farm women. More efforts are needed for reaching to end users and availability of tools at village level.

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Received on May, 2015, Revised on November, 2015

Journal of Community Mobilization and Sustainable Development Vol. 10(2), 237-240, July-December, 2015

Analyzing the Adoption level vis-à-vis associated factors of Potato growers regarding Integrated Pest Management Practices in Madhya Pradesh

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ABSTRACT

This study was undertaken to investigate the adoption of Integrated Pest management practices of potato cultivation in Chhindwara district of M.P. Data were collected from 120 potato growers through well-structured interview schedule. The data indicated that majority of potato growers had low adoption of IPM practices. The study indicated that age did not show any significant association with the adoption of IPM practices by the potato growers. However, education, annual income, area under potato crop, farm power, social participation, information sources utilization, extension participation, mass media exposure, economic motivation, attitude towards IPM, scientific orientation and knowledge level had significant association with adoption of IPM practices by the potato growers. Hence, it is recommended that during the project or programme initiation these finding must be considered for the successful implementation of the concerned programmes.

Keywords: Adoption, IPM practices, Potato growers

INTRODUCTION

Potato (*Solanum tuberosum* L.), family Solanaceae, is one of the most popular vegetable grown in India because of its higher nutritive and higher production. It is the cheapest source of dietary carbohydrates (20.6%), protein (2.1%), fat (0.3%), crude fiber (1.1%), ash (0.9%), starch and vitamins especially C and B_1 and minerals. India is in 3rd position in potato production and 4th position under area in the world. In India, potato is grown over an area of 83 thousand hectares with a production of about 21 lakh metric tones. Madhya Pradesh is one of the eight largest potato producer states in India having an area of 56695 hectares with a productivity of potato in about 125.76 q/ha. It is recorded from the available secondary data that the area and production of potato crop in Chhindwara district is 6750 ha and 168750 metric tones, The Chhindwara block shares an area of 2015 ha with a production of about 50375 metric tones.

Though IPM has been developed long back but its field application and adoption rate was low with the cotton farmers (Singh *et al*., 2014). The productivity of potato is affected by many factors viz., crop genetics, resource management and climatic factors (Priya *et al.,* 2014). Singh *et al.* (2013) observed during study that enough viable and adoptive technologies have been evolved but many of these have not reached to the end-users. Limited adoption of the HYV were mainly due to non-availability of the seeds of the desired variety at the farmers level during the sowing time (Dwivedi *et al*., 2011).

MATERIALS AND METHODS

The present study was conducted in Chhindwara district of Madhya Pradesh where potato is grown largely out of all districts of Jabalpur division of this state. There are 11 blocks in the districts and out of them one block i.e. Chhindwara block was selected purposively for this

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study because of largest area under potato crop, as compared to other blocks of the district.

The respondents were selected through multi-stage random sampling method. At first stage, out of 131 villages of Chhindwara block, 6 villages were selected randomly. At the second stage, a list of farmers was prepared from all 6 villages. At third stage, 20 potato growers from each selected villages were randomly selected from the list, making the total of 120 farmers for the study.

RESULTS AND DISCUSSION

Attributes of the Potato Growers: The collected data were analyzed into frequency percentage averages and applied chi-square test. The findings of the study are discussed as under.

Table 1: Attributes of Potato growers

Attributes	Scoring method	Categories	No. of respondents	Percentage
Age	No. of years	Young	43	35.83
		Middle	57	47.50
		Old	20	16.67
Education	No. of classes passed	Illiterate	09	7.50
		Up to Primary	35	29.16
		Up to High School	42	35.00
		Higher Secondary and above	34	28.34
Annual Income	In Rupees	Low income	70	58.34
		Medium income	34	28.33
		High income	16	13.33
Area under Potato crop	In hectares	Up to 2 ha	82	68.34
		2.01 to 4 ha	26	21.66
		Above 4 ha	12	10.00
Farm power	Self-scoring	Low	51	42.50
		Medium	56	46.67
		High	13	10.83
Social participation	Trivedi & Pareek (1965)	Low	45	37.50
		Medium	53	44.16
		High	22	18.34
Information sources utilization	Nandapurker (1982)	Low	37	30.83
		Medium	62	51.67
		High	21	17.50
Extension participation	Siddaramaiah & Jalihal (1983)	Low	36	30.00
		Medium	59	49.16
		High	25	20.84
Mass media exposure	Desai (1977)	Low	47	39.16
		Medium	51	42.50
		High	22	18.34
Economic motivation	Supe (1969)	Low	28	23.34
		Medium	34	28.33
		High	58	48.33
Attitude towards IPM	Chouhan (2003)	Unfavorable	29	24.17
		Moderate	58	48.33
		Favourable	33	27.50
Scientific orientation	Supe (1969)	Low	50	41.67
		Medium	44	36.66
		High	26	21.67
Knowledge level	Self-scoring	Low	55	45.83
		Medium	47	39.17
		High	18	15.00

It is evident from the data in Table 1 that higher percentages of the farmers (47.50%) were in medium age group, maximum number of potato growers (35.00%). Out of total sample respondents, 68.34 per cent were having less area under potato crop and majority of potato growers (58.34%) had low annual income of Rs. 2,00,000/-. The higher percentage of potato growers had medium farm power and had medium social participation. About 50.00 per cent potato growers used medium information source and medium (49.16%) extension participation. The higher percentage of respondents (42.50%) had medium mass media exposure and had higher (48.35%) economic motivation, while 489.33 per cent had moderate attitude towards IPM. The higher percentage of potato growers (451.57%) had low scientific orientation and most of the potato growers had low knowledge level (45.83%).

Extent of Adoption of IPM: All the respondents were grouped into low, medium and high categories of adoption level. The table 2 reveals that 46.67 per cent respondents belonged to low level of adoption, followed by 33.33 per cent had medium adoption level and 20.00 per cent respondents belonged to high level of adoption.

Table 2 : Distribution of potato growers according to their adoption level of integrated pest management practices

Categories	Frequency	Percentage
Low adoption	56	46.67
Medium adoption	40	33.33
High adoption	24	20.00
Total	**120**	**100.00**

Association between adoption of IPM practices with the attributes of potato growers: The data in Table 3 presents the association between attributes of respondents and their adoption of IPM practices. The attributes of potato growers like education, area under potato crop, total annual income, social participation, mass media exposure, extension participation, information source utilization, attitude towards IPM, scientific orientation, economic motivation and knowledge of IPM practices were found to be significant with adoption of integrated pest management practices, whereas only age has shown non-significant association with adoption level of IPM practices by the potato growers.

Table 3: Association between adoption of IPM practices with the attributes of potato growers

Variables (Attributes)	χ^2	df	Level of significance
Age	0.456^{NS}	2	0.05
Education	13.029*	4	0.01
Total annual income	25.352*	4	0.01
Area under potato crop	6.250*	2	0.05
Farm power	11.750*	2	0.01
Social participation	14.174*	4	0.01
Information sources utilization	16.300*	4	0.01
Extension participation	20.329*	4	0.01
Mass media exposure	30.592*	4	0.01
Economic motivation	11.389*	4	0.05
Attitude towards IPM	13.908*	4	0.01
Scientific orientation	22.171*	4	0.01
Knowledge level	31.900*	4	0.01

NS = Non-significant * = Significant

CONCLUSION

It can be concluded that maximum potato growers were middle age group, up to high school level education, had low annual income and less area under potato crop, had medium farm power and most of them were having medium participation in social activities. In case of communication variables, majority of the potato growers had medium information source utilization, medium extension participation and medium mass media exposure. It was also found under psychological variables, majority of the potato growers had high economic motivation, moderate attitude towards IPM, low scientific orientation and possessed low knowledge level regarding IPM practices. Significant association of adoption of IPM practices was observed with education, annual income, area under potato crop, farm power, social participation, mass media exposure, economic motivation, attitude towards IPM, scientific orientation and knowledge level, whereas only age has shown non-significant association with adoption of IPM practices.

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Received on May, 2015, Revised on November, 2015

Journal of Community Mobilization and Sustainable Development Vol. 10(2), 241-245, July-December, 2015

Viable Interventions for Old Age Homes in Delhi: A Case Study

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ABSTRACT

Institutional support for the older persons in the form of old age homes is a western concept. Although institutional care for the destitute has always existed in India but, for the elderly especially as an alternative living arrangement is a recent concept and a viable option. The requirements of institutionalization cannot be denied for those elderly who are neither able to manage their own affairs nor do they have any person to look after them. It also fulfils the affective needs of elderly to live with the same age group. Various stakeholders like NGOs, Welfare Department of the Government; Religious societies play an important role in establishment and effective management of these homes in providing facilities and services to the elderly. Old age homes offer a continuum of lifetime care for elderly with acess to various services including food, health, personal asssitance. This paper outlines the case studies of three Old Age Homes in terms of their provision of facilities and services. The paper tries to highlight some interventions that are being organised for the elderly. The findings suggest that there exist a vast scope of intervention that can be taken up at these homes for the welfare of the elderly people. The paper will suggest a roadmap for future need based interventions and activities that can be taken up for the elderly in these homes.

Keywords: Elderly, Old age homes (OAHs), Interventions, Destitute, NGO, Societies

INTRODUCTION

The ageing process is a biological reality which has its own dynamics, largely beyond human control. However, it is also subject to the constructions by which each society makes sense of old age. In the developed world, chronological time plays a paramount role. The age of 60 or 65, roughly equivalent to retirement ages in most developed countries is said to be the beginning of old age. In many parts of the developing world, chronological time has little or no importance in the meaning of old age. Other socially constructed meanings of age are more significant such as the roles assigned to older people; in some cases it is the loss of roles accompanying physical decline which is significant in defining old age. Thus, in contrast to the chronological milestones which mark life stages in the developed world, old age in many developing countries is seen to begin at the point when active contribution is no longer possible" (Gorman, 2000).

In India, family is idealized as an institution that could take care of the older persons. However, reality tends to vary from this perception; many older persons find living with their adult children to be more difficult than living alone and many do not have a choice and have to live separately from their adult children. In these circumstances old age homes seems to be the choice for the older persons. The question that arises is the attitude of the older persons to these institutionalized settings in the last phase of their life. Do they feel depressed and sad? Do they compromise with the situation or are they happy and free to live life with peer group people?

The traditional model of Indian joint family caring for elderly has been breaking down. Living in old age homes is not approved in the Indian culture (Dandekar, 1996). Although institutional care for the destitute has always existed in India but, for the elderly especially as an alternative living arrangement is a recent concept. There are about 12.75 million older persons in India

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who are without family and they constitute about 30 per cent of the total population of the elderly. The old age homes in India cater to only one per cent of the needy elderly (Ara, 1995).

The projection made by the United Nations (UN) study revealed that by 2050, India will have 324 million elderly, forming over a fifth of the total population, out of which 15% will be over 80 years. Projected increases between 2000 and 2050 in the number of persons aged 60 or older would be 636 million men and 729 million women in the world as a whole (UNO, World population Ageing 1950-2050, 2002).There is dearth of data on the actual numbers of elderly seeking institutional services, somehow the data has not been collated.

With a broad framework of various areas of need based interventions that could benefit the elderly in future can be taken up in these homes. The capacity building interventions like motivational lectures and informative activities brings positive impact on the group dynamics (Sidhu, 2009). Study results shows continuous home based physiotherapy intervention was effective to improve functional capacity of the elder people living in residential care facilities (Thiyagarajan, 2012). The main aim of these interventions is to take care of the all round needs of elderly i.e. physical, social, leisure & Recreation, psychological etc. The major objectives were -

1. To understand the functioning of OAHs with regard to service provision
2. To explore the existing interventions at old age homes
3. To suggest possible interventions that can be taken up in future by these homes

MATERIALS AND METHODS

An explorative approach was applied using a combination of field study and semi-structured interview. Various study trips were carried out in between February and December 2012. Survey of institutional heads of OAHs and elderly residents in the homes was carried out. A total of three OAHs, each one catering to the elderly from different economic background i.e. for LIG, MIG and HIG were selected randomly. Each home manager was subsequently phoned and requisite permission for carrying out the study was taken. On request by the concerned homes, their names have been kept anonymous. In addition to the interviews data was collected by visual observation of the appearance, design and activities conducted. Semi-structures interviews were designed to capture information regarding (1) various facilities and services being provided (2) To gain an insight into the gaps that existed and thus subsequently suggesting a roadmap to the interventions needed to improve their living. The three case studies includes interviews with 3 administrative heads and interview with 40 elderly

Case Study 1

Year of Establishment : 1961

Total Number of elderly residents : 110

The Old Age Home is a separate registered society and was established in the year1961 in 11512 square yards on the Ridge of New Rajinder Nagar. It can house 110 elderly but presently the occupancy is 100. It is well connected to the main road. The home is easily accessible. The home charges one time donation from those elderly who can pay but it offers free services to the elderly who are not in a condition to pay. The OAH caters to elderly from LIG.

Case study 2

Year of Establishment : 1995

Total Capacity : 42

This privately owned home was established in the year 1995 on the main road of Mayur Vihar. It has easy accessibility to markets, parks, banks and other such basic immunities. The home caters to the elderly belonging to MIG. Initially the elderly has to pay a lump sum amount of Rs 8 Lacs that includes 5L of donation and 3L as security. The fees include the charges of accommodation of the elderly till their demise and food charges. The rooms are spacious with attached western toilets. It housed a common kitchen and dining mess where the food served to all residents. The home had the provision for single as well as double bedded rooms thus providing for couple stay. The place is well equipped with lifts to facilitate the residents. The other in-house facilities include a recreation room, Library, big lawns, temple.

Case Study 3

Year of Establishment : 2002

Total Capacity : 61

The homes cater to elderly belonging to HIG offering premier living arrangement. The home offers round the clock common floor attendant, security, maintenance, housekeeping, linen services, wellness, entertainment etc. It offers a gracious, luxurious life within their own secured, beautiful, private apartments. There is a provision of Single/Double Standard Apartments. Apart from these there is a facility of intercom telephone, T.V with cable connection facility etc. The homes provide meals according to residents' health conditions and Physician's advice.

RESULTS AND DISCUSSION

Admission of elderly: All the three homes catered to only mobile and alert elderly. The homes expressed their intention to take care of the elderly residents within the home until they died, if possible. Interacting with the elderly and discovering their profile, it was found out that, these homes cover a wide range of elderly, from 60 years up to more than 90 years. Elderly coming to these homes come from different social background, ethnic groups, held different opinions.

Facilities and services

Infrastructure: The homes are situated in community with easy accessibility. The homes had provision for single and double occupancy for the elderly people. The buildings were equipped with necessary facilities but were not disabled friendly. Ramps were only provided in the home catering to HIG group elderly. Elderly were given an option to choose according to their paying capacity as shared rooms were cheaper in comparison to single rooms. The sizes of the room vary in the complex. The rooms in the HIG OAH were more spacious and better ventilated than the rest especially the LIG home where the rooms were gloomy and cramped. Residents are required to bring their own furniture. The staff comprises of a Manager, guard, cleaners and medical staff including doctor and nurse. Al the homes provide a big lawn wherein concrete benches are provided for seating. All the OAHs provided food and dining facility to the elderly residents, Home has a common kitchen which offers meals at subsidized rate in LIG home whereas in rest one had to pay good amount for availing the service. Paid service of laundry can be availed.

Safety: The homes are somewhat designed keeping the safety considerations in mind. Adequate lighting during night time, guard, non-slippery floor, wide passages for free movement, furniture with no sharp ends, and availability of fire extinguisher are some of safety measures taken into consideration. However grab bars in toilets and emergency alarm buttons like call buttons in bathrooms and rooms were not provided.

Health: The LIG OAH was equipped with medical facilities. The home has four separate medical care units namely -Homeopathy, naturopathy, Physiotherapy and Dental Clinic. These medical facilities are availed by the resident elderly at a very nominal change. Home also has an ambulance donated by rotary club to meet the emergencies.

At the MIG and HIG Home a visiting doctor coming twice a week is provided for the residents. Health camps are organized for the residents by the concerned NGOs at their own will. Facility of ambulance was only provided in 2 homes to tackle. Unique feature of the HIG home was the provision of gym with various equipments. However, the elderly can only avail the facility under the instructor with the permission of the doctor. No effort was made at these homes to organized regular medical camps and distribution of free medicines.

Leisure and Recreation: The various facilities includes at homes included Library & Reading Room, indoor games like chess, carom. All the home catered to the religious needs of the elderly. They organized various religious programs like *havans, kirtans*. Outreach activities like interaction with children from various schools, medical camps organized by private agencies like rotary, lions club is organized during the year. Other facilities includes the celebration of birthdays, musical evenings only at HIG home.

Perception of elderly regarding the living at OAHs: The most important aspect of change needed as desired by elderly (52%) is inclusion of optioning at mealtime. Apart from the home catering to HIG group, rest two homes did not cater to the choice of meal in accordance to the health of elderly. The reasons cited by the homes

were the lack of staff, and cost. Most of the residents (64%) complained of falling and lack of absence of emergency alert like call buttons in bathroom to call for help in time of need. The resident complained of lack of physical exercise and health interventions.

Other problems reported by the residents in these homes were long queues in the LIG home as they had to use the common toilet. As it is well known that after a certain age, elderly have difficulty in controlling/ holding urine (especially during night time) till they reached the toilet. This gets further compounded with mobility problems as most elderly suffer from arthritis which restricts their movement. Due to these concerns, all the elderly urged that if they were provided with toilets attached to their rooms so that there was no time spent to walk upto the toilet or wait for their turn to use the facility. The elderly from the MIG and HIG complained of high electricity bills and water bills and thus demanded a viable option to reduce the soaring cost.

Only 42% percent elderly participated in different activities at the home. Thirty percent elderly felt that the home fulfils the role of a service provider Fifty five percent elderly were of the opinion that there was a need to upgrade the programmes in the areas focusing on health and wellness, opportunities for volunteer work for the betterment of society. Seventy percent elderly felt the need for some more activities for their capacity building like learning to operate mobiles, cooking, making hand crafted goods etc. An urgent need to provide facilities such as group programs, celebrations, and outdoor visit was felt by most elderly.

Roadmap for Interventions: The survey of the homes and problems encountered by elderly has enabled us to identify various interventions needed. Thus a flexible approach of intervention catering to their needs is most required. In order to tackle the issue of elderly care in OAHs in a holistic manner, interventions are categorized under the following themes:

Areas for intervention	Interventions
Physical	
Diet & nutrition	• Awareness sessions on nutritious diet, low cost meals, therapeutic diet • Traditional innovations in cooking (elderly volunteering for cooking at the mess) • Including choice of the elderly in the menu planning and also catering to health requirements of elderly
Health	• Regular health check up and monitoring • Regular lectures on diseases and their management • In-house yoga and meditation trainers
Other facilities	• Availing services of Mobile Medicare Unit (MMU), • Ready ambulance service to tackle emergencies • Availability of 24/7 nurse • In-house availability of physiotherapist, acupressure and massage services
Liaison	• Liaison with nearby hospitals for check up of elderly at subsidized rates • With various welfare agencies like Rotary, Lion's club, NGOs for free distribution of medicines especially for economically weaker sections.
Design of OAHs	
Safety	• Provision of grab bars in rooms and toilets • Provision of emergency alarm devices like call buttons in all rooms and toilets • Non-slippery floors, contrast of wall and floor color.
Elderly Friendly structures	• Designing disabled friendly homes , provision of ramps, adequate lighting, wide passages· Provision of lifts • Attached toilets-western and Indian • Barrier free design of rooms, bathrooms and kitchen • Facility for solar based lighting, heating and cooling system

Contd.....

Areas for intervention	Interventions
Recreation and Leisure	
Religious	• Organizing religious/spiritual activities weekly
Games	• Organizing various games by the trainer/volunteer • Group activities like dancing, sing-s longs, • Brain age games
Outdoor trips	• Organizing outdoor trips for picnics, travel destination
Knowledge based programmes	• Awareness sessions on their rights & privileges, latest technology care, assistive devices
Capacity building of elderly	
Technology intervention	• Technology interventions like training sessions for computer learning, operating mobiles
Income generating programmes	• Like toy making, cards, candle making, weaving, etc
Leadership	• Forming their association within the old age home and thus taking up various activities for managing and organ sing activities at home
Others	• Engagement with schools for *dadi and nani ki kahaniyan* program. Thus utilizing the vast experience of elderly
Psychological	
Counseling	• In –house counselor
Stress management	• Programmes like time –slips, life –review by specialized trainers to reduce stress
Networking	• Creating common portal of various old age homes and connecting them to each other so that elderly can share various concerns

CONCLUSION

Though these old age homes are in nascent stage but in future they will responsible for the well –being of thousands of elderly. The mission of these homes should be to provide quality services that delight the elderly and is a key to the sustainability of the organization. Thus these homes act as focal points where services of counseling, employment, educational programs, capacity building can be taken at large. The range of activities should meet the needs of all residents, from the disoriented to the wheelchair bound to the ambulatory. However the structure and delivery of programs can vary from home to home.

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Received on May, 2015, Revised on November, 2015

Journal of Community Mobilization and Sustainable Development Vol. 10(2), 246-250, July-December, 2015

A Study of Extension Scientists' Awareness on Climate Change

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ABSTRACT

Any change in climate over time, generally caused by natural variability and/or human activities has great devastating impact, particularly on agriculture and by extrapolation on farmers and the economy. Scientists working in KVKs being principle stake holders to demonstrate and teach both farmers and extension personnel regarding coping mechanism from climate change need to be aware regarding various facets of climate change and adaptation strategies. 75 scientists working in krishi vigyan kendras and directorate of extension education were interviewed to assess their awareness on climate change. Findings indicated that overall awareness of extension scientists was found low to moderate which indicate that they were not completely abreast of major challenge for the sustainability of agriculture. Vast majority was found aware of rise in temperature every year, weather forecasting system i.e. SMS service of CCSHAU, Hisar, excessive use of natural resources effect of excessive uses of insecticides/pesticides on climate and soil health, green house gases and factor responsible for high GHGs emission is industry while their exposure pertaining to climate variability indicated that they were exposed to discussion of climate related problems with friends or co-workers, whereas they were not aware or least aware of information and communication technologies and tools of forecasting systems like other facility/tool for weather assessment. It implies that extension scientist must be well acquainted with knowledge on climate change to effectively transfer same knowledge to the farmers and field functionaries. Government should equip the scientists with ICTs and other tools and techniques. Trainings need to be imparted by lead institutes working on climate change to the scientists working in KVKs.

Keywords: Awareness, Climate change, Green house gases, Pollutants

INTRODUCTION

Climate change is a long-term shift in weather conditions identified by changes in temperature, precipitation, winds, and other indicators. Climate change can involve both changes in average conditions and changes in variability, including, for example, extreme events. These changes can occur by natural process or by human activity. Global warming is increase of surface temperature due to emission of greenhouse gases, thereby, increasing global atmospheric temperature over a long period of time. There are so many factors which play a great role in changing the climate but most important are increasing CO_2 emission day by day, increasing level of greenhouse gases (GHGs) including black carbon and burning of fossil fuel, chlorofluorocarbon (CFCs), ozone depletion, eruption of volcanoes, increased deforestation, indiscriminate use of insecticides-pesticides and fertilizers on agricultural crops and high rate of industrial wastes. It has great devastating impact, particularly on agriculture and by extrapolation on farmers and the national economy. The future problems caused by rising sea level, growing of deserts, more frequent droughts and floods all look set to affect the developing world more than the developed. Considering the seriousness of undesirable effects of climate change, everyone try to resolve these calamities. The frontline agricultural extension workers are expected to be among the principal stakeholders to teach farmers how to cope with climate change. The application of the scientific knowledge and recommended farm practices to reduce the effects of climate change is the best alternative for sustainable development of agriculture. Realizing

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significance of role played by KVKs scientists in assessment and refinement of situation and location specific technologies for sustainable development of agriculture and also catalytic force for field functionaries and farmers, keeping these all in view a study on awareness of extension scientists on climate change was undertaken.

MATERIALS AND METHODS

The study was conducted in Haryana. Scientists working in directorate of extension education and KVKs of CCSHAU, Hisar were purposively selected for their significant contribution in sustainable development of agriculture as well as responsible for further updating the knowledge of field functionaries and farmers by demonstrating the frontier technologies. The data were collected with the help of well structured and pre-tested interview schedule. The data were analyzed and tabulated after applying the statistical techniques like frequency and percentage.

RESULTS AND DISCUSSION

Awareness of extension scientist regarding climate change: Awareness is considered to be the first stage of an innovation dissemination and play an important role in decision–making process. Awareness is a function of an innovation decision process, which has been defined as "the individual comes to know of something which is related to one's own need or arouses the need' (Rogers, 2003). The person becomes acquainted with broad features of an idea, object or technology but lacks detailed information about it. For instance, the person may know only the name and may not know what the idea is, what it will do or how it will work. A high level of awareness about the technical nature of improved agricultural technology would lead to a higher adoption because awareness is pre-requisite to adoption. Awareness once acquired and accumulated in mind of the extension scientist, it undergoes and produces change in thinking process. The result of this active functioning of awareness has been seen in the outward behavior of the extension personnel i.e. adoption of improved technology.

Table 1: Overall awareness of extension scientists on climate change (n=75)

Awareness level	Frequency	Percentage
Low (21-29)	24	32.00
Medium (30-34)	29	38.67
High (35-38	22	29.33

The data regarding overall awareness of extension presented in Table 1 indicate that 38.67 percent of extension scientists belonged to medium category followed by 32.00 percent to low category while 29.33 percent belonged to the high level of awareness. In nutshell, 70.67 percent of extension scientists had low to medium level of awareness on climate change means that extension scientists were not completely abreast of crucial phenomenon before the sustainability of agriculture. It may be due to lack of access to information and communication facilities like internet and also poor co-ordination between various organizations/ institutions working on climate change. As such organization of the training programmes to enhance their capacity to promote climate smart agriculture is highly needed.

It is evident from the data presented in Table 2 that a vast majority (96.00) of extension scientists were found aware of aspects such as rise in temperature every year followed by temperature variations occurrence in area (88%) whereas, they were less aware of aspects viz. high GHGs produced (76%), high pollution and industrialization rate (84%). The findings seem logical due to enormous awareness programmes run on global warming by the print and electronic media. Similar findings have been reported by Sarkar and Padaria (2010) that most of the respondents' perceived climate

Table 2: Awareness of extension scientists regarding temperature change (n=75)

S.No.	Aspect	Yes	No
1.	Observed temperature variations occurrence in area	66(88%)	9(12%)
2.	Rise in temperature every year	72(96%)	3(4%)
3.	Main reasons of temperature rise in last few years		
	(a) High GHGs produced	57(76%)	18(24%)
	(b) High pollution rate	63(84%)	12(16%)
	(c) High rate of industrialization	63(84%)	12(16%)

Table 3 Awareness regarding previous year monsoon (n=75)

S.No.	Aspect	Yes	No
1	Month in which monsoon reach	69(92%)	6(8%)
2	The month in which maximum rainfall occurred	72(96%)	3(4%)
3	Average rainfall of area	51(68%)	24(32%)
4	Change in the monsoon onset in area		
	(a) early	6(8%)	69(92%)
	(b) late	60(80%)	15(20%)
5	Change in monsoon withdrawal		
	(a) early	36(48%)	39(52%)
	(b) late	30(40%)	45(60%)
6	Crop replaced due to change in rainfall in area	36(48%)	39(52%)

changes due to rapid industrialization by human being. People were aware about phenomena like increase in temperature, reduction in agricultural and livestock production, increase in diseases, rise in sea level etc.

Regarding extension scientists awareness of previous year monsoon, data in Table 3 indicate that they were aware of month in which monsoon reach (92%), month in which maximum rainfall occurred (96%) and late onset of monsoon in area (80%). Whereas no awareness or least awareness on the aspects such as average rainfall of area and crop replaced due to change in rainfall in area (48%) probably may be due to lack of continuous survey or field work. It is well known that cropping patterns nowadays are greatly followed by open market and climatic aspects prevailing in area through out the world.

Data pertaining to awareness of extension scientists on weather forecasting system revealed that majority of them were aware of CCSHAU, SMS service (96%), agro meteorological observatory of area (72%) and television (64%) whereas they were not aware or least aware of forecasting systems like other facility/tool for weather assessment (12%), internet (36%) and source providing training related to weather forecasting (50.67%). It is alarming situation to note that persons with responsibility of situation specific development of agriculture are not equipped with internet and tools of weather forecasting in era of digital world.

Data presented in Table 5 revealed that all extension scientists were aware of pollutant aspects such as excessive use of natural resources like water, soil, forest etc. affect the climate adversely and excessive use

Table 4: Awareness regarding weather forecasting system (n=75)

SNo.	Aspect	Yes	No
1	Agro meteorological observatory of area	54(72%)	21(28%)
2	Received weather forecasting from source:		
	(a) CCSHAU, SMS service.	72(96%)	3(4%)
	(b) TV	48(64%)	27(36%)
	(c) Newspaper	48(64%)	27(36%)
	(d) Internet	27(36%)	48(64%)
3	Have other facility/tool for weather assessment	09(12%)	66(88%)
4	Source providing training related to weather forecasting	38(50.67%)	37(49.33%)

Table 5: Awareness regarding pollutants causing climate change (n=75)

S.No.	Aspect	Yes	No
1	Excessive use of natural resources like water, soil, forest etc. affect the climate adversely	75(100%)	-
2	Excessive use of insecticide/pesticides affect the climate and soil health	75(100%)	-
3	Burning of crop residue is a main reason of air pollution	69(92%)	6(8%)

Table 6: Awareness of extension scientists regarding green house gases (n=75)

S.No.	Aspect	Yes	No
1	Names of GHGs	60(80%)	15(20%)
2	GHGs emissions affect the climate soundness	54(72%)	21(28%)
3	Factors responsible of high GHGs emissions		
	(a) Agriculture	39(52%)	36(48%)
	(b) industries	69(92%)	6(08%)
	(c) Animal excreta	33(44%)	42(56%)

Table 7: Extension scientists' exposure pertaining to climate variability (n=75)

S.No.	Aspect	Yes	No
1	Access to any institute/organization working on climate change	30(40%)	45(60%)
2	Heard about climate change from		
	(a) T.V.	69(92%)	6(8%)
	(b) Radio	45(60%)	30(40%)
	(c)News papers	63(84%)	12(16%)
	(d)Govt. scheme/programs	36(48%)	39(52%)
3	SMS service of CCSHAU, Hisar	72(96%)	03(04%)
4	Discuss climate related problem with friends or co-workers	75(100%)	-

of insecticide/pesticides affect the climate and soil health followed by burning of crop residue is a main reason of air pollution (92%). Similar findings were reported by (Pandey *et al.,* 2012) that extension officers were found aware of pollutants causing climate degradation. Findings are in conformity with the researches of Joseph *et al.* (2009) who reported that forest fire has profound impacts on atmospheric chemistry, bio-ecological cycling and ecosystem structure.

Awareness of extension scientists regarding green house gases revealed that they were aware of factor responsible for high GHGs emission is industry (92%) followed by names of GHGs (80%) also whereas they were not aware or least aware of aspects that animal excreta (44%) and agriculture are also responsible for high emission of GHGs (52%). Findings are in agreement with past study of Pandey *et al.* (2012) and Ghanghas *et al.* (2015).

Data regarding extension scientists' exposure pertaining to climate variability revealed that absolute majority of them were exposed to discussion of climate related problem with friends or co-workers (100%), SMS service of CCSHAU, Hisar (96%) followed by TV (92%) whereas they were not exposed or least exposed to institute/organization working on climate change (40%), Govt. scheme/programs (48%) and radio (60%). It implies that government should organize more awareness programmes and trainings to update the knowledge and skill of extension scientists, similar have been reported by Pareek and Trivedi (2011) Chandrashekar (2013) and Ravi Kumar *et al.* (2015).

CONCLUSION

Overall awareness of extension scientists on climate change was found low to moderate indicate that they were not completely abreast of major challenge for the sustainability of agriculture. Vast majority was found aware of rise in temperature every year, weather forecasting system i.e. SMS service of CCSHAU, Hisar, excessive use of natural resources like water, soil, forest, excessive uses of insecticides/pesticides affect the climate and soil health, green house gases and factor responsible for high GHGs emission is industry while their exposure pertaining to climate variability indicated that they exposed to discussion of climate related problems with friends or co-workers, whereas they were not aware or least aware of information and communication technologies and tools of forecasting systems like other facility/tool for weather assessment than SMS (12%), internet (36%) and source providing training related to weather forecasting (50.67%).

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Received on July, 2015, Revised on October, 2015

Journal of Community Mobilization and Sustainable Development Vol. 10(2), 251-255, July-December, 2015

Technological Empowerment of Farmer Interest Groups(FIGs) in Palakkad district of Kerala

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ABSTRACT

Farmer Interest Groups on rice, vegetable and rubber were formed in Palakkad district of Kerala. Based on the problems expressed by the groups need based interventions were introduced as a process of Technological Empowerment. These interventions were demonstrated in the selected farmers' field within the group. In the rice mechanization group motorizedconoweeder were tried. The results of the demonstration showed motorized weeder performed better than conventional method in terms of time taken and economy. In the Rubber group introduction of Apiculture fetched an additional income to the farmer. The introduction of cool season vegetables and precision farming in the two groups formed showed better performance in terms of yield and income of vegetables.

Keywords: Technology, Empowerment, Farmer interest group, Rice, Vegetable, Apiculture

INTRODUCTION

A farmer interest group is a self managed, independent group of farmers with a shared goal and interest.In India most farmers have only small marketable surpluses and therefore they have to sell their produce in the local markets at low prices immediately after the harvest. Moreover the latest technologies do not reach the farmers due to the wide extension – farmer linkage. Thus a strategy was needed to increase the bargaining power of farmers and to know the latest technology through group approach. Patil (2014) also concluded that promotion of Farmer Interest groups would result in improvement in livelihood of farmers, leading to economic sustainability. In this endeavor, the present study was conducted to promote Farmer Interest group (FIG) with the objective to promote commodity specific farmers interest group through participatory approach for intervention in production and profitability of farming.

MATERIALS AND METHODS

The present study was conducted purposively in selected Palakkad district of Kerala. Four villages namely Ongallur, Lakkidi, Perumatty and Elavancherry representing different Farmer Interest Groups were selected with the help of Agricultural Officer. The groups were registered in the Krishi Bhawan with each group having 12-15 member farmers. After formation of these groups, technological interventions were made on a participatory approach during 2012-13. Group meeting were arranged and the problems faced by different groups were ascertained.The groups were identified as Rice mechanization group, Apiary group, Cool season vegetable group and Precision farming groups Each group was assigned with the task of conduct of demonstration.Demonstration on mechanization in rice, introduction of Apiculture among rubber growers, introduction of Cool season crops and Precision farming in vegetables were undertaken in the Lead farmers (progressive farmer) plot of each selected group. Capacity building and empowerment of farmers were conducted through series of group meeting and exposure visits to generate general awareness about utility of group approach.

RESULTS AND DISCUSSION

Structure and management of farmer interest groups: In Kerala there exists groups for different crop

which are large in number and active participation of members does not exist. In order to make to effective small groups of 10-15 members with a Convenor and Co-convenor were operationalized. The main goal perceived for FIGs are enhancement in productivity and production in selected commodity chosen thereby solving the problems faced by the farmers.

Facilitative activities: Resource persons from Kerala Agricultural University headquarters, Central Plantation Crops Research Institute and Regional Agricultural Research Pattambi played a major role in conduct of training programme both on-farm and off farm. Study tours to different places like Dharmapuri Precision farming development centre and private firm Jain irrigation, Udumulpet, Coimbatore, Tamil Nadu State helped in empowerment and capacity building of farmers.

Technology demonstration: The Technology demonstration of each group was decided on participatory approach after having discussion by conduct of group meetings. The interventions selected were need based, scientific and practically feasible to adopt.The results of demonstration conducted under each group is given below:

1. Rice Mechanisation group: Paddy is the main crop in the village selected. However the farmers face the problem of non availability of labour during peak season. The cost of labour works out to Rs. 500 per day for men and Rs.350 per day for women. Hence intervention on mechanization in Paddy was introduced.Group comprising 14 farmers who are willing to take up mechanization in Paddy were registered under Krishibhavan at Ongallur village of Palakkad district. Demonstration on mechanization and the cost of cultivation pertaining to rice crop are presented in Table 1. The results of demonstration showed that Cost and Time taken was relatively less in the motorized cono weeding than other methods of weeding operation. However the constraints in the Innovation are the operation of machine requires skill, it has to be operated in the right stage of crop,weeds closer to plant are difficult to be removed using motorized conoweeder as it may harm the main plant, pollution in the form of sound is noticed while operating the machine. Further the weight of the machine and control of speed were some of the difficulties faced in operation of the machine. The findings from the mechanisation demonstration revealed that motorized conoweeder use in Paddy could save labour, time and cost of cultivation. However skill in operating the machine is major aspect for success of the technology. (State Planning Board, Kerala, 2012) concluded that increasing the production of paddy will be ensured through encouraging mechanisation of paddy cultivation. Further Socio economic development of the farmers also emphasized through this process.

II Rubber growers group: Rubber crop is the major crop for the farmers. However the gestation period of rubber is more further the price of rubber fluctuates very often which forced farmers to seek alternate methods of increasing the income. Group comprising 12 farmers cultivating rubber crop who are willing to take up Apiculture were registered under Krishi Bhavan at Lakkidi village of Palakkad district. Demonstration were conducted in 3 farmers field and 3 honey bee boxes were provided to them. Training on Apiculture was given for one day for all the participants in the

Table 1: Economics of mechanisation in paddy

Particulars	Conventional (Rs/ha)	Mechanisation (Rs/ha)	Decrease in cost of cultivation
Nursery preparation	2700	2125	575
Main field preparation	4250	4250	-
Planting	6250	3000	3250
Manures and fertilizers	8000	8000	-
Irrigation	450	450	-
Weeding cost	7500	1800	5700
Plant protection cost	1800	1800	-
Harvesting	8000	3500	4500
Total cost	38950	24925	14025

Table 2: Yield of cabbage and cauliflower

Crop	Yield kg/ha
Cabbage	12000
Cauliflower	13000

group. Pre and Post training tests were conducted to ascertain their knowledge level after conduct of training. Results showed that an increase in knowledge to the tune of 70 per cent was noticed. The findings of apiary demonstration showed that additional income can be made from rubber cultivation through production of honey. Esekhade *et al.* (2012) concluded that introduction of honey bee hives into rubber plantation lead to increase in the revenue and profit margin of the farmer compared with when matured rubber plantation are left as sole rubber plantation.

III. Vegetable group: Farmers in the village grow vegetables which is not remunerative crop due to reduced market price. Hence it was decided to introduce cool season vegetables in the area as a new crop during the month of November. Group comprising 11 farmers growing vegetables who are willing to take up Innovative technologies were registered under Krishi Bhavan at Perumatty village of Palakkad district. Demonstrations on Cool season crops like cabbage and cauliflower were conducted by providing 500 seedlings of each Cabbage and cauliflower.A comparison of net income from Cabbage and Cauliflower is depicted in Table 3. A perusal of table shows that introduction of cool season vegetables gives higher yield to the tune of 12000 kg/ha for Cabbage and 13000 kg/ha for Cauliflower. A net income of Rs. 82,250 /ha and Rs. 90,250 per hectare was realized from Cabbage and Cauliflower. The results of demonstration showed that cool season vegetable can be cultivated in Kerala.

Table 3: Economics of cabbage and cauliflower (Rs/ha)

Operation	Cabbage (Rs/ha)	Cauliflower (Rs/ha)
Seedling cost	14000	16000
Preparatory cost	6750	6750
Weeding cost	2250	2250
Plant Protection	2250	2250
Manures and Fertilizers	9000	9000
Harvesting	3500	3500
Total cost	37750	39750
Gross income (kg/ha)	1,20,000	1,30,000
Net income	82,250	90,250

George (2012) opined that with the development of tropical varieties in Cabbage and Cauliflower it has been demonstrated that the crop can be cultivated anywhere in Kerala.

IV. Precision farming group: Interventions in the group include use of hybrid varieties from private companies and adoption of drip fertigation method of cultivation. Based on the demonstrations conducted the Economics of Bitter gourd and Snake gourd was worked out. From Table 4 it can be concluded that an yield increase of 58 per cent can be achieved by adoption of drip fertigation in vegetables. Mondal Pinaki and Manisha Basu (2009) concluded that rapid socio economic changes in some developing countries are creating new scopes for the application of precision agriculture. Application of Precision Agriculture technology based on the need of specific socio-economic condition of a country will make Precision Agriculture a tool to reduce the gap between the developed world and the rest.

Table 4: Yield performance of different vegetable under Micro Irrigation

Crop	Yield (t/ha)		Per cent yield increase
	Traditional method	Drip fertigation method	
Bittergourd	19.31	30.64	58.67
Snake gourd	26.32	41.64	58.21

The results presented in Table 5 on Comparative Cost of cultivation of bitter gourd and snake gourd revealed that nearly half of the cultivation cost was spent on Fertilizers (41.74%) followed by planting (23.46%) and Harvesting (17.26%) cost. The total cost of cultivation works out to Rs. 3,64,985 per hectare. The results presented on Cost of cultivation of Snake gourd revealed that nearly half of the cost was spent on Fertilizers cost (41.38%) followed by planting and trailing cost (21.87%) and harvesting cost (18.98%). The total cost of cultivation works out to Rs. 3.31. 985. The reason for fertilizer cost accounting to nearly 42 per cent in Snake gourd and Bitter gourd is due to the adoption of more organic manure application like Farm yard manure, Ground nut cake, Poultry manure, Bone meal , neem cake and water soluble fertilizers. The second rank occupied for planting and trailing cost is

Table 5: Comparative cost of cultivation bittergourd and snake gourd under drip fertigation method

Operation	Cost of cultivation (Rs)			
	Bitter Gourd	Per cent	Snake Gourd	Per cent
Land preparation	22125	6.06	22125	6.66
Planting and Trailing cost	85625	23.46	72625	21.87
Fertilizer application cost	152360	41.74	137360	41.38
Weeding cost	8750	2.40	8750	2.64
Irrigation cost	13125	3.60	13125	3.95
Plant protection cost	20000	5.48	15000	4.52
Harvesting cost	63000	17.26	63000	18.98
Total cost	364985	100.00	331985	100.00

Table 6: Comparative cost of returns inbittergourd and snake gourd under drip fertigation method

Parameter	Method of cultivation			
	Bitter gourd in traditional method	Bitter gourd in drip fertigation method	Snake gourd in traditional method	Snake gourd in drip fertigation method
Yield (t/ha)	19.31	30.64	26.32	41.64
Establishment of MI system /season	-	5000	-	5000
Maintenance of micro irrigation system	-	7500	-	7500
Cost of cultivation (Rs/ha)	300000	364985	280000	331985
Total cost of cultivation	300000	377485	280000	344485
Gross income (Rs/ha)	347580	551520	315840	499680
Net income (Rs/ha)	47580	174035	35840	155195
B:C ratio	1.16	1.46	1.12	1.45

due to the high cost of Hybrid seed which costs around Rs 6500 per kg. Further the Trailing cost which requires Bamboo poles, String and rope also makes the farmer to invest in such cost as it is absolutely necessary for the growth of crop.

A comparison of net income from Bitter gourd and snake gourd crop under traditional and drip fertigation irrigation system is depicted in Table 6. A perusal of table shows that adoption of drip fertigation method gives higher yield to the tune of 58.67 per cent increase in yield compared to traditional method of cultivation. It is seen in bitter gourd crop that a B: C ratio of 1.46 was obtained using drip fertigation method compared to 1.16 in the case of traditional method of cultivation. Likewise in snake gourd a B:C ratio of 1.45 was obtained using drip fertigation method compared to 1.12 in the case of traditional method of cultivation. Suresh (2013) revealed that advantage of adoption of microirrigation resulted in water saving, increased yield,uniformity of produce, early maturity, longer shelf life, labour saving, fertigation efficiency, energy saving, reduction in weed growth, maintenance of soil health and possibility of irrigating in night time in the load shedding areas.

SUMMARY AND CONCLUSION

Mechanisation in Paddy is the only alternative for sustaining rice production in Palakkad. Allied enterprises like Apiary increases the levels of income among farmers.Precision farming demonstrations revealed saving of labour cost as the major success in adoption of technology. Vegetable demonstration using cool season vegetable like Cabbage and Cauliflower revealed the suitability and higher yield for cool season vegetables in Palakkad region. The study has concluded that formation of commodity specific FIGs has been highly beneficial to farmers. Learning has become more effective when group action is initiated. Therefore there is a need to bring a comprehensive policy/framework in formation and functioning of the commodity groups in the near future.

ACKNOWLEDGEMENT

The author is thankful to the State Planning board, Government of Kerala for financial assistance to carry out this study.

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Received on May, 2015, Revised on August, 2015

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Printed and Published by Dr. J.P. Sharma, President, Society for Community Mobilization for Sustainable Development, Division of Agricultural Extension, IARI, New Delhi-110012